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Social production of ecosystem services through the articulation of values in landscape design practice in South Africa

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Ethics statement

The author, whose name appears on the title page of this dissertation, has obtained, for the research described in this work, the applicable research ethics approval.

The author declares that she has observed the ethical standards required in terms of the University of Pretoria's Code of Ethics for Researchers and the Policy Guidelines for Responsible Research.

Declaration

The author testifies that this thesis submitted for the degree Doctor of Philosophy in Landscape Architecture, has not previously been submitted to this or any other tertiary institution for such a doctoral degree.

The author further declares that this thesis is substantially her own work. Where reference is made to the works of others, the extent to which that work has been used is indicated and fully acknowledged in the text and lists of references.

The following conference presentations and proceedings were part of the thesis process, prior to submission of the thesis:

- INCUL2014 5th International Cultural Landscape Conference: The Urban Cultural Landscape: Past, Present and Future, 17-18 November 2014, Tehran, Iran. Paper presented and abstract published in proceedings: *The Potential of Cultural Ecosystem Services for Future Urban Cultural Landscapes in South Africa.*
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- 7th National conference of the South African Journal of Art History, School of Language, Media and Culture, 7-8 June 2013, Nelson Mandela Metropolitan University, Port Elizabeth, South Africa. Papers presented: *Increasing food security and social capital through urban ecology,* and *cultural landscapes as a model for natural and human systems integration.*

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“Although ideas of nature may be the projected ideas of men and women, the world onto which we project those ideas is by no means entirely of our own making: there is more to the world than just words.” –William Cronon, 1996b, p. 458

“A genuinely humanizing urban experience, long dreamed of and frequently sought, is worth struggling for.” –David Harvey, 1989, p. 255

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CURRICLUM VITAE

Christina A. Breed

Ida is a professional landscape architect actively involved in several fields of landscape architecture in South Africa. She is well travelled, having visited over 30 countries worldwide, her specific focus on the developing world.

She holds a Bachelor's degree in Landscape Architecture (BLArch, UP, 1998—with distinctions in design and design communication), a Master's Degree in Design, Urban Studies, Methodology (MDes, UAM, Mex, 2003—cum laude) and a Post Graduate Certificate in Higher Education (PGCHE, UP 2009—cum laude). Her Master's degree was done as a structured two year programme with the focus on qualitative research methods. Her thesis fieldwork was conducted in Mamelodi, Pretoria where she considered how qualitative methods can aid designers in participative approaches towards contextually appropriate design.

Since joining the University of Pretoria in 2008, she has supervised Masters Candidates in Architecture and Landscape Architecture, presented her research at national and international conferences and published peer reviewed articles and book chapters.

Her doctoral thesis considers value systems inside the landscape design profession in South Africa and how to operationalise them. The research unites concepts of ecosystem services with human values and contributes to the limited body of work that focuses on landscape designers as actors in social-ecological systems. In the research she reviews an extensive range of interdisciplinary publications; she makes use of a qualitative research approach and instruments; she identifies professional biases on ecosystem services, nature and landscape values in landscape design; based on the fieldwork and theory she proposes four social practices and recommends five strategies towards value operationalisation.

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ABSTRACT

Title: Social production of ecosystem services through the articulation of values in landscape design practice in South Africa

Submitted by: Christina A. Breed

Study Leader: Professor Roger C. Fisher

Degree of: Doctor of Philosophy in Landscape Architecture

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Department: Department of Architecture

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The implications of projected urbanisation for human well-being and ecosystem integrity for social-ecological resilience emphasise the latent potential of facilitated landscapes and the values and knowledge of landscape design practitioners. This study therefore considers how to operationalise values in landscape design practice so as to achieve a balanced social production of ecosystem services. It uses the dual methods of constructivist content analysis of design projects featured in three prominent profession-focused magazines and interpretivist analysis of semi-structured interviews with experts in the landscape design industry. The combined findings indicate that, contrary to what scientific literature and theory propounds, landscape design practitioners perceive Cultural and Regulating Services as more important than Provisioning or Supporting Services. This reflects concern for social and community matters, sustainability, and the showcasing of design and aesthetics. For designers, two pertinent concerns are contextual influences on design and design as part of professional identity. These preferences result in the neglect of Intrinsic and Fundamental Nature Values and Intangible Landscape Values. In response, this study identifies social practices that show potential for the operationalisation of values in the profession: education, legislation, rating systems and award systems. From these, award systems are selected because they provide both intrinsic and extrinsic incentives and show best potential for the South African context. The analysis of existing award systems revealed trends and discourses in the industry, and shortcomings in the awards criteria. The study recommends that the awards criteria specifically articulate all Functional Values of biodiversity, all categories of ecosystem services, all Nature Values, and reflect both tangible and intangible Landscape Values. Operationalisation as part of the awards can be achieved in five ways: through social rituals, alignment with existing values, concepts of multifunctionality and Cultural Services; and examples of best practice. This study promotes inclusionary processes that respect different kinds of knowledge and values in the South African landscape, which can contribute to the needs of the majority of the population. The study calls for the reorientation of values inside the built environment so that the long-term societal benefits and losses of various land use scenarios are effectively considered in design decisions.

Key words: biodiversity, ecosystem services, green infrastructure, landscape design, social-ecological systems, social practices, social production, values

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ACRONYMS

ANT	Actor-Network Theory
CBD	Convention on Biological Diversity
CPD	Continued Professional Development
DAFF	Department of Agriculture, Forestry and Fisheries
EBA	Ecosystem-Based Adaptation
ESS	ecosystem services
FIFA	Fédération Internationale de Football Association
PPGIS	Public Participation Graphic Information System
GIW	Green Infrastructure Wiki
ICOMOS	International Council on Monuments and Sites
IKS	Indigenous Knowledge Systems
ILASA	Institute for Landscape Architecture in South Africa
LEED	Leadership in Energy and Environmental Design
MEA	Millennium Ecosystem Assessment
NGO	non-governmental organisation
NQF	National Qualifications Framework
PES	payments for ecosystem services
PPGIS	Public Participation Geographic Information Systems
RDP	Reconstruction and Development Programme
SACLAP	South African Council for the Landscape Architectural Profession
SALI	South African Landscape Institute
SITES	Sustainable Sites Initiative
TEEB	The Economics of Ecosystems and Biodiversity
UK	United Kingdom
UN	United Nations
UNFPA	United Nations Population Fund
US	United States
VBN	Values-Belief-Norm theory
WCED	World Commission on Environment and Development

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Chapter 1



carbon sink

ESS image by Jan Sasse (TEEB 2011)

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CHAPTER 1: The Problem and Its Setting

1.1 Background and rationale of the problem

Africa faces perhaps the largest proportion of urban development challenges in the world. The continent has the highest urbanisation rate, and sub-Saharan Africa is home to the largest portion of slum dwellers (UN-Habitat 2010; United Nations Population Fund 2007). In South Africa, 61% of the population resides in urban centres, with 29% living in informal settlements; poverty is on the rise and high levels of inequality remain (UN-Habitat 2010). These statistics raise daunting questions about how urban development may bring about an improved environment for the broader population and how these improvements can be measured (Martin & Mathema 2010:3).

The largest threats to biodiversity in the world today are habitat loss and degradation as a result of human activity (Lindenmayer & Fischer 2006). Urbanisation has become a significant part of this global land transformation (Pickett *et al.* 2011) contributing to biodivesity loss and ecosystem degradation (Millennium Ecosystem Assessment [MEA] 2005). Africa is among the most biodiverse regions in the world, with close to 40% of the world's biodiversity (Myers, Mittermeier, Mittermeier, Fonseca & Kent 2000). Although it comprises only two per cent of the earth's surface, South Africa contains ten per cent of global plant species and seven per cent of all vertebrates (Le Maitre, O'Farrell & Reyers 2007). South Africa also houses three of the world's 34 global biodiversity hotspots (Myers *et al.* 2000). As the 21st century unfolds, vast and urgent urban infrastructure challenges, alongside private and public decision-making based on short-term economic gains (Le Maitre *et al.* 2007), seemingly outweigh the importance of biodiversity protection in South Africa (S. S. Cilliers 2010:94).

In the 1970s and 1980s, an attempt to create global awareness and greater prominence for the term 'biodiversity' gradually unfolded. This rise in interest culminated in the completion of the Millennium Ecosystem Assessment (MEA) in 2005. The assessment applied a transdisciplinary knowledge approach and made use of over a thousand experts worldwide to synthesise scientific datasets and models. The assessment aimed to determine the status quo of ecosystem change and its consequences for human well-being. The MEA (2005) raised the concern that ecosystem services are declining in many regions around the world, and globally, an alarming approximate 60% of ecosystems are in a degraded state (Myers *et al.* 2000). This finding provides a scientific foundation for actions needed to improve the conservation and sustainable use of ecosystems since the human species is fundamentally dependent on these (MEA 2005). The MEA popularised the concept of

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"ecosystem services" to explain the value of biodiversity and benefits that nature provides for human well-being in non-specialist terms (for example, fresh air, climate control and psychological health). This concept provides a helpful framework for understanding and acting on the links connecting people and the environment (MEA 2005:19). The concept of ecosystem services is increasingly incorporated into local government policy—as services that need to be considered, protected and promoted—through documents such as The Economics of Ecosystems and Biodiversity (TEEB): Manual for Cities (TEEB 2011). The objective is to base decision-making on the recognition that ecosystem services have equally significant biophysical and socio-economic merit (Yapp, Walker & Thackway 2010).

Due to the exponential urbanisation of humankind, as predicted by UN-Habitat (2010), cities have been earmarked as areas of high potential for biodiversity conservation and promotion (Farinha-Marques, Lameiras, Fernandes, Silva & Guilherme 2011). In cities, ecosystem services are subject to moderation through the social practices of development and management. The 2010 Convention on Biological Diversity (CBD) promotes three main ways to stop biodiversity loss—all focused on urban centres: (1) sustainable use of ecosystem goods and services within cities; (2) the conservation of biodiversity within towns and cities; and (3) the sustainable design of all urban areas to maximise their ability to support biodiversity (Müller & Werner 2010:6). There has been a worldwide attempt to focus scientific interest with subsequent implications for the design and aesthetics of cities. These initiatives have also opened up new possibilities for affinities between nature, culture and science (Gandy 2013a).

The scientific pursuit for greater urban biodiversity support led to several new branches of research emerging worldwide. These research fields have a common focus on cities as complex social-ecological systems, seeking practical applications for planning and design (S. S. Cilliers 2010) by emphasising resilience through learning and adaptation (Le Maitre *et al*. 2007). Resilience refers to the ability of a complex system to absorb disturbance and reorganise (Folke, Carpenter, Walker, Scheffer, Chapin & Rockström 2010) that is in essence a response to change (MEA 2005). Examples of related research fields in South Africa include: urban ecology (Cilliers, Cilliers, Lubbe & Siebert 2012; Cilliers, Müller & Drewes 2004; Holmes, Rebelo, Dorse & Wood 2012); sustainability science (Le Maitre *et al*. 2007); infrastructure transition for increased urban resilience (Schäffler & Swilling 2013); and ecosystem services research (Cilliers & Siebert 2012; De Wit, van Zyl, Crookes, Blignaut, Jayiya, Goiset & Mahumani 2012; O'Farrell, Anderson, Le Maitre & Holmes 2012). In complex social-ecological systems, human benefits from biophysical processes are understood as mainly driven by

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human action and choice in terms of land use (MEA 2005). Although much research has been undertaken in the last decade worldwide to improve urban biodiversity support, basic foundational knowledge, greater understanding and examples of practical applications are still lacking, along with a need for raised public awareness (Müller & Werner 2010:24).

To direct pro-environmental management practices, researchers formulate system models to illustrate and better understand the connection between humans and environmental processes (Zipperer 2011). Human decisions are steered by both knowledge and socio-cultural norms and values (MEA 2005) that influence the production of ecosystem services (Ernstson 2013). Research has progressively focused on the compelling role that human values play in the social production process alongside knowledge accumulation and distribution (Ernstson & Sörlin 2009, 2012; Ernstson, Sörlin & Elmqvist 2008). An increasing body of research emphasises that all aspects of ecological management are tightly connected to human values of some kind (Ives & Kendal 2014). Research also highlights the different degrees of power, ability and skill held by various actors, in terms of influencing decision-making (Ernstson 2012).

A variety of actors have potential as drivers of change in ecosystems and their services with regard to their decision-making power in terms of land use (MEA 2005). Green spaces directly affect the provision of "green infrastructure" (Douglas 2011:xxi; Farinha-Marques *et al.* 2011), making the decisions of built environment professionals and landscape designers significant. The role of green infrastructure in producing local ecosystem services that include biodiversity is a major focus for resilience thinking (Gómez-Baggethun & Barton 2013). Yet, in South Africa green spaces are not acknowledged for the critical social and ecological functions they provide (Schäffler & Swilling 2013). Currently, a number of actors from different disciplines, including landscape design practitioners, are considering how to negotiate trade-offs between human preference and pro-environmental design practices. These considerations also include meaningful reflection on the reciprocal influence between science and social discourses, as well as identifying repercussions for urban ecology, landscape design and environmental politics (Gandy 2013a). Somehow neglected are studies that consider professionals—and specifically landscape design practitioners—as role players, whose decisions, values and preferences contribute to the quality of green space in urban development.

Against this background, this research aims to consider the role of landscape design practitioners in contributing to a more biodiverse and sustainable urban future, as designers of urban green spaces with potential for green infrastructure and ecosystem services. Since all disciplines have their biases,

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it is necessary to challenge existing assumptions and world views that generate collective behaviours, both social and ecological, in urbanising environments (Alberti 2008:252,263) regarding the acceptable roles and purposes of urban nature (Gandy 2013a). The objective of this study is to investigate the contemporary role of landscape designers in the social production of ecosystem services in South Africa. It focuses on values, social practices and value articulation inside the landscape design profession as potential drivers for future change to facilitate and support urban biodiversity.

1.2 Problem statement

This research centres on how values in landscape design practice can be operationalised in order to achieve a balanced social production of ecosystem services.

The thesis statement hypothesises that, through the process of value articulation, a contextually appropriate social practice among professionals in landscape design can effectively operationalise values to socially produce essential ecosystem services.

1.2.1 Research questions

The primary research question is addressed by means of four sub-questions (see Figure 1):

i) What have been the concerns addressed by landscape design practice in South Africa in the last decade?

ii) What do these concerns disclose about contemporary values related to urban ecosystem services—for example, which ecosystem services are valued and which are neglected by landscape design practice in South Africa?

iii) Which contemporary professional social practices are articulating the value of certain ecosystem services in the landscape design community of practice?

iv) How can professional social practices operationalise values to socially produce essential ecosystem services?

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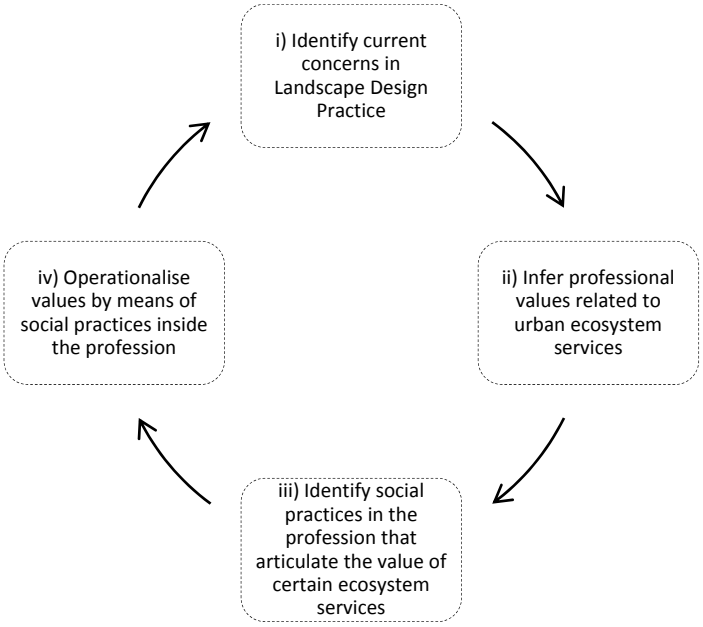


Figure 1: Flow diagram indicating the cyclical connection between, and social processes related to, the research questions

Source: author (20014)

1.2.2 Significance and rationale of the study

In contemporary South Africa there is a failure to regard green assets as equally important to grey infrastructure based on a combination of socio-economic realities and socio-cultural values (Schäffler & Swilling 2013:1). 'High quality' green infrastructure (Douglas 2011:xxi) has been strongly associated with engineered systems that mimic grey infrastructure utility services as part of corporate efforts to demonstrate sustainability. This approach has a causal power associated with elite endorsement (see Wilson 1994) that has placed a largely technologically driven focus on the sustainability of cities; thus, initiatives are mostly technically challenging, resource-intensive and marketing-focused. In practice green infrastructure has been poorly linked with multifunctionality and biodiversity conservation compared to examples elsewhere (see Douglas & Sadler 2011; Francis & Lorimer 2011; Hostetler, Allen & Meurk 2011). Instead, in South Africa, the pursuit for sustainability has led to the adoption of green rating systems (for example, Green Building, Green Star, Leadership in Energy & Environmental Design [LEED]) that are largely focused on efficient energy consumption management and are often tied to economic incentives. Such rating systems incentivise through minimising cost, which influences short-term financial decision-making, but have thus far unsurprisingly failed to affect social norms and values in the long run (see Pretty 2003). The Sustainable Sites Initiative (SITES 2014) is a rating system recently adjusted in the United States (US) for the landscape design industry to incorporate an ecosystem services approach. Thus far in South Africa the ecosystem services approach has not been adopted in practice, resulting in landscape

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designers taking a back seat in green infrastructure initiatives. The current approach to green infrastructure does not confront performance in private and public decision-making based on short-term socio-economic gain (Le Maitre *et al.* 2007:368). Furthermore, it does not promote the inclusion of biodiversity, comprising all ecosystem services, in green infrastructure planning. Scientific pursuit and artistic endeavour currently remain largely within the prevalent paradigm (Fisher 1993:33), hindering required change in spite of available solutions. This study argues that despite advances in scientific knowledge, other social values (including those of professionals) strongly dominate decision-making responses. Research thus increasingly considers how to reiterate scientific knowledge to effectively challenge prevailing local values in decision-making processes.

South African subject research applies three main approaches to increase the importance given to green infrastructure and associated ecosystem services, including biodiversity, in cities. The first approach ascribes the absence of consideration to a lack of awareness of available ecosystem services (Schäffler & Swilling 2013). Several local studies have attempted to raise awareness of the services provided by urban green infrastructure (see Cilliers & Bredenkamp 1998, 1999a, 1999b, 2000; Lubbe 2011; Lubbe, Siebert & Cilliers 2011a, 2011b; McConnachie & Shackleton 2010; Rebelo, Holmes, Dorse & Wood 2011; Roberts, Boon, Croucamp & Mander 2005; Roberts, Boon, Diederichs, Douwes, Govender, McInnes, McLean, O'Donoghue & Spires 2012). Nevertheless, such studies remain isolated examples and have not necessarily become part of public or professional awareness in the form of results being taken into account in decision-making.

A second approach used to promote green infrastructure involves the economic valuation of ecosystem services, which in turn provides a rationale for investing in green infrastructure (E. J. Cilliers 2010; Mertz, Ravnborg, Lovei, Nielsen & Konijnendijk 2007). Recently, there have been a number of valuation studies in South Africa (E. J. Cilliers 2010; De Wit *et al.* 2012; Roberts *et al.* 2005; Stoffberg 2006; Stoffberg, Van Rooyen, Van der Linde & Groeneveld 2010). Still, in order to make an impact, these studies need to tie in directly with municipal decision-making (Schäffler & Swilling 2013), which poses bureaucratic challenges. Such studies are valuable because they explicitly demonstrate the functions of nature to decision-makers; however, they only succeed partially due to the limitations of money to measure and represent the non-material advantages, as well as the intrinsic and non-exploitative value of nature (Chiesura & Martinez-Alier 2011:94). This study concurs with the opinion of McMichael and Scholes (2005:55) that the act of quantifying the value of such services alone is not enough to serve as an incentive to make accountable choices that affect their use or misuse.

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A third approach—and the approach taken by this study—attempts to understand the socio-cultural values of stakeholders associated with environmental practices. This includes recognition of differences in world view and encouragement of dialogue between stakeholders (Le Maitre *et al.* 2007). The rights and values accorded by humans to nature are complex and often contradictory (Byrne 2011). Green infrastructure enhancement requires action from local authorities, property owners and/or lessees (Francis & Lorimer 2011:1436), but opinion leaders in government and the community can also serve as agents of change (MEA 2005), and so can small groups or individuals (Folke 2006). Therefore, ecosystem services can be seen as the result of a social production process (Ernstson & Sörlin 2012), and stakeholder values steer decision-making with regard to these services when affecting the outcome of land use practices (Ernstson 2012). Research in South Africa that incorporates values and stakeholder opinions in terms of practices affecting the environment includes studies on the consideration of the socio-economic realities of residents (Cilliers *et al.* 2012), landowner and stakeholder opinions (Urgenson, Prozesky & Esler 2013), civic involvement in municipal maintenance practices (Avlonitis 2011) and public opinion in land use decisions (Graham & Ernstson 2012). Most of these studies have focused on the general public as user or those in management positions, with emphasis on values and decisions concerning planning and management rather than on questions of built environment design.

Thus, built environment design professionals represent a hitherto insufficiently explored stakeholder group, whose knowledge and values can affect green infrastructure enhancement in cities. This study argues that landscape design practitioners should be considered stakeholders capable of effectively articulating concerns related to land use practices. In order for this to happen, values within the profession need to be operationalised through professional practices, to enable a balanced social production of ecosystem services. The study thus seeks a way to harness what is known into action (Steiner 2014:6) by influencing the “social ecology of knowledge” (Terre Blanche & Durrheim 1999:14) in local landscape design practice. The study posits that the proposed operationalisation might be constructive to both the profession and the South African public at large.

Since the number of practicing landscape architects in South Africa is relatively small, this study uses the terms “landscape design practice” and “landscape design practitioners”. These terms comprise groups and parties dedicated to the design and implementation of green space to increase the inclusion and quality of green infrastructure and ecosystem services in urban development.

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Importantly, since the study considers professionals in practice, the focus is on the values of adults. Research has shown that values and norms continue to evolve through adult experience (Aaron, Mann & Taylor 1994:11).

1.2.3 Research objectives and anticipated outcomes

Based on the research questions and thesis statement, this study has two main research objectives:

To establish best practice in the functional production of ecosystem services in urban environments as set out by current scientific literature;

To make a practical proposal for operationalization of values inside the landscape design profession to achieve this best practice;

This study anticipates the following outcomes:

1) A summary of current concerns and values articulated in landscape design practice;
2) A delineation of valued and neglected ecosystem services and potential tendencies over time (based on findings in item one);
3) A deduction of social practices that articulate values of ecosystem services in landscape design practice in South Africa;
4) An inference on how, via social practices, specific values are articulated that lead to ecosystem services production in landscape design practice;
5) A proposal of how these social practices can articulate the value of desired ecosystem services and lead to their production in landscape design practice;
6) An expansion of existing theory regarding the social production of ecosystem services to include the perspective of professionals, specifically landscape design practitioners;
7) A projection of some identified interrelated and dependent components of discourses on urban ecology in South Africa.

1.2.4 Structure of the enquiry

The study follows the basic structure suggested by Goulder and Kennedy (1997) that makes use of a philosophical and empirical framework. The first part of the study hence consists of a theoretical enquiry that aims to articulate the sources of value around urban nature. Since value in landscape design may refer to human desirability, scientific importance or monetary worth, these value dimensions are explored and clarified from the vast amount of literature related to social-ecological systems and resilience.

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The theoretical survey has two main focus areas. Firstly, it reviews current scientific findings with regard to the Fundamental Value of biodiversity in urban areas. This enquiry commences with the core concept of biodiversity, its Functional Value for life on earth and its dependence on land, ecosystems, their functions, processes and services. A second ethical and philosophical enquiry surveys the possible subjective human values assigned to biodiversity as part of nature and urban reconstructed nature. This enquiry is then expanded to consider value creation and value change with implications for operationalisation in landscape design.

The second part of the study is empirical. It proposes and utilises instruments to measure current values in landscape design practice and relates these to professional social practices and discourses used in the industry at the time of the study. The study then compares these to both the scientific and ethical values identified in the first part, namely, the theoretical survey. The enquiry also considers the identified professional social practices with potential in terms of operationalisation.

The last part of the study consists of a proposal that selects a specific professional social practice, which holds potential with regard to operationalisation according to both the empirical findings and literature review. The social practice is analysed and, based on the former findings, suggestions are made in terms of values to be articulated and the operationalisation process. The study ends with a summary of conclusions and recommendations for future research.

1.3 Definitions

The following key terms are used throughout the thesis. They have a specific meaning in the thesis that sometimes differs from standard usage in the literature:

Biodiversity: diversity of "...genes, individuals, demes, populations, meta-populations, species, communities, ecosystems, and the interaction between these entities" (Lindenmayer & Fischer 2006:5);

Communal social practice: a customary way of operation or behaviour as a collective activity;

Design: refers to the shape, configuration or appearance of an object, building or landscape in the simplest sense, but it also refers to a process in the professional or academic sense (Swaffield 2013:1194);

Economic valuation: monetary worth;

Ecosystem services: the goods and services derived from natural processes (ecosystems) that are linked and interdependent, and benefit human well-being; "This includes provisioning services such

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as food and water; Regulating Services such as flood and disease control; cultural services such as spiritual, recreational and cultural benefits; and supporting services such as nutrient cycling that maintains the condition for life on Earth" (MEA 2005:375);

Functional value: exists despite human attitudes or awareness, it is not preference related like other values (Lockwood 1999);

Green Infrastructure: "the entire working landscape, ranging from any remaining natural areas inside a city, parks, remnant vegetation, residential and street vegetation, plus innovative engineered systems, such as green roofs and walls" (GIW 2013);

Landscape: interaction between people and place;

Landscape architect: a person that studied landscape architecture, sometimes referred to specifically in interviews; the term *landscape designers* or *landscape design practitioners* is inclusive of *landscape architects* while the specific term excludes the former more general terms, based on formal qualifications only;

Landscape architecture: a recognised international profession and degree course that includes the study of landscape design;

Landscape design: refers to the shaping of the configuration or appearance of a landscape in the simplest sense, but in the professional or academic sense it also refers to a process that is largely a graphic illustration of this shaping and the documented rationale behind it (adapted from Swaffield 2013);

Landscape designers: see *landscape design practitioners;*

Landscape design practice: activities and processes related to the execution and implementation of landscape (open space) design projects;

Landscape design practitioners: people involved in landscape design practice including landscape architects;

Nature: defined by Picket *et al*. (2011:255) as "organisms, structures, and functions that reflect their own evolutionary history, inborn behaviours, and the working out of unmanaged interactions";

Operationalise: put into operation or use;

Professional social practices: established customary activities of and among professionals in the same practice, that relate to skills, knowledge and understanding;

Resilience: a property of a system and a non-normative goal of retaining system functions in spite of change by means of absorbing shocks or disturbances, having the capacity to self-organise and inventing creative solutions in response to change (Gunderson & Holling 2002 in MEA 2005:210); this study uses the definition by Folke, Colding and Berkes (2003 in MEA 2005:210): "[r]esilience in social-ecological systems depends on the capacity of ecosystems as well as social capacity to

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respond to ecosystem change in a way that sustains and enhances the capacity of ecosystems to generate essential ecosystem services";

Rural: "sparsely settled areas comprised by individual homesteads" (MacGregor-Fors 2011:348);

Social practice: a customary way of operation, actions or behaviour of the individual; it is used to link common cultural actions to context. The focus is on the skills, knowledge and understanding of people;

Social construction: is based on values, and the social production of meanings which affects spatial practices and perceptions;

Social production: phenomena brought about through social practices—value creation occurs through social practices of value articulation that influence social perceptions or meanings (Ernstson 2008);

Social production of ecosystem services: social factors that generate, distribute and make ecosystem services possible (Ernstson 2013); human decision making—based on perception, articulation, and political struggle—limits ecological processes in urban landscapes but also facilitates them through management activities (Ernstson 2008:171,173);

Socio-cultural values: see *values;*

Sustainability: a normative goal of management of resources for current and future situations; see *sustainable use;*

Sustainable use (of an ecosystem): "…human use of an ecosystem so that it may yield a continuous benefit to present generations while maintaining its potential to meet the needs and aspirations of future generations" (MEA 2005:378);

Transdisciplinarity: "In contrast with interdisciplinarity, transdisciplinarity involves stakeholders and decision-makers with scientists and professionals, throughout a project, with all parties contributing to, and benefiting from, a mutual knowledge and experience base" (Naveh 2001 in Ahern 2012:n.p.);

Urban ecology: an interdisciplinary field that aims to understand how humans and ecological processes can coexist in human-dominated systems and help societies to become more sustainable (Cilliers & Siebert 2012; Marzluff, Shulenberger, Endlicher, Alberti, Bradley, Ryan, Simon & ZumBrunnen 2008); "[u]rban ecology integrates both basic (i.e., fundamental) and applied (i.e., problem oriented) natural and social science research to explore and elucidate the multiple dimensions of urban ecosystems" (McDonald & Marcotullio 2011:9);

Urban ecosystems: "cover not only city centres, but also suburban areas, sparsely settled villages that are connected through commuting or other utilities to the denser and more built-up areas. This does not include areas affected by energy and material transformation generated in urban areas" (Pickett *et al.* 2011:333);

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Urbanisation: the action by which people dwelling in rural areas actively migrate to cities, as distinguished from *urban growth;*

Urban growth: the increase in population and size of cities due to human activities of reproduction;

Value: may refer to human desirability, monetary worth or scientifically validated functional importance;

Value articulation: a social practice of expression, translation or emphasis of value(s) by means of artefacts, actors and/or arenas (Latour 2005);

Values: "norms and precepts that guide human judgement and action" (MEA 2005:379).

1.4 Delineations

1.4.1 Delimitations

This research investigates landscape design practice in South Africa. Due to projected changes to the National Qualifications Framework (NQF), this thesis includes not only landscape architects but also members of other green industry professions that will soon be incorporated in the South African Council for the Landscape Architectural Profession (SACLAP). *Landscape design practice* thus includes all persons involved with landscape design work (refer to 1.3 Definitions).

This research is restricted to the social production of ecosystem services. It investigates professional social practices as social processes of value construction. It does not aim to investigate or empirically measure ecosystem services production through specific ecological indicators in landscape design projects.

This study does not consider questions of distribution of ecosystem services or issues relating to politics of ecology and environmental justice in any great depth, as these are studies in their own right. Although these ethical questions are acknowledged in the literature review, the study only addresses ethics as far as professional practice is concerned.

This study primarily focuses on urban settings and ecosystems, rather than rural areas. Urban ecosystems do, however, include towns, villages and sparsely populated areas. Although there are points in common between urban and rural ecosystem services, studies show that the use and value of ecosystem services differ in urban and rural settings in Africa (Egoh, O'Farrell, Charef, Gurney, Koellner, Abi, Egoh & Willemen 2012; Molebatsi *et al*. 2010).

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1.4.2 Assumptions

The study assumes that the profession-focused magazines used in the content analysis are culturally representative of the South African urban landscape design practice context. This assumption is based on the fact that major urban areas are represented in the articles with all of the provinces and seven of the nine biomes. Although the editors may hold specific biases and perspectives, the success of the magazines is arguably dependent on the social support received; therefore the content is presumed to reflect values and opinions generally held in the industry.

This study assumes that interviewees interviewed for this study were open and willing to share their opinions without specifically aiming to alter the research findings. The views of selected experts in the field are assumed to be illustrative of general dominant opinions held within the industry.

1.4.3 Limitations

The research only addresses those involved in landscape design practice. This research does not aim to be representative of the view of the general South African public on landscape design or values towards nature. In terms of practice, it excludes labourers, municipal workers and other implementers who are not directly involved in landscape design decisions.

The research considers social production of ecosystem services and is not representative of the actual ecosystem services and benefits currently present and produced through on site landscape design projects.

This study mainly focuses on urban centres in South Africa; findings are not necessarily representative of rural areas. Rural areas were used as a way to distinguish from urban areas in the fieldwork, which did reveal some value projections, implications and consequently suggestion for rural areas in the findings. These suggestions are only in as far it concerns urban areas and aspects of urbanisation.

The study does not consider every urban centre in South Africa. The general representativeness of the content analysis and experience of the experts interviewed make findings more applicable to the major urban centres, namely: Cape Town, Durban, Johannesburg and Pretoria.

South Africa has a history of political oppression and racial segregation that ended in 1994. The apartheid legacy may be argued to still influence perspectives and values. This is also true for the

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interviewees, who were all approximately 40 years of age or more at the time of the study. For reasons of clarity, it is important to state that experts interviewed are not representative of the racial and gender composition of South Africa. Experts were qualitatively identified based on duration in the industry and geographic representativeness. The experts are, however, representative of the racial and gender composition of the profession according to the records held by three institutions for landscape designers in South Africa at the time of the research (refer to 7.4.2 on research instruments, population and sample size).

This research excludes cultural specific or ethnic interpretation of values. Although the importance of Indigenous Knowledge Systems (IKS) is recognised, the role this can or should play in current practice has not been considered in any depth in this study.

The findings of the study aim only to reveal the status quo and will not be able to project how these findings may change in future.

1.5 Chapter overviews

The study and chapter layout is graphically presented in Figure 2. As illustrated there are 11 chapters that can be divided into four main sections: (1) a core review of axiomatic concepts for social-ecological systems and values; (2) a focused review on value operationalisation, functional landscape design criteria and South African subject literature; (3) the findings from the two research instruments; and (4) the methodology of enquiry that cuts through the previously mentioned three sections.

Chapter 1 sets out the main problem and its importance. The research questions and anticipated outcomes are stated along with key definitions, the delimitations of the study, its approach and layout.

Chapter 2 provides an overview of core concepts in the international subject literature with regard to social-ecological systems. The first section focuses on scientific findings from urban ecological studies, while the second section explores the social production process. The chapter provides the scientific rationale for the Functional Value of urban nature for resilience in social-ecological systems as juxtaposed to the philosophical and ethical position of value-related studies for biodiversity conservation that follow in the next chapter.

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Chapter 3 offers a detailed review of the international subject literature, giving specific attention to the concept of philosophical human values with regard to biodiversity conservation. The chapter defines values and reviews axiomatic theories of value concepts of nature, place and landscape. It reviews contemporary studies on values focusing on different approaches and research instruments, quantitative, qualitative and mixed method.

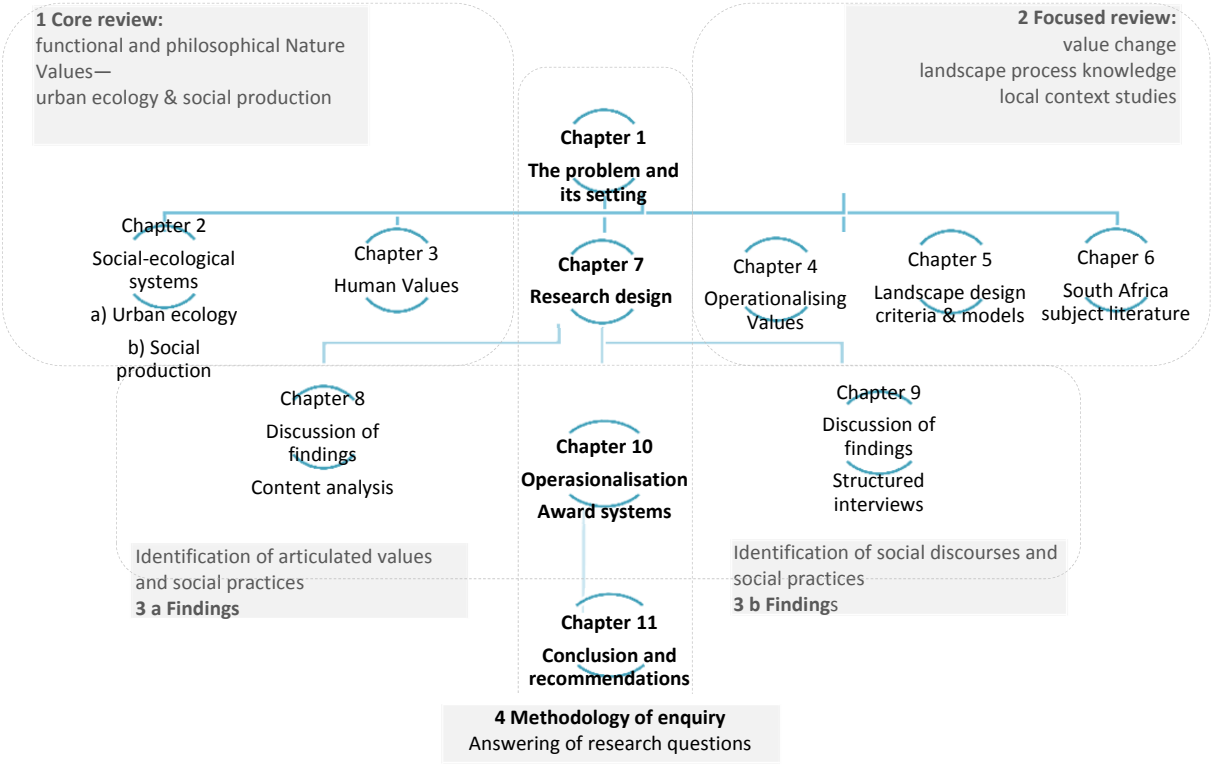


Figure 2: Graphic illustration of the thesis chapter layout

Chapter 4 considers value creation and value change for understanding the opportunities and implications of the operationalisation of values. The chapter considers different forms of value articulation, including economic valuation, governance and ethics. The chapter ends with a section on recent studies that focus on considerations for professional values in landscape design.

Chapter 5 follows on the basis set by earlier chapters to review recent models for social-ecological integration that take into account scientific, ethical and operational considerations. It summarises landscape process knowledge in green infrastructure, ecosystem services and plant selection, as scientifically recognised Functional Values that pertain to landscape design.

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Chapter 6 reviews the recent subject literature in South Africa, covering different research focuses pertaining to the study area. This section aims to demonstrate a lack of focus in the literature on environmental values as related to professional practice and specifically landscape design practice. The end of Chapter 6 provides a summary of the theoretical survey up to this point in the thesis.

Chapter 7 explains the rationale for the research design, study area, sample population and sample size. The chapter describes the research instruments used in the study, as well as the data and analysis thereof. The chapter concludes with a reflection on the strengths and weaknesses of the research design and ethical considerations.

Chapter 8 discusses the first data findings from the content analysis of design projects featured in three prominent profession-focused magazines. It considers the findings on values in the form of themes and ecosystem services. The chapter identifies and considers professional social practices with potential for ecosystem services articulation and value operationalisation. This section concludes with a first approximation towards answering the research questions.

Chapter 9 discusses the second round of data findings, gathered through semi-structured interviews held with experts in the industry. The analysis attempts to establish the nature of values in the industry through identifying social discourses and reflecting on the first data findings of the content analysis in discussions with experts. The chapter also revisits the professional social practices with potential for ecosystem services articulation identified in the previous chapter. It concludes with a second approximation towards answering the research questions.

Chapter 10 selects a social practice within the profession for value operationalisation, namely, award systems. The analysis explores recent trends and opportunities of two existing award systems within two different institutions in the industry. It considers the awards criteria and compares the criteria to the literature with regard to the articulation of values and urban ecosystem services. The chapter proceeds to identify opportunities for value articulation and make recommendations for the operationalisation of values.

Chapter 11 draws conclusions and considers the outcomes of the study. It reflects on implications for theory and practice and makes recommendations for future research.

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Chapter 2



genetic diversity

ESS image by Jan Sasse (TEEB 2011)

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CHAPTER 2: Introduction to Social-Ecological Systems

2.1 Introduction

The theoretical survey conducted as part of this thesis has two main focus areas: a review of current scientific findings with regard to the Fundamental Value of biodiversity for resilience in urban social-ecological systems and a second ethical and philosophical survey of possible human values assigned to urban nature. This chapter forms part of the first focus area. During the last half century, our renewed understanding of the unique conditions and potential of cities as life supporting centres has resulted in the emergence of several terms. Most of these terms build on former understandings and highlight aspects that previously hampered progress in application. This research is situated in an interdisciplinary field of study incorporating theory from the natural and social sciences. Consequently, the literature reviewed in this chapter is divided into two subsections, each leaning towards a particular field, while progressively expounding on how social and ecological factors become inextricably linked in urban environments.

Through a review of the literature, this chapter aims to briefly demonstrate the evolution of urban ecology and social production toward the current concept of social-ecological systems. As illustrated in Figure 3, the functional management of complex adaptive systems leads to the key concern of ecosystem services generation, while a critical social perspective focuses on value creation and discourse as a social production process. This chapter subtly highlights how these processes are recognised as part of a greater discussion. The next chapter (Chapter 3) specifically elaborates on the concepts of values and discourse, and related studies.

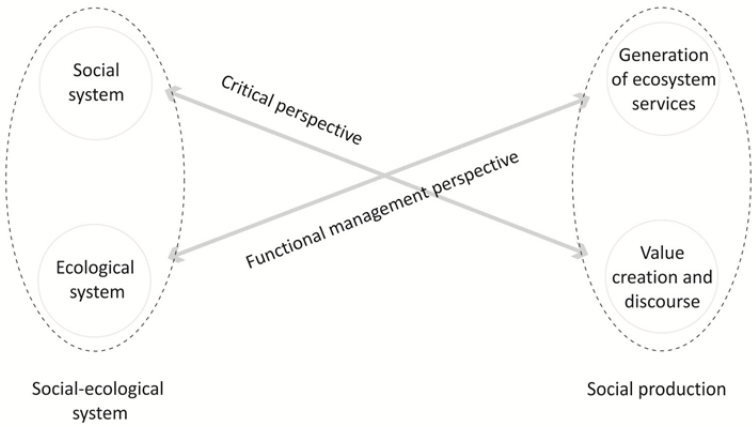


Figure 3: Graphic illustration of the research ambition of the literature review

Source: by author, adapted from Ernstson (2013:15)

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This chapter provides the rationale for the importance of value systems in the landscape design industry in terms of the social production of ecosystem services in urban environments. Key terms and concepts—required as part of the rationale for the study and the selected research design—steered the review. Due to the volume of research in this field, this review focuses on the most recent work and findings, including primary works where necessary and possible. As illustrated in Figure 4, the first part of the review looks at the general urban question from an urban ecological perspective. The second part of the review focuses on more specific questions of social production. The axiomatic concepts are discussed in each relevant section.

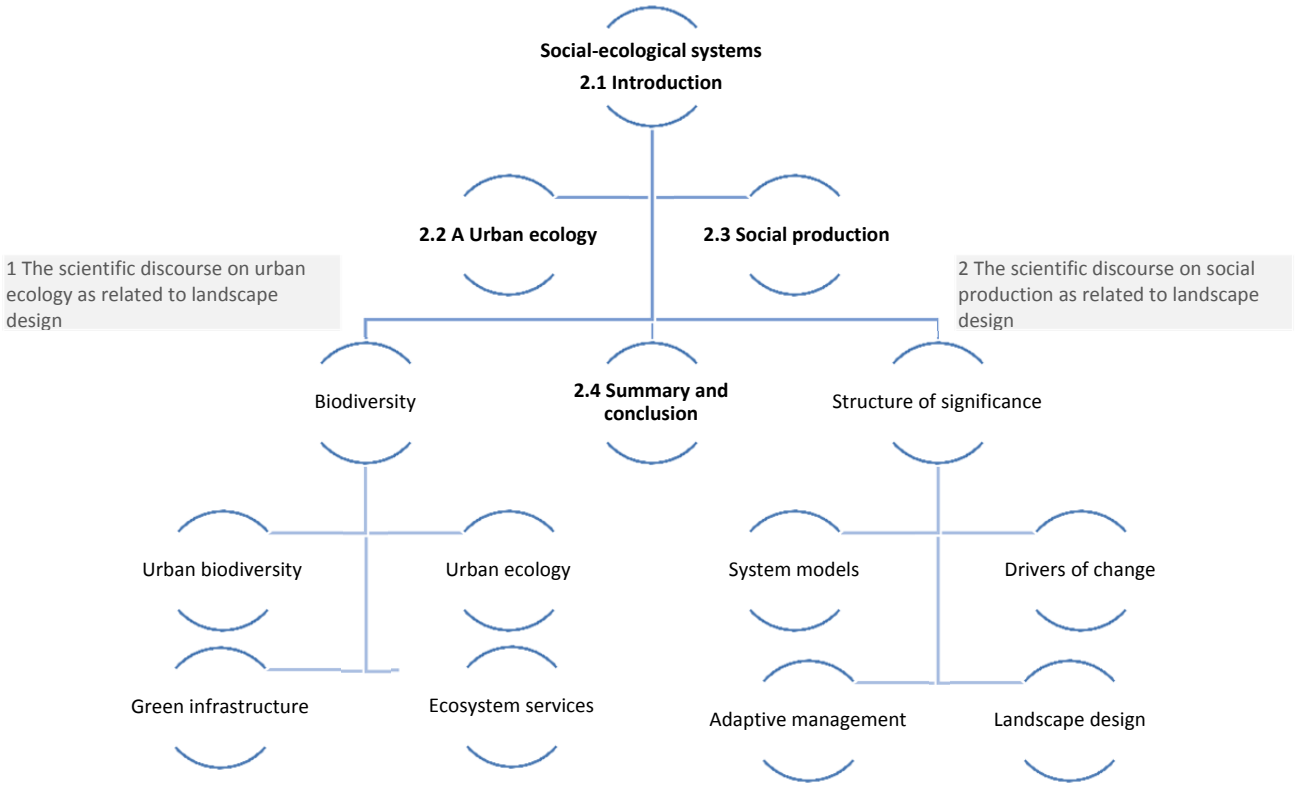


Figure 4: Graphic illustration of the chapter layout

The aim is not to divide the discussion between social and ecological aspects, but rather to trace different processes within a complex system, assigning consequences to particular processes (Bunnell 1999 in Lindenmayer & Fischer 2006:2). Within this discussion the different links between processes may become apparent, some of which are graphically presented.

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2.2 Urban ecology

2.2.1 Introduction

Initial interest in urban ecology focused on spontaneous behaviour of flora in urban and modified habitats. Although studies began as early as the 17th century, the work of Herbert Sukkop in the 1960s laid an important foundation for the new discipline (Gandy 2013b). Under seclusion in the enclave of West Berlin from 1949 to 1990, ecologists at the Technical University of Berlin undertook detailed surveys documenting urban flora. These studies revealed new insights on the changing structure of urban space over time as related to social and ecological phenomena (Gandy 2013b). By the late 1950s and early 1960s, scientists recognised that humans and rising atmospheric C02 emissions altered properties of the atmosphere which led to climate change and alterations to ecosystems (McDonnell 2011:7). This awareness gave rise to a growing interest in urban ecology in light of worldwide concern for the urban condition of the planet.

Consequently, the scope of urban ecological research today comprises studies with varying focuses that investigate both ecological and human dimensions of urban ecosystems. The ecological branch is concentrated in the field of natural sciences, physical urban conditions, existing or created urban habitats, and urban processes affecting biodiversity (Niemelä 2011). These studies generally employ either a bio-ecology approach—focused on distribution and abundance—or an urban landscape approach—focused on multi-scaled patch dynamics (Wu 2014). The more socially oriented branch of study covers a range of subjects from human ecology to social-ecological systems, ecosystem services, human values, mapping and valuation methods, and different social system applications (for example, policy, technology, planning, design, management) (Niemelä 2011). Within the latter category of socially oriented studies, this study aims to understand professional values and their relation to ecosystems and human well-being, in order to seek application in design. However, this pursuit is inseparably related to research in the urban landscape approach. For that reason, this chapter will identify the key aspects connecting professional values to multi-scale patch dynamics. In short, the basis for scientific merit or “value” given to urban nature and biodiversity must influence professional judgement. This chapter identifies core principles of the rationale on social-ecological systems that concerns landscape design practice.

Considered as the very essence, this chapter begins with the importance of biodiversity and its Functional Value in urban centres. It traces the evolution of nature as it merges with the urban to become the focus of urban ecological studies. It introduces the concept of green infrastructure in cities, as well as its principles regarding habitat, scale and social considerations within facilitated

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assemblies. The section ends with a discussion of the conceptual apparatus of ecosystem services, which articulates the value of biodiversity, taking the discussion full circle.

2.2.2 The value of biodiversity

Biodiversity remains a significant, yet complex, concept in the landscape industry, and in design practice in general. In scientific discussions, the term is foundational for urban ecology, sustainability science, and resilience, yet researchers often use the term abstractly. As Bunnell explains, vague entities are often weakly defined and become "catch-all phrases" that mean different things to different people (1999 in Lindenmayer & Fischer 2006:239). Haines-Young and Potschin (2010:122) point out that people typically form mental constructs of biodiversity around cultural concepts (for example, "wilderness" or "danger") and may also include non-living and human made features of the landscape in these definitions. This ambiguity, occurring in both popular understanding and scientific work, is precisely due to the broadness and complexity of concepts like biodiversity, which calls for an identification and separation of individual processes and consequences in research (Bunnell 1999 in Lindenmayer & Fischer 2006:239).

Despite the ambiguity of the term, many of the benefits of biodiversity are tangible. For this reason biodiversity is frequently explained by, and even equated to, what humans can gain from it. Lockwood (1999) explains that Functional Value is not preference related like other values discussed by the social sciences (see Chapter 3) and exists despite human attitudes, awareness or lack thereof. However, "…the knowledge individuals acquire about Functional Values can motivate construction of other value types" (Lockwood 1999:382). Biodiversity is functionally important for the direct human needs it satisfies through food, medicine, building material, recreational harvesting, eco-tourism and biological control. Biodiversity plays a critical role in ecological systems functioning, including speciation, which ultimately prevents the extinction of species, including the human race (Lindenmayer & Fischer 2006). This is its "Fundamental Value" (Jax *et al.* 2013), yet it remains often unrecognised beyond the scientific realm. Some researchers argue for the "Intrinsic Value" of biodiversity, preserving it in its own right (Kaplan 2011; Nicholson-Lord 2011). These more ethical and philosophical debates on held and asigned human values for biodiversity are elaborated in section 3.2 on defining human values. Scientifically, the Functional Value of biodiversity is not disputed. However, how to precisely define and measure biodiversity remains an open debate among scientists.

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In scientific literature, biodiversity—when defined as the maintenance of diversity and ecosystem processes or functions—is difficult to measure. Not enough is known about ecosystem functions and how to measure or replace them (Lindenmayer & Fischer 2006:6). As a result, the most widely accepted concept of biodiversity equates to "species richness"—the number of species in a given area. This concept is easily measurable and directly interpretable. However, this definition has its own problems. For example, scale dependency of species richness (that is, the degree to which the landscape supports species) is left out of the equation while taxa are given equivalent status (meaning, introduced alien invasive species may be assigned equal value as threatened species) (Lindenmayer & Fischer 2006:6). Lindenmayer and Fischer (2006:6-7) use examples to demonstrate the vital need for consideration of the scale at which species richness is maximised, due to potential consequences at other scales, and to take into account the identity of taxa that comprise an assemblage of species. They reiterate another matter of concern: the measurement of patterns versus processes, with the latter being more difficult to capture and therefore generally studied less. In sum, biodiversity measurements should both account for the number of entities (for example, genes, populations, species, etc.) and the differences within and between these, while taking into account questions of scale and process (Lindenmayer & Fischer 2006).

Scientific studies and opinion on biodiversity have gained public support and interest due to the visible effects of climate change. Given the threats posed by urbanisation and climate change to global biodiversity, human management of the environment has become central. This shift has led to the framing of problems for specific audiences (Maddox 2000 in Lindenmayer & Fischer 2006:249). In her seminal work, *Nature's Services*, Daily (1997) emphasises ecosystem services as the "maintainers of biodiversity", rather than focusing solely on biodiversity itself. As a result, recent publications have popularised the term "ecosystem goods and services" to highlight the human benefits of biodiversity. Although the integrity of ecosystems is necessary for human well-being (Haines-Young & Potschin 2010), the question remains: do ecosystem services require biodiversity?

The MEA (2005) acknowledges the difficulty of identifying which components of biodiversity are required for ecosystem function and service provision. Some ecosystem services do not require diversity of organisms; the presence of a viable population of one species can suffice (MEA 2005). Low diversity vegetation can at times (but not always) perform the same function as high diversity vegetation (for example, carbon sink). Many services require a degree of diversity but not necessarily the maximum degree. As a result, some definitions consider biodiversity as an ecosystem service in itself (see MEA 2005; TEEB 2011). Other definitions consider biodiversity as not useful to

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people in itself (not an ecosystem service), but rather view biodiversity as a requirement for ecosystem functions and processes (see Wu 2014).[1] This definition has led to discourses on the distinction between "benefits" versus "services" and "ecosystem functions" versus "ecosystem processes", as well as discussions on whether "services" have to be utilised directly by people or not (see discussion by Hermann, Schleifer & Wrbka 2011). It is thus advisable to consider these concepts as prompts and not as watertight definitions. It is, however, important to note that the contribution of biodiversity to human well-being is often only part of a larger system, which may include social and economic components (Haines-Young & Potschin 2010:118).

Whether considered an ecosystem service or not, specific studies have conversely indicated the direct "usefulness" of biological diversity for humans through increased psychological benefits (see Fuller, Irvine, Devine-Wright, Warren & Gaston 2007). Biodiversity is further argued to directly restore human contact with nature, which culturally serves as raw material for education, unstructured play and exploration, and spiritual connection (Pickett *et al.* 2011:355). Furthermore biodiversity has "security value" because aspects of stability, functioning and sustainability of ecosystems depend on it (Redman 2011). This is reflected in the possibility of increased functional roles in areas with more species (Tilman 1997).

Hector and Bagchi (2007) have shown how greater numbers of species are required for ecosystem multifunctionality in grassland vegetation. Similarly, in soil ecosystems there is a close relationship between biodiversity and ecosystem functioning (Lavellea, Decaëns, Aubert, Barota, Blouina, Bureaub, Margerieb, Moraa & Rossic 2006). Loss of biodiversity can in this way affect ecosystem functions and ecosystem services. For urban bound areas Ahern (2012:4), explains the importance of urban biodiversity in the context of response diversity. Initially described by Elmqvist, Folke, Nystrom, Peterson, Bengtsson, Walker and Norberg (2003:488) as "the diversity of responses to environmental change among species that contribute to the same ecosystem function", response diversity "...is critical to resilience, particularly during periods of reorganization" following disturbances. The response diversity of species can serve as a key resilience capacity building factor in reaction to the effects of climate change (Ahern 2012) and rests on functional redundancies and functional diversity (Hunter 2011).

[1] This classification appears somewhat inconsistent since several cultural ecosystem services also do not have direct use value but may contribute to some final benefit, for example, aesthetics. However, this approach avoids biodiversity to be regarded as a "nice to have" along with other "goods and services" and allows it to be considered a minimum requirement.

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As pointed out previously by Lindenmayer and Fischer (2006), biodiversity not only entails numbers of specific different entities, but also includes questions of scale and process. Levin (1998 in Alberti, Marzluff, Shulenberger, Bradley, Ryan & Zumbrunnen (2008:154) explain: "[h]igher-level biodiversity provides interconnections between multiple elements operating at multiple levels and transforms the community from a random selection of species into an ecosystem of interrelated biotic and abiotic parts." As Hooper *et al.* (2005) conclude in their review, some combinations of species are complementary since interspecific interactions among species increase the joint capture of resources. This has been ascribed to the functional diversity or the range and relative abundance of functional qualities in a community, which can have key consequences for ecosystem processes (De Bello *et al.* 2010). The concept of response diversity may seem to emphasise species richness, yet as a study by Balvanera, Pfisterer, Buchmann, He, Nakashizuka, Raffaelli and Schmid (2006) suggests, the strength of the relationship between biodiversity and the measure of ecosystem function is strongest at the community level, compared to the whole ecosystem level. Haines-Young and Potschin (2010:128) elaborate, "although species richness per se may be important in relation to the maintenance of ecosystem functioning, the role of particular keystone species or groups with specific functional capabilities should not be overlooked." Thus, it appears that in terms of biodiversity, the complexities of plant co-existence and interaction at the community level, as functional units, are what bring about functional diversity and resilience. Since many of the indirect affects between species remain unrecorded, not replicable and only partially understood by science, the "magic formula" of spontaneous native plant communities remains our best example of resilience and reorganisation after disturbance. The importance of this understanding in terms of landscape design decisions is considered and discussed in Chapter 5.

2.2.3 Urban biodiversity

The largest threats to biodiversity in the world today are habitat fragmentation and change due to human activity, including urbanisation (Lindenmayer & Fischer 2006:6). With the majority of the earth's population now living in urban centres, the trend towards urbanisation is not predicted to change (UN-Habitat 2010). Climate, soils and hydrology in urban areas are altered. These conditions determine biodiversity, while high natural diversity and endemism often coincide with locations of cities on river systems, islands and coastal lines (McDonald & Marcotullio 2011:203). In this way urbanisation leads to biodiversity decline and challenges, which ultimately stretch beyond the area it occupies (McDonald & Marcotullio 2011:203). A recent global study of cities confirmed anthropogenic drivers as the main reason for a decline of bird and plant diversity, reviewed in 54 and 110 cities, respectively, and directly related to city age and land cover (Aronson *et al.* 2014). The

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negative consequences of urbanisation in terms of sprawl and densification are summarised to include (Farinha-Marques *et al.* 2011:249): (1) land disturbance and conversion to impervious surfaces; (2) increased temperatures, water run-off and production of carbon dioxide; (3) removal of native vegetation and introduction of exotic species; (4) changes in species composition and species extinction; (5) changes in water and nutrient cycles; (6) degradation, fragmentation and isolation of natural habitats; (7) fewer native species; (8) larger amounts of disturbed habitats in early successional stages; and (9) altered ecosystem functionality compared with natural ecosystems. Although the maintenance of biodiversity is a result of ecosystem processes or functions, it is clearly influenced by both ecological and social systems.

Müller (2010:xvi) offers a succinct definition for urban biodiversity: ''the variety and richness of living organisms (including genetic variation) and habitat diversity found in and on the edge of human settlements''[2]. There is, however, a recognised urgency to incorporate human social institutions and decision-making in the built environment as part of urban biodiversity (Guntenspergen 2011), which is not reflected in this definition. The projected urban reality and its consequences bring about challenges for improved management of resources in cities as reconstructed "nature" that reflects human intentionality but includes managed interactions (Pinceti 2012:537). From this perspective it could be argued as essential for humans to intentionally design cities to support and conserve biodiversity (Farinha-Marques *et al.* 2011:248).

Urban biodiversity is unique in a number of ways. These include: the exclusive physical and ecological status of cities; the mixed and small-scale habitat varieties; the collection of local and introduced species that form a recombinant habitat with its proper dynamic, ecology and value; and the occurrence of habitat types and biological communities that are significantly dissimilar from others found elsewhere (Farinha-Marques *et al.* 2011:248; Müller 2010). Due to the marked uniqueness of urban areas, it has been argued that the concept of urban biodiversity not only rests on habitats, genes, species richness and composition but also reflects human culture by integrating socio-economic, aesthetic and ethical human values (Kaplan 2011; Nicholson-Lord 2011; Tzoulas & James 2010) and comprises the functional elements of ecosystems (Farinha-Marques *et al.* 2011:248).

Melles (2005) similarly shows how human behaviours and activities influence urban biodiversity. Due to this increased acknowledgement of cultural and distinctly human attributes that influence

[2] Note that matters of scale and process are omitted in this definition for ease of measurement that leads to difficulties of data interpretation.

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biophysical processes in cities, the tendency to exclude humans and their activities and values in biodiversity discussions is no longer entertained (Ernstson 2013). It has also led to the gradual emergence of new interdisciplinary fields of study, such as urban ecology.

2.2.4 Urban ecology

Traditionally, the term urban ecology refers to studies of the distribution and abundance of organisms in and around cities (Pickett *et al.* 2011:333). Yet, Marzluff *et al.* (2008 in Cilliers & Siebert 2012:n.p.) refine the definition of urban ecology as: an "emerging interdisciplinary field that aims to understand how humans and ecological processes can coexist in human-dominated systems and help societies with their efforts to become more sustainable." This definition acknowledges: firstly, the need for studies that allow for interdisciplinary understanding; secondly, that cities are seen as human dominated systems; thirdly, that there is a need for nature and humans to coexist; and lastly, that definite human action is required for cities to be sustainable. According to McDonald and Marcotullio (2011:9) "[u]rban ecology integrates both basic (i.e., fundamental) and applied (i.e., problem oriented) natural and social science research to explore and elucidate the multiple dimensions of urban ecosystems". Both definitions are applicable to this study.

In the last half-century, urban ecology has grown from a primarily ecological focus to a more social-ecological focus. Various authors summarise different perspectives in the global development of urban ecology (see Grimm, Morgan Grove, Pickett & Redman 2000; Jansson 2013; Niemelä 2011), distinguishing between "ecology in cities" versus "ecology of cities". Figure 5 shows the summary by Du Toit and Cilliers (2014:4). The first outlook focuses mainly on understanding socio-economic systems and is centred on urban social studies, including culture and social institutions. It mainly investigates patterns of land use and land cover as related to demographic distribution. Secondly, the bio-ecological position mainly looks at comprehending ecology in cities but regards humans only as the disturbers of nature (i.e., no social science studies occur). The third perspective refers to "cities as ecosystems" in which humans form an inherent part and allow for integration between natural and social systems. This understanding, which sees cities and humans as part of ecosystems—considered as hybrid systems (Alberti 2008:252)—is widely referred to as the "social-ecological systems approach". This approach requires multidisciplinary research teams to bring together an understanding of natural and social processes and show how they are interconnected and influenced by one another. In this perspective, the pursuit of urban ecology has become the integration of research findings from the natural sciences—by means of the social sciences—into design and planning (S. S. Cilliers 2010). This study takes a social-ecological systems approach.

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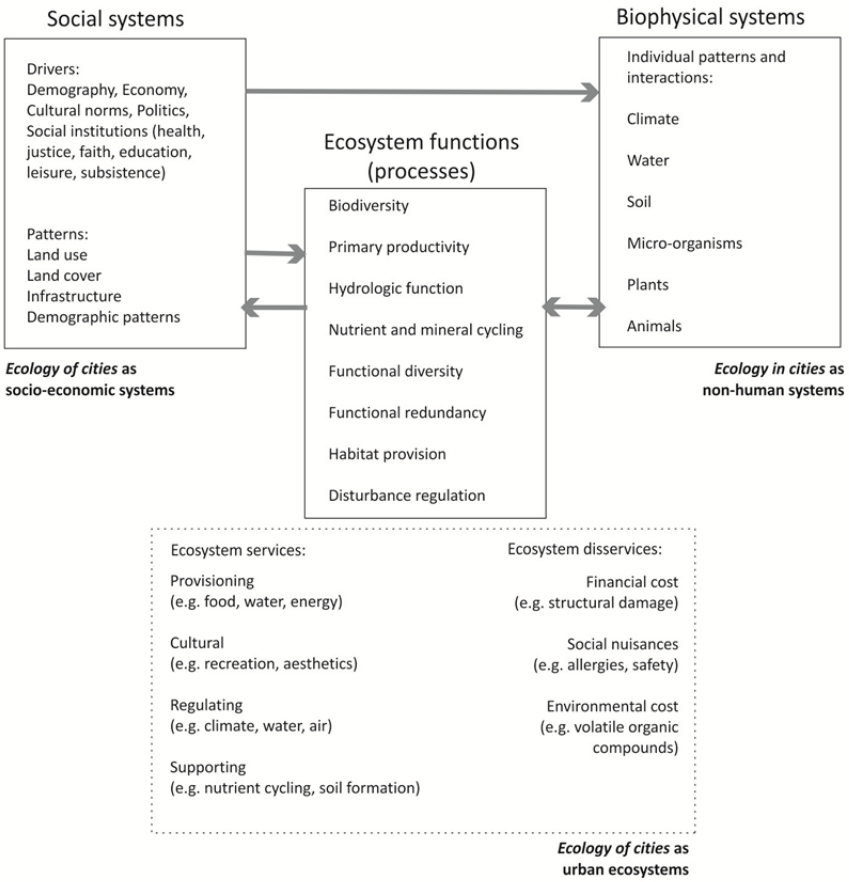


Figure 5: Different approaches in urban ecology and key fields of application

Source: by author, adapted from Du Toit & Cilliers 2014

Since cities worldwide do retain regional indigenous species, they can be opportunities for biodiversity conservation and awareness (Aronson *et al.* 2014). Whereas natural areas conserve indigenous species and their ecological functions (Connor, Hafernik, Levy, Moore & Rickman 2002), other green spaces can support overall biodiversity objectives (Kotze, Venn, Niemelä & Spence 2011:165). Arguably, the variety of habitats required for species diversity can be facilitated through planning and design. As pointed out in the previous section, urban habitats are characterised by specific dominant human land uses and activities, as well as structures built by humans (MacGregor-Fors 2011). They also have different types of land cover that are generally small-scale, diverse and intense (Breuste 2011) but differ in size and frequency of human access (MacGregor-Fors 2011). The position of green spaces in the city (in terms of connecting habitats) and the quality of linked habitats can influence the levels of biodiversity greatly (Hostetler *et al.* 2011).

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2.2.5 Green infrastructure in cities

The concept of green infrastructure originated in the US in the 1990s (Pauleit, Liu, Ahern & Kazmierczak 2011:272). Green infrastructure has been defined as "an interconnected network of green spaces that conserves natural ecosystem values and functions and provides associated benefits to human populations" (Benedict & McMahon 2001:5). Urban green space has since been internationally recognised to provide "green infrastructure" (Farinha-Marques *et al.* 2011), which is also described as "strategically planned" or "high quality green space" (*Natural England* cited in Douglas, Goode, Houck & Wang 2011:xxi). The term has become somewhat ambiguous and vague and is sometimes used to include only unmanaged "natural" spaces (see Hostetler *et al.* 2011:369), while it is also used to drive political or economic agendas (Wright 2011). This study follows a broad regional application and the definition of University of Melbourne, Green Infrastructure Research Group, which includes "the entire working landscape, ranging from any remaining natural areas inside a city, parks, remnant vegetation, residential and street vegetation, plus innovative engineered systems, such as green roofs and walls" (GIW 2013).

As explained by Alberti and Susskind (1997 in Alberti *et al.* 2008:148), "[t]he spatial organization of a city and its infrastructure affect the resources needed to support the city's human activities and thus the city's level of environmental pressure on the regional and global environment." The green infrastructure approach aims to facilitate the coexistence of other species with humans in urban environments to foster resilience and reorganisation required for climate change. These areas are important because vegetation determines the composition and abundance of other biota (Cilliers & Siebert 2011). Therefore, for landscape design, green infrastructure specifically places emphasis on non-sealed surfaces, plant habitats, the concept of plant diversity and decisions of plant selection. The word "infrastructure" intends to rank green space planning with the importance accorded to other forms of infrastructure (Pauleit *et al.* 2011), which according to Schäffler and Swilling (2013), it generally does not receive. Traditionally, planning for green space or infrastructure in cities has to compete with these other forms of infrastructure provided for human functioning.

Sustainable "smart growth" initiatives reduce energy consumption and fragmentation of natural habitat. However, such initiatives often include densification and more sealed surfaces that leave little space for greenery. These conditions result—as in the case of urban sprawl—in an increased heat island effect, reduced evapotranspiration due to loss of plants, and increased storm-water run-off (Pauleit & Breuste 2011:24). The benefits green spaces and plants render to humans are termed "ecosystem services" (Breuste 2011). Dunn and Heneghan (2011) provide a summary of studies that

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indicate these services of urban vegetation to include: shading, screening, consumable products, reduced heat, sequestration of pollutants and carbon, reduction of nutrient input in waterways, and habitat contribution.

In the last two to three decades, researchers and practitioners have explored the potential of hybrid infrastructures of green space and built systems to ameliorate conditions in land scarce environments and provide ecosystem services. Although not often designed for this intention, the urban environment also presents innovative and interesting habitation opportunities: (1) green spaces; (2) water structures; (3) brownfields (or built-up sites that are now vacant or derelict); and (4) grey structures (current build up areas or impervious surfaces) (Farinha-Marques *et al.* 2011:252). The development and association of 'green' roofs and walls with high technological solutions through architecture and engineering has gained corporate popularity and public acceptance, albeit mainly through elite endorsement. However, green infrastructure requires specific conditions and initiative to coexist in urban environments. Pauleit *et al.* (2011) summarise the main six principles that green infrastructure rests on as: (1) connectivity; (2) multifunctionality; (3) integration; (4) communicative nature; (5) social-inclusiveness; and (6) a long-term strategy. The next two sections elaborate on these principles.

2.2.5.1 Urban habitat, scale and connectivity

From a sociological perspective, urban ecosystems imply high densities of people and a land surface cover of built structures and infrastructure (Pickett *et al.* 2011:333). These factors make the connectivity required for green infrastructure difficult. Habitat transformation and fragmentation as a result of urbanisation change urban flora and introduce important themes of patch dynamics, connectivity and edge effects (Lubbe, Siebert & Cilliers 2011a) that compete with biodiversity potential. Plant species affected by fragmentation are those with limited dispersal capacity, low seed production and no seed bank, as well as those who are dependent on mutualism (for example, specialised pollinators) and with high inbreeding depressions (Williams *et al.* 2009 in Cilliers & Siebert 2011).

The concept of green infrastructure as habitat for ecosystems predictably relates to systems thinking. As explained by Hostetler *et al.* (2011:370), "[s]ystems thinking encourages us not to focus on discrete elements in the system, but rather to see the world as elements and processes that connect and interact in dynamic ways to form a whole". Pickett *et al.* (2011) for this reason argue that urban ecosystems should be understood not only as city centres, but also as suburban areas or

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sparsely settled villages connected to the denser and more built-up areas. This leads to the consensus that planning for preserving and enhancing urban biodiversity should consider a multi-scaled approach (see review by Farinha-Marques *et al.* 2011:250; MEA 2005).

In terms of scale, built environment projects mostly happen at the individual property level. The size of these properties falls into the habitat patch level, defined as an area that can comprise several square metres (or hectares) with a specific human use and structure (Farinha-Marques *et al.* 2011:249). This use and structure is influenced by the urban neighbourhood, which includes a specific building structure or socio-economic quality, and the urban land use type, which involves the prominent land use functions and patterns (Werner & Zahner 2010). These aspects are thus regarded as important in terms of design and planning for multifunctionality of spaces in terms of ecological, social and economic functions (Pauleit *et al.* 2011). Land use and land structure also influence disturbance or productivity gradients, seen as environmental filtering, that have an impact on community assembly and species richness (Swan, Pickett, Szlavecz, Warren & Willey 2011:182). Furthermore, these urban land use patterns modify landscape heterogeneity and structure that can contribute to several valuable functions in terms of biodiversity (Syrbe & Walz 2012; Walz & Syrbe 2013).

It is equally important to analyse and understand contextual influences on specific land use sites. These influences have not only been shown to influence biodiversity (Hostetler *et al.* 2011), but they also need to be integrated to assure physical and functional relation between different urban structures (Pauleit *et al.* 2011). Planning for green infrastructure needs to take place at the urban matrix level that corresponds to connected built-up areas governed by one local authority (Farinha-Marques *et al.* 2011:249) in order to connect and integrate multiple uses that happen at the habitat patch level.

Niemelä (1999) argues that there is no distinction between urban and non-urban ecological processes and patterns. This means scholars can use existing ecological theories when studying urban ecosystems. Although Alberti (2008:257) cautions against the use of ecological theory to fully explain urban ecosystems, different ecological theories are used to support the notion, design and maintenance of green infrastructure, especially with regard to connectivity.

Firstly, based on the theory of island biogeography, in general, larger islands sustain more species, remote islands support fewer species and new species often replace extinct species (Forbes *et al.*

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1997 in Colding 2011:230). Following these findings, the theory states that green infrastructure habitats in isolated patches require a matrix of connectivity for organisms to move and spread to other habitats. Connectivity is thus one of the most important objectives of green infrastructure planning, through habitat corridors that facilitate species movement. According to available research, protection of existing corridors is more effective than the creation of new ones (Forbes *et al.* 1997 in Colding 2011:230).

Secondly, the theory of metapopulation and metacommunity dynamics states that species are connected via a regional species pool. Central to the concept are the explicit roles of space and dispersal relative to local environmental conditions and interspecific interactions. Local effects of connectivity include environmental constraints and species interactions, while regional effects focus on dispersal and factors influencing it (Leibold *et al.* 2004 in Swan *et al.* 2011:180).

Thirdly, the theory of patch dynamics supports green infrastructure. The shape, size and edge of patches affect habitat, resource availability and competition of species (Alberti 2005). As urbanisation decreases patch size and increases the number of patches, the edge areas are increased (Cilliers & Siebert 2011). Edges can have a negative effect as they include different microclimates, higher human interference, different plant species composition, and abundance that influence competition, herbivory and seed dispersal (Cilliers & Siebert 2011). Spatial heterogeneity and habitat connectivity are considered important for dispersal between habitats (Picket *et al.* 2010 in Swan *et al.* 2011:182). Connectivity between fragmented patches should be considered at the habitat level, physical landscape level and ecological process level (Lindenmayer & Fischer 2006). Findings by Bodin and Norberg (2007) indicate the ways connectivity adds complexity to ecological systems, as well as how patches of small size in fragmented landscapes can have disproportionally high importance in large-scale processes and the generation of ecosystem services. The habitation benefits of these smaller areas are that of stepping stones between larger patches, and they also secure the survival of species adapted to small habitats (Godefroid & Koedam 2003 in Farinha-Marques *et al.* 2011:250).

2.2.5.2 Facilitated assemblies and social inclusion

Urban environments largely consist of “self-assembly” of communities—as a reaction to the altered urban environmental conditions—and “facilitated assembly”—based on human facilitation and manipulation (Swan *et al.* 2011:182). Although urban ecology originates from studies related to the spontaneous assembly of species in urban environments, this study is mainly concerned with

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facilitated assembly through design. Facilitated assembly, or landscape design, is dominated by human preference in species selection and physical interference or gathering of plantings. Human choice and preference influence existing vegetation conservation and human facilitated assembly of vegetation. High socio-economic status that consider housing density, household income, educational level and unemployment rate have been positively correlated with added green space per capita, more tree cover, greater plant diversity and increased indigenous plant diversity (Cilliers *et al.* 2012; Lubbe, Siebert & Cilliers 2010; Lubbe *et al.* 2011; McConnachie & Shackleton 2010). Public expectations for urban landscapes are usually very specific and hard to change (Gandy 2013b; Quigley 2011).

The mechanisms and factors that underpin the metacommunity approach are difficult to facilitate in urban environments. The metacommunity approach focuses on mechanisms of steering community assembly from regional species pools and the factors manipulating species turnover in space (Swan *et al.* 2011:182). Facilitated assemblies mostly rely on human intervention, with no local reproduction or trophic interaction. Low maintenance requirements can reduce plant choice to a palette of “tried and true” cultivars requiring little water or nutrients, and withstanding cold and pests. Quigley (2011:89) points out that these selections cannot begin to replicate functional or structural biodiversity and are often treated as furniture and not living organisms. Furthermore, public expectation on monocultures, regular and short mown lawn limits possibilities of species-rich, self-sustaining herbaceous turf (Quigley 2011:89). Though urban surfaces may hold potential for spontaneous colonisation by plants, birds and insects, these migrations are often not desired or even discouraged due to potential maintenance implications.

Besides parks and gardens, ecological restoration projects are another example where geomorphic and other manipulations create circumstances to attract desirable species and influence interspecific dispersal patterns. Even here, the metacommunity process depending on life-history attributes (for example, reproduction) is, however, disconnected from the urban ecosystem (Swan *et al.* 2011:184) since distance and environmental filtering influence species turnover between self and facilitated communities. Environmental filtering is mediated by human manipulation—removal and introduction (Swan *et al.* 2011:184). Common human practices aim to increase plant dispersal, decrease stresses and improve winter survival (Niinements & Penuelas 2008 in Cilliers & Siebert 2011). These are identified challenges for self-sustaining biodiversity in urban habitats that green infrastructure hopes to overcome.

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When designing in urban environments, up to the last two decades the goal was mainly to meet societal needs and values through service provision. A prior attempt with origins in the 19th century to support multiple purposes, such as recreational and ecological functions for sustainable land use in green infrastructure planning is that of "greenways", which consist of linear land networks (Ahern 1995 in Colding 2011:230). It is often found that these networks need to comply with human preferences for cleanliness, aesthetics, safety, access, naturalness and development, which makes their main purposes amenity and recreation rather than biodiversity (Colding 2011:230; Gobster & Westphal 2004). Furthermore, in general, funding and fiscal policy underestimate the value of green space to society, often neglecting aspects such as design, biodiversity value, climate change mitigation and human security. Planning regulations and designations in terms of land use restrictions to protect heritage and natural areas need to be understood in terms of the benefits they provide (Douglas & Ravetz 2011:259). The attitudes of individuals and institutions often become the arbiters of "good design"; this needs to be acknowledged and addressed in the pursuit of the encouragement of biodiversity in cities (Douglas & Ravetz 2011:259).

The lack of incorporation of biodiversity in traditional green space design shapes public perceptions and attitudes. This may lead to neglect of biodiversity conservation in urban areas and a failure to consider biodiversity important for "non-natural" purposes (Melles *et al.* 2003 in Colding 2011:233). Up to the last half century, ecologists did not acknowledge the semi-natural ecosystems of parks and gardens in terms of migration of species (Colding, Lundberg & Folke 2006). However, subsequently socially inclusive community and allotment gardens have been shown to function as habitats for pollinator and invertebrates, as well as to provide services such as pollination, seed dispersal and insect/pest regulation (Colding *et al.* 2006). Urban golf courses if properly managed can also contribute to urban biodiversity and services such as species migration, pollination, natural pest control and water purification (Colding & Folke 2009 in Colding 2011:232). Still, biodiversity in cities today remains an afterthought in terms of existing structures and institutional processes, including planning and legislation and requires alteration in physical habitat but also in legislature and cultural perceptions (Sadler, Bates, Donovan & Bodnar 2011:296-297).

Building on the initial six principles of green infrastructure developed by Pauleit *et al.* (2011), Hansen and Pauleit (2014) have expanded the principles to nine approaches. Table 1 summarises these approaches, which feature a marked increase in social consideration to enable successful implementation of green infrastructure.

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Table 1: Different approaches to green infrastructure

Approach	Definition
Approaches addressing green structure	
Integration	Green infrastructure planning considers urban green as a kind of infrastructure and seeks the integration and coordination of urban green with other urban infrastructures in terms of physical and functional relations (for example, built-up structure, transport infrastructure, and water management system).
Multifunctionality	Green infrastructure planning considers and seeks to combine ecological, social and economic/abiotic, biotic and cultural functions of green spaces.
Connectivity	Green infrastructure planning includes physical and functional connections between green spaces at different scales and from different perspectives.
Multi-scale approach	Green infrastructure planning can be used for initiatives at different scales, from individual parcels to community, regional, and state. Green infrastructure should function at multiple scales in concert.
Multi-object approach	Green infrastructure planning includes all kinds of (urban) green and blue space, for example, natural and semi-natural areas, water bodies, public and private green space like parks and gardens.
Approaches addressing governance process	
Strategic approach	Green infrastructure planning aims for long-term benefits but remains flexible for changes over time.
Social inclusion	Green infrastructure planning stands for communicative and socially inclusive planning and management.
Transdisciplinarity	Green infrastructure planning is based on knowledge from different disciplines such as landscape ecology, urban and regional planning, and landscape architecture, and developed in partnership with different local authorities and stakeholders.

Source: by author, adapted from Hansen & Pauleit (2014:517)

According to Pauleit *et al.* (2011:275), human preference in terms of needs and interests must be managed through communicative stakeholder involvement to establish mutual learning and understanding in terms of gains and losses of different land use scenarios. Transdisciplinary research and practice that includes people beyond the scientific and professional realm has gained increasing importance in urban ecology due to the lack of accomplishment that comes from isolated mono-disciplinary approaches. According to S. S. Cilliers (2010b:94), "different perspectives on urban biodiversity need to come together to form an integrated approach to enable commitment to sensible development and use of nature around urban cores". Local knowledge about the biophysical and socio-cultural environment, also termed Indigenous Knowledge Systems (IKS), often resides in the memory of ordinary citizens. These calls for discussions between actors that entails ongoing learning and adaptive planning by professionals were coined "design experiments" by Felson and Pickett (2005) and include "[i]nterdisciplinary partnerships of scientists, planners and designers collaborating to insert experiments into the urban mosaic, balancing ecological goals with context, aesthetics, amenity and safety". Importantly, the pursuit of these ventures is a long-term vision that allows for new inputs yet does not permit short-term economic gains of interest groups to override public best practice and cause ecosystem service erosion (Pauleit *et al.* 2011:275). Chapter 5 discusses the repercussions of the pursuit of green infrastructure on design approaches.

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2.2.6 The conceptual tool of ecosystem services

Closely related to the green infrastructure approach, the concept of ecosystem services can be seen as a way to communicate society's dependence on ecological life and its support systems (Gómez-Baggethun, De Groot, Lomas & Montes 2010). Almost every resource used by humans on a daily basis relies directly or indirectly on nature or ecosystems. These benefits, which humans derive from the biophysical environment, have been termed "ecosystem goods and services" (Daily 1997; MEA 2005). The utilitarian framing of beneficial ecosystem functions commenced in the 1970s with a goal to increase public interest in biodiversity conservation (Gómez-Baggethun *et al.* 2010; Hermann *et al.* 2011). Building on a concept initially introduced by Ehrlich and Ehrlich in 1981 (Mooney & Ehrlich 1997), Daily (1997: 3) highlights the need for ecosystem services to be urgently studied and valued, making three key arguments:

1) Society undervalues services flowing from natural ecosystems.
2) The consequent damage done by humans to natural ecosystems is difficult or impossible to reverse.
3) All natural ecosystems will be destroyed within decades if current trends continue.

According to Gómez-Baggethun *et al.* (2010:1213), "The rationale behind the use of the ecosystem service concept was mainly pedagogic, and it aimed to demonstrate how the disappearance of biodiversity directly affects ecosystem functions that underpin critical services for human well-being". The renowned paper by Costanza *et al.* (1997) on the value of global natural capital is a further important milestone for the concept (Hermann *et al.* 2011). In 2005, the global and sub-global Millennium Ecosystem Assessment indicated that ecosystem services are declining in many regions of the world (MEA 2005). These publications contributed to putting ecosystem services research in the mainstream, especially in terms of the policy agenda, making visible the role of biodiversity and its underlying functions and processes for human well-being (Gómez-Baggethun *et al.* 2010).

The allocation of services to different categories varies based on the distinction between key terms such as "function", "service" and "benefit" (see Hermann *et al.* 2011 for a comprehensive review). This study adopted the most widely used categorising system of four groups of ecosystem services based on TEEB (2011:3-4) and the MEA (2005:vi), which includes:

- **Cultural Services:** nonmaterial benefits obtained from ecosystems, like spiritual enrichment, cognitive development, recreation, aesthetic experiences, community cohesion, knowledge and education; tourism, etc.;

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- **Provisioning Services:** products obtained from ecosystems like food, fibre, water, fuel;
- **Regulating Services:** benefits obtained from regulation of ecosystem processes like carbon sink, microclimate control, flood prevention, noise reduction, temperature modulation, pollution control, protection of water quality, etc.;
- **Supporting Services:** ecological functions such as biodiversity, habitat, soil formation, ecological memory, seed dispersal, pollination, storage and cycling of nutrients (Farinha-Marques *et al.* 2011:253).

Urban systems are weakly dependant on tangible products from local ecosystems, which leads to a range of land use choices. In cities, Regulating Services are generally considered most valuable (Costanza *et al*. 1997), as they need to be supplied on site (Egoh, O'Farrell, Charef, Gurney, Koellner, Abi, Egoh & Willemen 2012:78). The importance of storm-water and flood mitigation as a Regulating Service is particularly prominent in the US and Europe (Moore & Hunt 2012). Benefits of other services can be provided off site through transportation. Human dependence on Provisioning Services is therefore more common in developing or rural areas where people depend directly on nature for food, firewood, water and other basic resources to construct housing, fuel and sustenance. In Africa, although collectively owned in many cases, these ecosystem services are also collected and sold to supplement household income (Egoh *et al.* 2012:72). Thus, people know the direct and even financial benefits of Provisioning Services. However, as people move to city environments, these services are often not available anymore, and the direct dependency of people on nature becomes indirect. While Cultural Services are rarely considered in studies (Wu 2014), countries become increasingly dependent on Cultural Services during economic development (Molebatsi, Siebert, Cilliers, Struwig & Kruger 2010; Plieninger, Dijks, Oteros-Rozas & Bieling 2013). Biodiversity and natural landscapes have been and remain a source of inspiration for art, culture and science (TEEB 2011). Cultural Services are specifically important since they depend on other services and thus influence strongly people's perceptions towards all services (Tengberg, Fredholm, Eliasson, Knez, Saltzman & Wetterberg 2012). In Africa, Cultural Services include the use of rivers, plants and animal species for spiritual purposes related to cultural identity, Indigenous Knowledge Systems, and mental and spiritual health. These rituals influence regionally specific attitudes towards nature and specific species protection and toleration efforts either positively or negatively. In fact, spiritual and Cultural Services are regarded important for wealthy and poor communities, in rural and urban settings (MEA 2005:3).

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As discussed in the beginning of this chapter, biodiversity is generally treated as an underlying condition required for the delivery of ecosystem services (MEA 2005). The Supporting Services category is hence excluded by some classifications of ecosystem services, but biodiversity or ecosystem processes and functions are not excluded from the overall model (Wu 2014). This confirms the critical importance of Supporting Services—through habitat and biodiversity—for the generation and existence of all other ecosystem services. In terms of important spatial aspects for biodiversity, highlighted in the previous sections, it is essential to distinguish between ‘‘service providing,’’ ‘‘service benefiting,’’ and ‘‘service connecting’’ areas; for ecosystem service requirements, some authors therefore favour the term “landscape services” (Syrbe & Walz 2012).

Society still greatly undervalues natural ecosystems as providers of goods and services for human well-being. This leads to people in management positions who are poorly equipped to evaluate environmental trade-offs based on their continued resolution on the sole basis of social, economic and political forces. Although a tremendous amount is known about the importance and value of natural systems that support human life and economy, this has not been conveyed in enough urgency to decision-makers and the general public (Daily 1997:2). The conceptual apparatus of ecosystem services is one of several ways to articulate the value of biodiversity to foster behavioural change (Ernstson & Sörlin 2012:275). According to Le Maitre *et al*. (2007:374) “[e]cosystem service research was born out of a need to highlight the inter connectivity between people and their environment and is grounded in the belief that urgent behavioural change is required”. The ecosystem services concept has recently been developed as a measurement tool for policy and practice in urban areas. According to TEEB (2011), the advantage of using the ecosystem service concept is threefold: (1) the benefits of a well-functioning environment become visible at a local (municipal) level; (2) the ease of foreseeing the consequences of decisions; and (3) the allowance for effective communication to all stakeholders (TEEB 2011:6). These benefits directly relate to the identified approaches for green infrastructure discussed in the previous section.

The concept of human well-being is quite complex. The definition by MEA (2005) entails basic material for a good life, health, good social relations, security, and freedom of choice and action. The sometimes opposing objectives of human values versus biodiversity support can lead to difficult design choices not always resolvable through scientific knowledge. Many natural services are taken for granted and hard to quantify, which leads to humans being poorly equipped to evaluate environmental trade-offs (Daily 1997:2). As noted by designers, the goods and services provided by urban nature can be regarded as positive or negative from a human social perspective. These

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ecosystem disservices, for example, social nuisances and financial and environmental costs (see Lyytimäki & Sipilä 2009), also need to be acknowledged as they greatly influence decision-making.

Besides the fact that disservices are not acknowledged enough, Ernstson and Sörlin (2012:280-282) points out other problematic areas around the concept of ecosystem services:

- Ecosystem functions and their controls are poorly known in cities.
- There is often no distinction made between technological versus ecosystem services, or between unintentional and deliberate services, in cities.
- Ecosystem services are difficult to measure.
- It is difficult to calculate trade-offs or make comparisons between quality of life and economic concerns.
- Ecosystem services are difficult to translate for design and planning.
- Ecosystem services can become a globalising tool that homogenises values and disconnects these from place, local polity and social complexities.

Cognisance should hence be taken of potential limitations when using the ecosystem service approach. In spite of the frustrations around ecosystem services and how to measure and apply the concept, they are still promoted for incorporation into government planning and policy as a conceptual apparatus with a strategic role. This study is based on the premise that the original intent of ecosystem services—to connect people to their environment and bring about positive behavioural change—is vital.

The ecosystem services approach was adopted in this study as a conceptual tool for a few reasons. Firstly, the approach allows the built environment to be looked at as “reconstructed nature” and as a product of human intentionality (Pinceti 2012). Secondly, in practical terms, the ecosystem services concept is useful for explicitly identifying and assessing the multiple functions of green infrastructure (Ahern, Cilliers & Niemelä 2014). Thirdly, the approach facilitates the inclusion of stakeholder viewpoints in assessments (Ernstson 2013), which allows one to use it as a potential tool for social system interpretation and understanding. Ernstson and Sörlin (2012) have pointed out the shortcomings of the TEEB (2011) step-by-step method for recording and quantifying price specific aspects of urban nature. There is consensus that both green infrastructure and ecosystem services lack development of effective practice-orientated application frameworks, yet the synthesis of these concepts seems promising, especially regarding multifunctionality and the integration of social and

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ecological systems (Ahern *et al.* 2014; Hansen & Pauleit 2014). These frameworks are discussed further in Chapter 5.

2.3 The social production process

2.3.1 Introduction

Humans play a decisive role in shaping biophysical processes (Berkes, Colding & Folke 2003: 2003). This shaping not only happens through scientific rationale but also through metaphorical processes that manifest in socio-cultural discourses affecting human attitudes and behaviour towards nature. According to Gandy (2013b:1305):

> *The very idea of biodiversity is as much a mirror of entanglements between different cultural and scientific discourses than any putative representation of external nature. In an urban context, the concept of biodiversity becomes even more difficult to determine, especially when used in relation to wider conservation objectives such as the protection of rare species or vulnerable habitats.*

In the social sciences, existing structures of power and ideology are not perceived as fixed and unchanging, which leads to critical perspectives in social research (Douglas & Ravetz 2011:247). These critiques allow for the exploration and deconstruction of urban ecological questions. Constructivist theory is a critical perspective that views reality as a social construct, and therefore sees the task of social knowledge to be the analysis of the process in which this occurs (Berger & Luckmann 1966). In social-ecological systems, social practices either advance or hinder the creation and distribution of ecosystem services (Ernstson & Sörlin 2012). This social production process (see Figure 6) is drawn from the post structuralist (Lefebvre 1974/1991) and the constructivist (Latour 2005) schools of thought, respectively, in philosophy and the social sciences.

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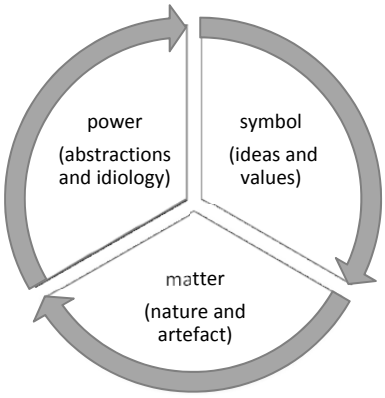


Figure 6: The social production of urban space and the components of engagement

Source: by author, based on Lefebvre (1974/1991)

In a pursuit towards the value of nature and biodiversity, this section reviews recent thinking on central concepts with potential for land use and social-ecological system resilience. The section starts off by considering metaphors in terms of urban land use management and their potential as structures of significance for collective behaviour. Secondly, it reviews recent social-ecological system models and developments in their ability to reflect social-ecological processes. These models also identify drivers of change in ecosystems and their services. The section then considers the concepts of adaptive management and innovative design approaches as functional management proposals. The chapter ends with contemporary design thinking specifically in landscape design practice and the potential it holds for urban green infrastructure and ecosystem services that include biodiversity.

2.3.2 Structure of significance: sustainability and resilience

As discussed in terms of ecosystem services (refer to 2.2.6), urban ecosystems depend in a limited way on tangible products from local ecosystems. This has led to a range of choices on how to use land (MEA 2005). The ability to influence land use decisions is a vital economic development tool, since land use plays an important role in the desirability and productivity of a city (E. J. Cilliers 2010). Since land is limited, this implies that spatial patterns of urban ecosystems are strongly influenced and are ultimately determined by political land use struggles (Ernstson 2013). In this way, social practices moderate the quantity and quality of green infrastructure through urban development (Ernstson 2013). During the last half century, several initiatives have aimed to achieve transformation towards more viable development pathways (Folke 2006). Both ecological and social systems are time and space related; Westley *et al.* (2002 in Zipperer 2011:298) argue for “structure of significance” to be recognised as a third component. In social processes, metaphors are deployed

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often from science, art or politics that influence cultural discourses, human attitudes and behaviour (Gandy 2013b). These metaphors or symbols reflect a collective reality and are used for decision-making. However, since they are socially constructed, they may not be a faithful reflection of conditions (Zipperer 2011). These metaphors are representative of the importance of "social production" in social-ecological systems and land use decisions.

The concept of sustainability is one such metaphor. Perhaps due to its broadness it has failed to transmit the need for pro-environmental change it originally intended. A misconception identified by Wu (2014:4) is "…a belief among the scientific and planning communities that the sustainability concept emphasises maintaining the status quo or a static steady state of some sort". Due to cost-benefit market-driven approaches to development, allocative efficiency is often seen to permit ecological sustainability and social fairness, which is not guaranteed (Costanza & Folke 1997:56). As Wu (2014) points out, the Brundtland Report (World Commission on Environment and Development [WCED] 1987) describes sustainable development as a process of change addressing the exploitation of resources, the course of investments, and the direction of technological development and institutional change to increase human capacity to meet human needs. The concept of sustainability is seen as a normative condition; in the past decade a new non-normative concept—resilience—has gradually emerged.

The closely related model of social-ecological systems (also called complex adaptive systems) is regarded as part of an adaptive urban sustainability approach. This approach considers cities as coupled human-environment systems that need to facilitate and maintain ecosystem services and human well-being (Wu 2014:4-5). A systems approach is in essence a method of locating the role and constituents of a system, within its operation (Exline *et al.* 1982 in Douglas 2011:17). To Ernstson (2008), complex systems are defined by connections, processes and flows; yet they aim to consider humans and their institutions (organisations, knowledge and values) together with biophysical matter.

The ecosystem services approach is another such social construction. It integrates land management, water and living resources towards sustainability and equity, but does not emphasise the link between ecosystem function and human security. There is an inextricable link between human security and well-being and functioning ecosystem services, which are better exploited through the concept of resilience (Redman 2011). The concept of resilience of social ecological systems acknowledges a need to manage change in terms of decision-making (Folke 2006). To

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enhance resilience in a system implies greater flexibility and adaptive capacity that can take the form of redundancy, inclusiveness, monitoring and preparation for different futures (Alfsen, Duval & Elmqvist 2011:191-192). The focus of urban transformation goes beyond sustainable resource management towards an increased potential for adaptive learning, anticipation and side stepping of vulnerability traps (Alfsen *et al.* 2011:191-192). Klein, Nicholls & Thornalla (2004 in Dominelli 2012:65-66) criticise the concept of resilience due to the failure of experts to operationalise it affectively for practice, yet it can be seen as one of many factors to enhance adaptive capacity

Folke *et al.* (2010:n.p.) describe resilience as "the capacity of a system to absorb disturbance and re-organise while undergoing change so as to still retain essentially the same function, structure and feedback". A more concrete definition applicable to this study comes from Folke, Colding and Berkes (2003 in MEA 2005:210): "[r]esilience in social-ecological systems depends on the capacity of ecosystems as well as social capacity to respond to ecosystem change in a way that sustains and enhances the capacity of ecosystems to generate essential ecosystem services". There is thus a need for simultaneous support of human and ecological functions (Alberti 2008). The social capacity referred to in the definition is comprised of organisational faculty (in charge for implementing responses) and institutional ability (systems and social norms that lie beneath these organisations) (MEA 2005). These components are better explored by means of system models in the next section.

2.3.4 Social-ecological system models

System models provide a useful framework to evaluate the effect of social structure on ecosystem structure and function (Zipperer, Morse & Johnson-Gaither 2011:303). They are structural representations and focus on system-level patterns and processes, which include institutions, demographics, policies and land use patterns (Zipperer *et al.* 2011:303). These models require a record of causes and functional representations, and suppose linearity across spatial scale (Parker *et al.* 2003 in Zipperer *et al.* 2011:303). Haines-Young and Potschin (2010:132) argue that the structure of social-ecological systems is best understood in terms of relationships between resources, resource users and governance systems. A range of different models have been developed in the past two decades that mark the inclusion of critical aspects that influence social-ecological system resilience.

In their model, Redman *et al.* (2004 in Zipperer *et al.* 2011:302) suggest that land use, land cover, production, consumption and disposal mediate interactions of humans and ecological components. Alberti *et al.* (2008) and Grimm *et al.* (2000) link social and ecosystem patterns and processes

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directly through interaction and feedbacks. Human behaviour (Alberti *et al.* 2008) and changes in human perceptions and attitudes (Grimm *et al.* 2000) are thus recognised to influence land use (Grimm *et al.* 2000), as well as land cover and biodiversity (Alberti *et al.* 2008). At an earlier stage, Pickett, Burch, Dalton, Foresman, Grove and Rowntree (1997) also acknowledged the role of knowledge, social norms as elements of social order and beliefs and myths as cultural resources in their "human ecosystem" model. Zipperer *et al.* (2011:307) present a conceptual model for human decision-making to indicate the effects of land use on social-ecological systems.

The Millennium Ecosystem Assessment (MEA 2005:210) uses a simple model (see Figure 7) to portray social-ecological systems. The model comprises three levels of interaction, namely: (1) social norms and rules; (2) management, actors and organisations; and (3) ecosystem function and dynamics—all of which produce and respond to (4) knowledge systems. This model is useful for interpreting the role that actors (such as landscape design practitioners) play in ensuring system resilience through their capacity to manage the required change in the generation of ecosystem services. Actors are influenced socially by the norms, rules and knowledge systems that impinge on decision-making.

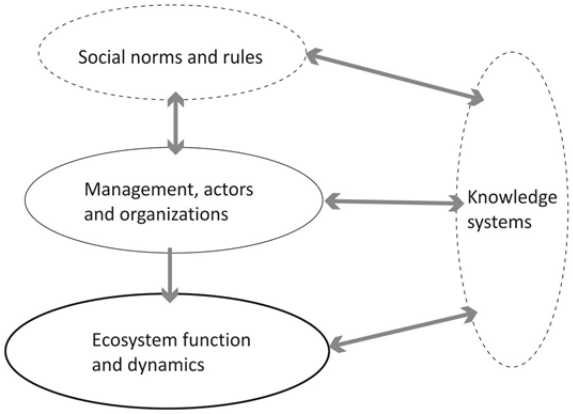


Figure 7: Social-ecological systems

Source: by author, adapted from MEA (2005:210)

In his model, De Groot (2006) acknowledges the process of valuation and distinguishes between ecological, socio-cultural and economic values that can be used to reach a "total value" for decision-making purposes (see Figure 8).

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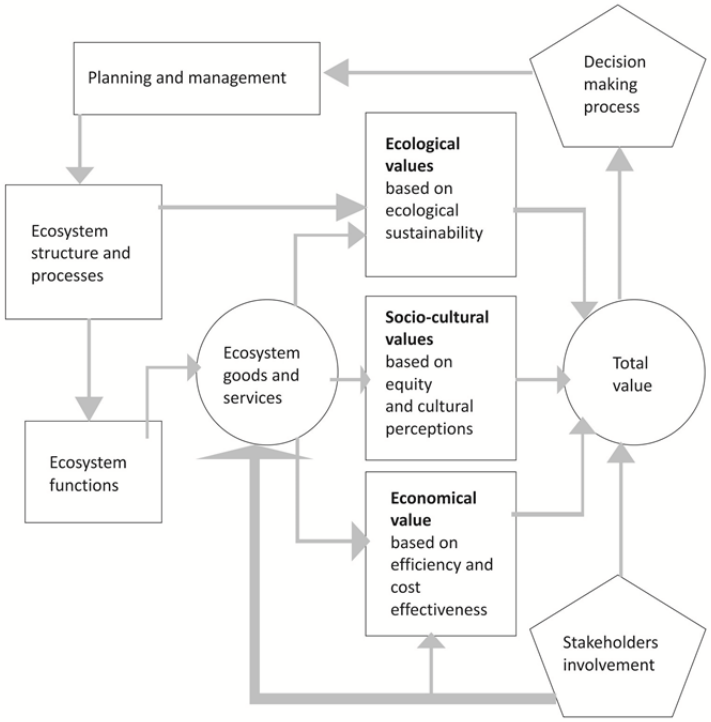


Figure 8: Functional analysis model indicating different value considerations that influence decision-making

Source: by author, adapted from De Groot 2006 by Hermann *et al.* (2011:6)

A more recent model of Van Oudenhoven, Petza, Alkemadeb, Heina and De Groot (2012) has been elaborated on to show several key components like ecosystem properties, ecosystem services, human value and value perceptions (see Figure 9). Value perceptions are also shown to have consequences for human well-being.

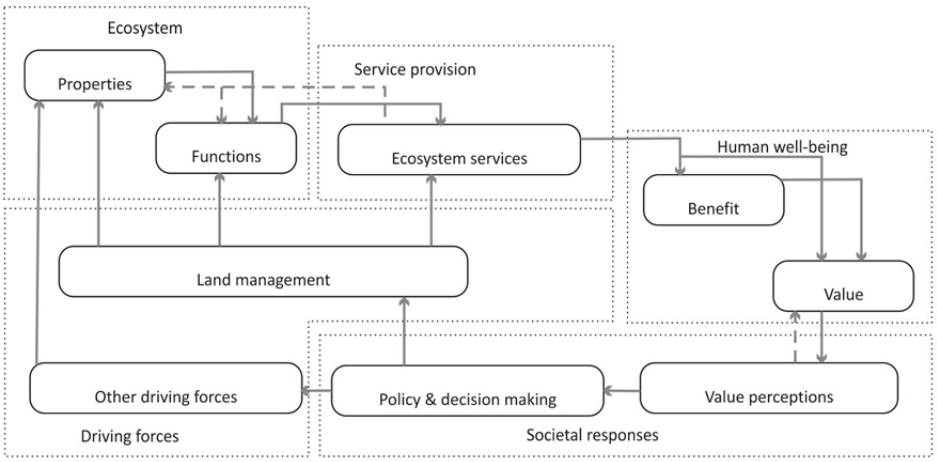


Figure 9: System model depicting the relationship between land management, ecosystem services and human value perceptions

Source: by author, adapted from Van Oudenhoven *et al.* (2012:112)

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These types of models allow for understanding of the links and feedbacks between changing ecological conditions and the complexities of decision-making (Zipperer *et al.* 2011:305). Noticeable in the progression of models is the increased differentiation between ecosystem properties (including biodiversity), functions, processes and services. Similarly there is an increased distinction between human benefits, values, perceptions and decision-making. The importance of knowledge is clearly indicated in Figure 7, but not in Figures 8 and 9. From the models discussed previously in this section only Picket *et al.* (1997) and Zipperer *et al.* (2011) pertinently include knowledge in their models. Zipperer *et al.* (2011:308) explain that knowledge is not perfect yet the focus on knowledge emphasises use of information, conservation learning and the development of an ecological aesthetic. However, it appears that more emphasis is placed on values, perceptions and beliefs than knowledge in recent system models.

Zipperer *et al.* (2011:303) argue that the shortcoming of system models is that they do not account for the effect of decision-making process of social drivers on social patterns and processes. Furthermore, feedback devices of how ecological systems may change socio-economic systems are often not measured (Zipperer *et al.* 2011:303). The model by Zipperer *et al*. (2011) places emphasis on the decision-making process and the importance of knowledge. This is further discussed in section 2.3.6. Contrary to the critique of Zipperer *et al.* (2011), Alberti (2008) points out that temporal and spatial dynamics of these systems, as well as hierarchical structure, are highly important. The Alberti (2008) model is valuable as it also identifies important social ecological drivers, which are discussed in the next section.

2.3.5 Drivers of change in ecosystems and their services

Social, political, economic and biophysical factors influence and drive urbanisation. These factors also affect ecosystems and their services (Alberti *et al.* 2008). The MEA (2005) has identified five indirect and seven direct drivers of change in ecosystems and ecosystem services (see Figure 10). Direct drivers of change are: (1) changes in land use and land cover; (2) species introduction and removal; (3) technology adaptation and use; (4) external inputs (fertiliser, pest control, irrigation); (5) harvest and resource consumption; (6) climate change; and (7) natural, physical and biological drivers (evolution, volcanoes). Direct drivers have an immediate influence on ecosystems, whereas indirect drivers operate across broad spectrums and are more difficult to identify and measure (MEA 2005), but can be tested in different scenarios through hypotheses (Alberti *et al.* 2008). Many changes in values, for example, evolve from broad socio-political or economic trends, one of which

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may include increased education (Aaron *et al.* 1994; Popenoe 1994; Yankelovich 1994). These factors operate simultaneously and at different scales (Alberti *et al.* 2008:154) and act in distinct ways in different regions (MEA 2005:6).

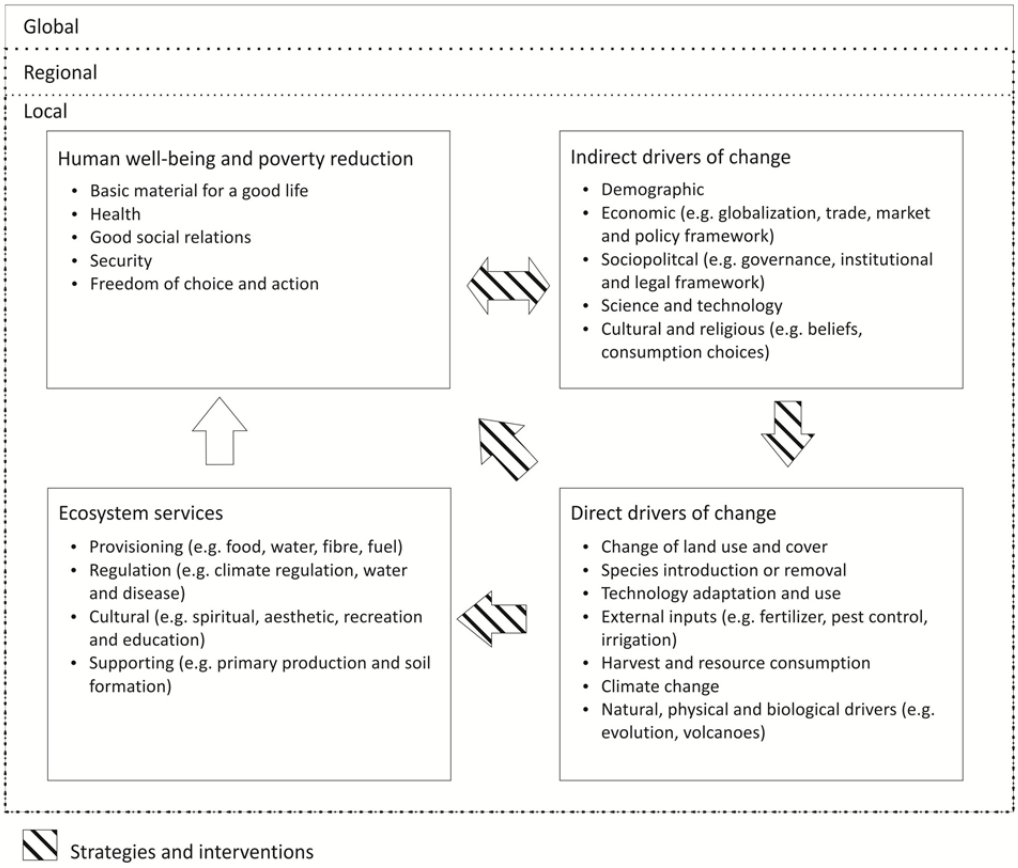


Figure 10: The conceptual framework of the indicating direct and indirect drivers of change that affect the production of ecosystem services and human well-being

Source: by author, adapted from MEA (2005:20)

Although the greatest perceived impact that scientists can make in terms of indirect drivers is through science and technology, scientific findings have an acknowledged lack of influence on socio-political governance (Alberti *et al.* 2008; Cilliers 2010; Niemelä 2011). In order for science and technological advances (or knowledge) to be operationalised, other drivers such as policy, governance and cultural values are receiving more attention in social-ecological research. Figure 11 schematically illustrates how social conditions can affect biodiversity outcomes.

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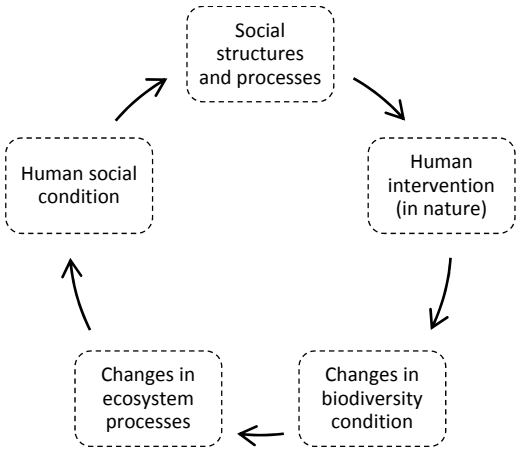


Figure 11: Social factors linked to biodiversity outcomes and back to social condition

Source: by author, adapted from Lele and Kurien (2011:215)

Swan *et al.* (2011:182) identify three important social dimensions as drivers of biodiversity patterns: (1) control over land; (2) power (through positions, wealth and information); and (3) social expectation (influenced primarily by education, culture and lifestyle). Most urban land is either free for all, privately owned, state owned, or community or institution controlled. However, as the authors point out, ownership is sometimes subordinate to control. In other words, ownership and control do not always coincide. The organisation of people into institutions such as interest groups, households and neighbourhood associations exercise control over land—intentionally or unintentionally—and affect decisions regarding biodiversity (Berkes & Folke 1994 in Swan *et al.* 2011). In addition, wealth connected to social individuals or groups can determine access to resources and enable management of land in ways that can drastically improve or decrease urban biodiversity. Political influence or social power in terms of government resources can play an equally important role. Access to information, wealth and power hence leads to inequality in terms of opportunities afforded (Redman 2011). This is critical in South Africa where socio-economic inequality remains extremely high. In terms of economic inequality, South Africa is ranked as one of the most unequal countries in the world (Oxfam 2013; World Bank 2011) There is also an extremely high socio-economic divide between rural and urban areas within South Africa. Meanwhile, between 29% and 46% of the South African urban population lives in informal settlements, which indicates other basic need deprivation (UN-Habitat 2010).

Lastly, education, culture and lifestyle can influence landscape vision and expectations. This point also relates to cultural beliefs and consumption choices (MEA 2005), as indicated in Figure 10. Consumption patterns shape social group identity. This includes, for example, aspects of the built

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environment, such as architecture, landscaping and leisure activities. Lifestyle and group identity is further influenced by commercial and political marketing strategies (Swan *et al.* 2011:182).

Alberti (2008:261-262) proposes agent-based structures to model decision-making processes through pattern-oriented modelling. Pattern-oriented modelling involves the observation of patterns at multiple scales and then relating these to agents, their behaviour and their interactions across scales (Alberti 2008:263). Efforts made by studies to relate these social and ecological realities have considered social characteristics of income, education, population density and lifestyle behaviour (Zipperer *et al.* 2011). Understanding these effects of social realities on the environment should guide the decision-making of those that have power in terms of control over land and access to information. Yet, as pointed out by Zipperer *et al.* (2011), existing structures and actions in a social system strongly influence decision-makers in their choices.

Giddens (1984) describes social systems as patterns of social relations and practices produced by structuration. In structuration theory, Giddens (1984) describes how human actions become continuous through internal structures that influence actions and activities and become the medium that produces the outcome of external structure or conduct. Individual actors and their actions are influenced by structures, and at the same time their actions reaffirm and create those structures (Giddens 1991:204). However, the core concern of this theory is as much recurrent social practices as their transformations, which can be studied through conceptual means (Giddens 1991:203). Although the human species is buffered against environmental changes by culture and technology, human beings are dependent on the flow of ecosystem services (MEA 2005). As our environment and lifestyle adapt to predicted urban realities, ecosystem degradation and climate change, resilience is the ability of a system to self-regulate and invent creative solutions in response to change (MA 2005). In this respect, studies confirm that individuals and small groups play key roles in initiating and managing change by means of decision-making for adaptive governance (Folke 2006:255). The next section elaborates on this.

2.3.6 Decision-makers and adaptive management

The MEA (2005) recognises the role of decision-makers, who affect ecosystems, ecosystem services and human well-being with their decisions. They can alter the direct drivers of change discussed in the previous section. Three levels of decision-makers have been identified: (1) individuals or small groups at local level; (2) public or private decision-makers at municipal, provincial or national level; and (3) public or private decision-makers at international level. Built environment professionals fall

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within the first or second group, and play a critical role in decision-making (Hansen & Pauleit 2014; Young 2011). The processes and feedback produced by the decisions of individuals and groups introduce vulnerabilities (Redman 2011:206).

The weaknesses of social complexity include the cost of the administrative hierarchy that manages goods and information, the loss in precision of information and the contextual influence of perceptions and values in decision-making (Redman 2011:211). According to Redman (2011:211), these problems do not have simple solutions and entail explicit attention to normative values of those involved. Though these values should be acknowledged, they also need to be compared and ranked and projected towards the future. From there the concept of complex adaptive systems arises, considering cyclical processes of human interaction and feedback with the environment that can lead to self-regulation, which is critical in terms of resilience and sustainability (Zipperer *et al.* 306). Adaptive management requires learning through the processing of information in the form of experimentation, monitoring and assessment (Gunderson 1999 in Zipperer *et al.* 2011:306). The concept of adaptive management has strongly influenced recent approaches to design in the built environment that is discussed further in the next section (refer to 2.3.7).

Powerful decision-makers have been identified as indirect drivers that often alter one or more direct drivers to bring about change. For example, green areas, vacant lots, and brown fields all can be turned into different forms of land use—from housing, offices, motorways or urban parks. Although this implies action of local authorities at public realm, conservation-minded citizens control private estates and gardens, while designers could give input to both these groups of actors. This affects the overall generation of ecosystem services (Alberti 2005; Ernstson 2013). No individual decision-maker has control over all drivers (MEA 2005). Social capacity entails skills, knowledge and world view (MEA 2005:210). The knowledge regarding decision-making has two dimensions: one entails the status quo, for example, ecological information, while the second relates to external social structures and how to influence them via social knowledge (Zipperer *et al.* 2011:307). As discussed under structuration theory in the previous section, institutions, policies and social and ecosystem resources are the products of previous human actions and intentions that enable and constrain new actions by agents (Morse 2007 in Zipperer *et al.* 2011:304). Moreover the motivation of the actor, rationalisation of action and knowledge, and ability for reflexive monitoring are equally important (Giddens 1984 in Zipperer *et al.* 2011:307).

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The study posits that built environment design professionals and specifically landscape designers are well positioned by their knowledge, skills and world view to influence decision-making and social structures. Landscape design practitioners have the power to influence the first four direct drivers of change (see Table 2) in everyday landscape projects across a nation. Their professional role allows them a central network position (Ernstson & Sörlin 2012) to make recommendations to those with control over land (Swan *et al.* 2011) that can greatly influence land cover and sense of place, which are seen as key integrators of social and ecological systems (Zipperer *et al.* 2011). In the next section contemporary approaches to design in the built environment are discussed, considering landscape design in particular.

2.3.6.1 Design professionals as role players

Research on ecosystem services in urban environments is providing foundational theory regarding actual and potential roles of professionals in the face of urban ecological challenges (Ahern *et al.* 2014; Grimm *et al.* 2000). The implications and consequences of design decisions as drivers of scientific progress and socio-political governance has become a key theme of socio-ecological research and has led to various design approaches that attempt to operationalise theoretical concepts. Sustainable design strives for the creation of futures that balance environmental, economic, and equity objectives to improve life for successive generations (Steiner 2014:2). It entails purposeful change of landscape patterns to sustainably provide ecosystem services, while meeting societal needs and with respect to societal values (Ahern 2011; Nassauer & Opdam 2008). Three closely related design approaches that were proposed in the last decade are: design experiments, adaptive design and regenerative design.

Designed experiments, promoted by Felson and Pickett (2005) and Nassauer and Opdam (2008), refer to transdisciplinary partnerships of scientists, planners and designers working to shape experiments into the urban mosaic, harmonising ecological goals with context, aesthetics, amenity and safety (Ahern *et al.* 2014). Similarly Ahern (2011) promotes a second concept of “safe-to-fail” adaptive urban design and “learning by doing” (Kato & Ahern 2008). This is a design concept through which pilot projects can test innovative but unproven solutions in a responsible and informed manner, with a low risk of failure. The approach explores innovative practices and methods, informed by ecological knowledge and research design, of selected urban plans and projects (Ahern 2012; Ahern *et al.* 2014; Rottle & Yocom 2010). According to Ahern *et al.* (2014:2):

> *Adaptive plans and projects are open to design innovations and creativity. They are monitored and analysed to learn with the goal of gaining knowledge to apply to future*

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> *projects. […] These activities take place in an experimental but small spatial extent mode where the possibility of failure is real. Importantly, the risk of failure is explicitly understood and accepted by decision-makers and stakeholders.*

Ahern *et al.* (2014) sustain that these initiatives from landscape designers that involve small risk taking can produce good workable examples, which are much needed in practice. The approaches of both design experiments and adaptive design relates to the concept of experiential learning, as advocated by Kolb (1984) and Dewey (1963) in education. As a consequence of a rapidly changing environment experiential learning becomes essential for modern living. As explained by Richards (1992:157) two decades ago: "… it will become more important to learn experientially so that the relevance of what is learned becomes apparent in adapting to a rapidly changing society, and there is an ability to live and function in today's world". Similarly inspired by the concept of change is the third approach of regenerative design.

Alberti (2008) cautions against traditional urban planning and design that aims to achieve a stable state, which reduces options, thereby decreasing resilience. Gunderson and Holling (2002 in Steiner 2014) equally promote planning and management that embraces uncertainty and complexity. They favour strategies that build flexibility, adaptability and resilience. These concepts led to the promotion of the concept of regenerative design, which attempts to create futures with an appreciation of uncertainty and flux so that subsequent generations are capable of adapting to change on their own terms (Steiner 2014). Although these design approaches are discussed in terms of all built environment professionals, several authors (for example, Gobster, Nassauer, Daniel & Fry 2007; Steiner 2014; Swaffield 2013; Waldheim 2006) identify landscape designers specifically as important role players with regard to processes of design in social-ecological systems. The role of professionals in collective behaviour in terms of social processes of articulation in the built environment (Latour 2005) is discussed under value articulation (see Chapter 4).

2.3.7 Ecological thinking in landscape design

As Corner (2006:26) explains, the term "landscape" is not equated with "nature" or unspoiled wilderness but to the human occupation of shaping land and natural processes in a reciprocal way. For this reason, landscape design as a cultural process ties in well with social-ecological systems thinking in urban environments. An ancient practice, landscape "…design comprises a creative integration of Landscape Values, form and process at a particular moment in time, which is realised by strategic interventions in the landscape at varying scales" (Swaffield 2013:1194).

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Landscape designers hold great possibility for social-ecological systems since they have been historically and are presently involved in urban green space decisions that affect public perceptions and the generation of ecosystem services. Urban parks can introduce foreign taxa, but they can also increase biodiversity and protect species (Kümmerling & Müller 2012:111). In terms of approaches to green infrastructure, the scientific ideal is for parks to be heritage sites, to house ecosystem services and to have social and aesthetic value at the same time (Hansen & Pauleit 2014). An intentional design approach can influence these abilities greatly. Recent reviews in urban ecology (Picket *et al.* 2011; Wu 2014) have acknowledged the visionary work of McHarg (1969) in terms of ecological design thinking in the 1960s.

A study by Kümmerling and Müller (2012) shows how design style can also have surprising outcomes. Their study indicates how a historic English landscape garden design, which allowed the use of natural topography, grazed grasslands and vistas, resulted in unexpected biodiversity habitats. The variety of views connected with vistas led to a mosaic-like distribution of different woodland and grassland habitats of different sizes. The edge effects produced created a wide variety of ecological niches. Unique plant communities and rare and endangered plants were found among the grasslands. The study provided insight into the biological conservation of historic parks. Similarly several ecological studies in urban areas relate to ecological design principles that are documented in new volumes (for example, Rottle & Yocom 2010) and historical works (such as Van der Ryn & Cowan 1996). Contemporary landscape designers have the potential to play a key role in the important research fields of ecosystem services, the role of green infrastructure, renewal of degraded urban places, and people's ability to adapt to new knowledge (Steiner 2014).

The consideration of landscape designers as role players in social-ecological systems is incomplete without a brief discussion of the conceptual framework of Landscape Urbanism, which emerged in the last couple of decades, mainly in the US. In spite of a longer history of landscape design driven by environmental thinking and principles from the 1960s, Landscape Urbanism made an appeal for a "new" theoretical premise for the discipline of landscape architecture. Landscape urbanists propose that landscape ought to replace buildings and transportation systems as the principal organising structure in urban design (Waldheim 2006). "The discourse of landscape urbanism establishes the significance of infrastructure and its associated landscape in the development of contemporary urbanism, and in the generation of public space" (Mossop 2006:165). These sentiments place

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landscape as the prime lens of representation and medium of construction for the contemporary city (Waldheim 2006).

As a seeming response to the urban and environmental crises, Landscape Urbanism theorists at the turn of the century advocated for the integration of ecology in city design and planning (Steiner 2014). This integration was proposed through emphasis on networks and complexity in order to create frameworks for urban transformation (Steiner 2014). The former broader regional planning thinking advocated by McHarg (1969) forms the foundation for much of Landscape Urbanism, which implies that large-scale systems understanding should come first (Steiner 2014:5). The focus is on abandoned urban territories and hazards becoming community assets and improving environmental conditions (Steiner 2014). The most renowned project examples thus far are the Freshkills Park and the High Line, both installed by the firm Field Operations in New York City (Steiner 2014:5). These projects have captured the attention of landscape architects worldwide. The High Line's romantic engagement with a post-industrial landscape—combined with concepts of cutting edge design and apparent ecological and public preoccupation—has made it an enticing reference point. At a cultural level it has been associated with neo-romanticist readings of aesthetic disorientation, the sublime and more modern preoccupations of psychological unease or feelings of estrangement associated with elitist romanticism of urban reality (Gandy 2013b:1310).

Landscape Urbanism is seen by some to promote urban sprawl and has certainly been opposed to New Urbanist "smart growth" initiatives, with much disagreement passing between supporters (Steiner 2014). New Urbanism centres on empirical observations and addresses the basic needs of urban life at pedestrian level. It is market-oriented and focuses on compact, multifunctional space design, human needs and adaptability (Steiner 2014). Landscape Urbanism has criticised New Urbanism for lack of ecological sensibility and a sole focus on socially determined designs through "rigid mechanisms of centralist planning" (Corner 2006). New Urbanism is also accused of restricting green areas to places that are too costly to develop and considering them as mere decorations (Steiner 2014).

Conversely, Landscape Urbanism has been accused of playing on the environmental crisis as a metaphor in order to strategically position the discipline of Landscape Architecture. These claims are based on the unimpressive use of natural species as a primarily visual effect with high cost and intensive maintenance (Duany & Talen 2013). Quigley (2011) has highlighted the general tendency of landscape architects to use plants ineffectively in design and concentrate on visual qualities. Gandy

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(2013b:1310) points out that in spite of much work in terms of plant community creation on the High Line, in the fashion of the sublime it ultimately replaces ecology with aesthetics through implicit "spectacularisation" of landscape, distancing it from direct cultural or scientific practices. In these acts Landscape Urbanism is seen to endorse aesthetic experiments by means of "cutting edge design" and using modernist architecture as accomplices, putting the creativity and self-renewing—of the designer—in first place regardless of social consequences (Talen 2013). Interventions are sometimes seen as remaining socially apathetic, unrelated to context and public space (Duany & Talen 2013). According to Talen (2013), the final outcome remains little more than an open-ended strategic model that does not address day-to-day challenges of urban dwellers. Meyer (2008) warns that there is a tendency for landscape design that focuses on ecological aspects of sustainability to not engage with the concept of beauty or the performance of appearance. Social equity, economy and ecology are pillars of sustainability with no room for aesthetics. Several studies pose convincing arguments for the important role that aesthetic experience can play in recognition, empathy and care for the environment through significant cultural impact (Gobster *et al*. 2007; Meyer 2008).

Notwithstanding, there are certainly reservations about contemporary movements in landscape design and the inability of these projects to meet either environmental or social requirements. Without invalidating the positive contributions these movements have made, this study has opted to not pertinently engage with these theories but rather to rely on ecological studies for green infrastructure principles. Alberti (2008:252) advises that disciplinary boundaries will not allow progress in the theory of urban ecosystems as social-ecological systems since no single discipline is free from its biases when devising an integrated perspective. More important than strategic positioning of disciplines with purposes of legitimisation is the understanding of the role that different actors and disciplines currently play as decision-makers and drivers in urban ecosystems and how this influences collective behaviour with regard to urban landscapes is a transdisciplinary objective. Alberti *et al.* (2008:155) advise that different disciplines are investigated for their biases and the social dynamics that give rise to these. This study has the latter objective.

2.4 Summary and conclusions

The literature review has set out a scientific rationale for the concept of social-ecological systems and aspects that pertain to landscape design. In brief, human activity, linked to urbanisation, has become one of the largest threats to biodiversity in the world today. Urbanisation is rapidly expanding and leading to habitat loss and degradation. This raises intimidating questions on how future urban development can result in an improved environment for all. In this context, cities are

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challenged to become places of high biodiversity protection and promotion. Landscape design can play a direct role in this process through facilitated assemblies in cities to house biodiversity through the approach of green infrastructure and/or to render essential ecosystem services. Some important considerations that form part of landscape process knowledge, which is critical for social-ecological resilience, include: requirements for biodiversity, approaches to green infrastructure and main categories of ecosystem services. These considerations are summarised below.

In terms of the review, the importance of biodiversity is scientifically accepted. Biodiversity is recognised to have: Functional Value as "ecosystem service" (MEA 2005; TEEB 2011), including direct psychological benefit (Pickett *et al.* 2011); and Fundamental Value for its role in ecological systems functioning and speciation (Lindenmayer & Fischer 2006), which includes security value in aspects of stability, functioning and sustainability of ecosystems (Redman 2011). These qualities can be ascribed to aspects of functional diversity (De Bello *et al.* 2010) and response diversity as key factors for building capacity for resilience (Ahern 2012; Elmqvist *et al.* 2003). These values reside in a tripartite relationship of diversity of species (Levin 1998 in Alberti *et al.* 2008), in keystone species and groups (Haines-Young & Potschin 2010), and in co-existence and interaction at the community level as functional units (Balvanera *et al.* 2006).

Urban ecological research aims to improve coexistence and sustainability in human-dominated systems. Research is increasingly centred on complex social-ecological systems as it seeks practical applications for planning and design in cities. The concept of ecosystem services explains nature's benefits to society; government planning and policy increasingly promotes its use. The effective design and implementation of green infrastructure is related to socio-cultural processes, which affect the production of ecosystem services in urban development. Due to social and ecological considerations, green infrastructure design and management should allow for both green structure and social governance. This is achieved by means of connectivity, integration and multifunctionality, through a multi-scale, multi-object approach, and strategic approach of social inclusion and transdisciplinary knowledge considerations (Hansen & Pauleit 2014). According to the literature, the following four categories of ecosystem services are important for inclusion in green infrastructure: Cultural, Regulating, Provisioning and Supporting Services (MEA 2005; TEEB 2011). Decision-makers such as landscape designers are significant stakeholders in terms of green infrastructure design considerations (Steiner 2014; Swaffield 2013).

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Besides landscape processes, different social factors influence land use practices at the level of implementation and affect social-ecological systems. These social factors include actors, organisational levels, knowledge systems and implementation instruments (MEA 2005); in constructivist social theory, these factors and processes are termed social production. Metaphors like sustainability and resilience reflect a collective reality and are used for effective decision-making with emphasis on human security and well-being. System models of social-ecological systems increasingly acknowledge social norms, values and value perceptions as important indirect drivers in social-ecological systems (MEA 2005; Van Oudenhoven *et al.* 2012). According to Ernstson (2013), ecosystem services are in this way also socially produced, and the socially accepted services of nature become representative of value systems in a specific community. Important social considerations include control over land, power and social expectations (Swan *et al.* 2011). Landscape design has specific control over direct drivers of change in ecosystems and their services like land use and cover, or introduction or removal of species (MEA 2005), while forming part of social lifestyle expectations that again influence human values. Furthermore, despite structuration in society that mostly reaffirms current systems (Giddens 1984) individuals and small groups, of which landscape designers form part, have shown potential to instigate social change (Folke 2006).

Landscape design has an important position in social-ecological systems with regard to resilience, as it is concerned with land and human processes and has been acknowledging ecological principles in design for the past half century. Recent attempts of Landscape Urbanism to build on this legacy have been less successful since Landscape Urbanists overlooked the important concepts of vegetation as building block for biodiversity and social inclusion. Regarding the role of professional practice for social-ecological resilience, Alberti (2008) urges the consideration of social group dynamics, as well as the biases captured in the data, methods, reasoning and values of disciplinary practices. The conceptual tool of ecosystem services holds potential for such an analysis.

In conclusion, this section has reviewed the rationale that supports social-ecological systems from both an urban ecological and a social production point of departure. It identified two major components of value for resilience that appear throughout contemporary scientific discussions on social-ecological systems, which pertain to landscape design practice. These components include: firstly, landscape process knowledge and the scientific or Fundamental Value of biodiversity, and secondly, philosophical or cultural human values that have ethical importance for humankind and affect urban ecological processes. Landscape process knowledge holds potential for improved design approaches to green infrastructure and design decisions for resilience through ecosystem service

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generation. Chapter 5 provides a succinct review and summary of considerations for landscape design practice with regard to biodiversity, green infrastructure and ecosystem services. The second component of value is the social production importance of human cultural, philosophical and ethical values and consequent behavioural patterns for resilience. Chapter 3 presents a literature review of core concepts and theories of human values as related to environmental management. Subsequently, through ethical considerations, Chapter 4 ventures into the fields of value change and operationalisation.

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Chapter 3



spiritual well-being

ESS image by Jan Sasse (TEEB 2011)

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CHAPTER 3: Human Values and Nature

3.1 Introduction

Socio-political factors and how the environment is considered in people's minds are increasingly recognised as influences that greatly affect ecological outcomes (Ives & Kendal 2014:67). This chapter reviews the concept of human values as it relates to nature and specifically biodiversity in urban nature. It defines and delineates human values as considered in recent studies on environmental values, attitudes and behaviour. The chapter seeks to identify the implications of these values for social-ecological systems. Human attitudes towards nature and the environment vary widely.

Özgüner (2001 in Özgüner & Kendle 2006:140) cautions that people's perceptions of nature and what is "natural" differ. These perceptions can either be opposed to built-up spaces or as a counter setting to a formal park. As discussed in the section on social drivers of change in ecosystems (refer to 2.3.5), human perception and associated preferences for natural areas vary depending on age, gender, social characteristics, cultural background, past experience, motives and the daily routine and particular interests of the person (Özgüner & Kendle 2006:141; Rohde & Kendle 1994).

The role values play has become apparent precisely due to the difficulty for designers of green areas to meet public expectations unanimously, despite increased awareness of the benefits of ecosystem services. This rightfully shows the importance of ecosystem disservices, as well as the cultural importance of and learned preference for formal and ornamental green spaces (Rohde & Kendle 2006). A recent review of value-related studies (Ives & Kendal 2014:71) concludes: "[n]o longer can ecological management progress on biophysical knowledge alone; every action and intervention is drenched in human values of some kind". There is thus a renewed international research interest in human behaviour steered by underlying knowledge and values, to uncover parallels between human values and biodiversity conservation. The aim is to consider human values in decision-making concerning landscape management and conservation as a way to increase resilience in systems.

This chapter reviews a large number of studies on values and has grouped them into a structure based on the focus and approaches taken in the studies (see Figure 12).

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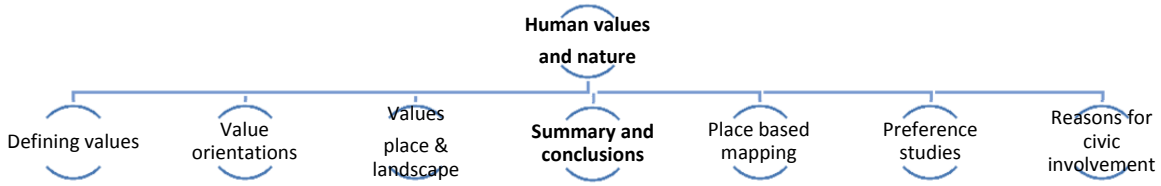


Figure 12: Chart showing chapter layout and groupings of value-related studies

Defining social values can be challenging, as there are different interpretations and applications in everyday use and academic disciplines—for example, philosophy, economics, sociology and psychology (Ives & Kendal 2014:68). The first section distinguishes between different types of values and argues the significance of held and assigned values. Considered as a projection of held values, the second section gives a short review of environmental value orientations as differentiated by different disciplines. This is followed by a review of different studies on values assigned by people to "place" and "landscape" and identifying possible reasons for this and implications for this study.

Values can be captured and quantified for large-scale predictions or qualitatively interpreted to gain in depth understanding (Ives & Kendal 2014:68). The following subsections consider methods for the capturing of held and assigned values: firstly, by considering studies that use a more quantitative approach through place-based mapping method; secondly, by reviewing studies with various novel methods that considered user preferences in urban settings; and lastly, by means of in depth qualitative studies that engage with reasons for civic involvement in green space. The chapter concludes with a summary of key points.

3.2 Defining human values

As a point of departure it is important to define the different kinds of values identified by the research. The initial discussion of biodiversity in Chapter 2 distinguished Functional Value from other human values as objective and non-preference related. Dietz, Fitzgerald and Shwom (2005) differentiate subjective socio-cultural values from attitudes, beliefs and norms. Ives and Kendal (2014:68) contrast these as follows: attitudes are likes or dislikes expressed in the form of preferences, while beliefs are often adopted (see Lockwood 1999) and relate to how people understand the world; meanwhile, norms refer to common consensus that dictates correct and

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wrong behaviour in social situations. Lockwood (1999:382) further distinguishes cognition, as understanding of people—whether factually correct or not—with respect to Functional Values, highlighting the importance of knowledge (refer to 2.2.2 for a discussion on the Functional Value of biodiversity). Values are regarded as more stable than cognition, beliefs and norms, yet all these have an influence on behavioural intentions and behavioural outcomes. Figure 13 illustrates these concepts that become progressively plentiful and changeable from bottom to top.

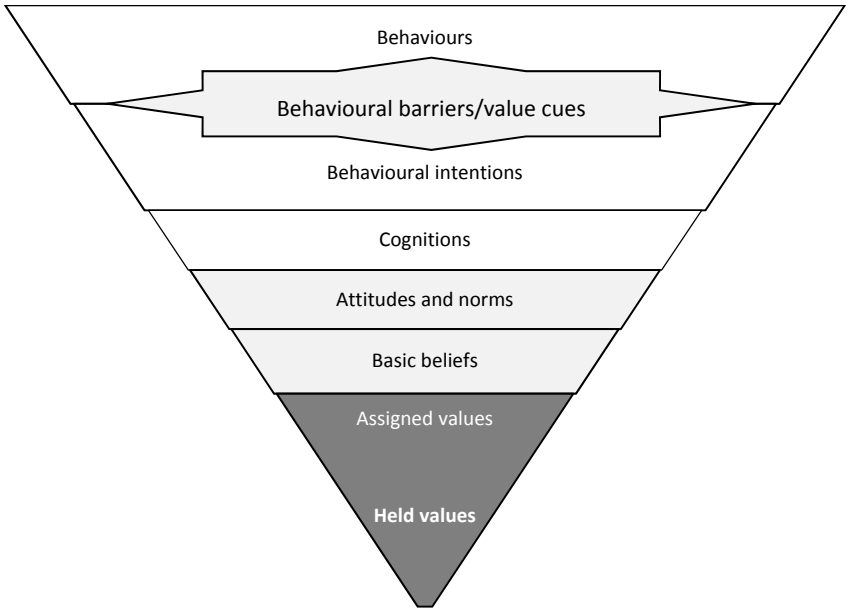


Figure 13: Visual representation of cognitive structures related to underlying values

Source: by author, adapted from Ives and Kendal (2014), Lockwood (1999) and Steg *et al.* (2014)

In their review of value concepts across different disciplines, Ives and Kendal (2014) further separate two types of values that are used throughout this study. Primarily, values can describe people's preference for a particular means based on deeply engrained standards—these are "underlying values", which are henceforth referred to as held values. These value orientations[3] held by people, shape their perception of the world (Ives & Kendal 2014:68) and affect their judgment or actions taken. On the other hand "assigned values" (term from Bengston 1994) are given to valued objects and refer to the relative worth given to things (Ives & Kendal 2014:68).

Assigned values are the subject of economics and often receive more attention in ecological management. Conservation planning tools mostly assign values to species related to level of threat, ecological function or genetic uniqueness (Arpogen *et al.* 2005 in Ives & Kendal 2014:68). Yet, these

[3] Note that some authors distinguish held values from value orientations. See Lockwood, M. 1999. Humans Valuing Nature: Synthesising Insights from Philosophy, Psychology and Economics. *Environmental Values,* 8(3):381-401.

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values often do not align with decisions by governing authorities related to different sets of social and political values (Brechin *et al.* 2002 in Ives & Kendal 2014:68). Another problem with assigned values is the incommensurable nature of some values. They are unable "to be reduced to a single scale of measurement that allows them to be compared directly" (Bengston 1994; Ives & Kendal 2014:68)[4]. The concept of cardinal utility theory allows for comparison and value trade-offs (Ives & Kendal 2014). The intangibility and incommensurability of some ecosystem services make them difficult to quantify. This has been highlighted as a concern in cost-benefit analysis (see section 4.5 on economic valuation and incommensurability). Regardless of these difficulties, assigned values are useful in environmental management since they apply more directly to management goals and actions (Seymour *et al.* 2010 in Ives & Kendal 2014:69).

Of fundamental importance are held values—more stable guiding principles of varying importance (Lockwood 1999)—that underpin and relate to assigned values (Ives & Kendal 2014). Enquiry has managed to reveal relationships between underlying values, assigned values and management preferences (Ives & Kendal 2014:70). Jax *et al.* (2013:262) point out the implication that held values already influence to a large extent how ecosystems are perceived and what is considered an ecosystem service. This results in normative aspects being of importance in the social construction of conceptual tools such as ecosystem services and also in their measurement and evaluation. These choices reflect specific individual or societal values, or are often representative of values of specific groups within society (Ernstson 2013; Ernstson & Sörlin 2012; Jax *et al.* 2013:262). The influence of held values is often overlooked, while in essence their unconscious stimulus over assigned values and management preferences implies that they are utmost import. The next section reviews and considers the different value orientations towards the environment identified by various disciplines.

3.3 Environmental value orientations

The interdisciplinary field of environmental psychology has developed different instruments to measure environmental values (Ives & Kendal 2014:69). These frameworks have been shown to predict environmental behaviours and attitudes and suggest that there are different ways in which people value nature. Based on this, different disciplines have distinct categorisations of value orientations used in studies. Defined by Axelrod (1994 in Lockwood 1999:382) a value orientation is a position taken by an individual that reflects a particularly important group of related held values. "Peoples' value orientations are likely to be especially strong determinants of their pro-environmental actions because people often need to react to environmental conditions or problems

[4] These findings are consistent with the philosophy of "value pluralism" (see Bengston 1994).

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on the basis of very limited experience" (Stern & Dietz 1994 in Lockwood 1999:382). People may however hold more than one value orientation (Lockwood 1999). Table 2 presents a summary of some of these categories.

Table 2: Summary of environmental value orientations identified by different authors and disciplines

Values influencing environmental beliefs and actions (Steg, Bolderdijk, Keizer & Perlaviciute 2014)	Ways humans value nature (Jax *et al.* 2013 based on Muraca 2011)	Value dimensions of the service consumer experience (Russell-Bennett, Previte & Zainuddin 2009)	Valuing plant and animal life (Goulder & Kennedy 1997)	Economic framework values (Lockwood 1999)	Environmental value orientations (Schultz & Zelezny 2003)	Environmental values (Thompson & Barton 1994)
Behavioural and social sciences	**Environmental ethics**	**Advertising and marketing**	**ESS economic valuation**	**Economics**	**Psychology**	**Environmental psychology**
Self-transcendent values Biospheric: concern with nature and the environment for its own sake	Intrinsic value: in and for itself that implies moral obligation towards it	Emotional value: intrinsically motivated in terms of the emotional experience directed at self	Non-use: Existence value	Intrinsic	Biospheric: nature centred	Eco-centric: valuing nature for its own sake
Self-transcendent values Altruistic: concern with the welfare of others	Fundamental Value: as a basic condition for life on earth	Altruistic value: intrinsically motivated in terms of self-fulfilment or a sense of well-being and directed at others	Non-use: Option or risk value	Non-use	Social Altruistic: human centred	
Self-enhancement values Hedonic: improving one's feelings and reducing effort	Eudaimonistic Value: as a basic condition for good human life	Social value: extrinsically motivated in terms of status or influence directed at others	Direct, non-consumptive use value			Anthropo-centric: valuing nature because of material or physical benefits it can provide for humans
Self-enhancement values Egotistic: safeguarding or increasing one's resources	Instrumental Value: as a means to something else; functional utility	Functional value: extrinsically motivated for self-benefit	Direct consumptive use value	Use	Egoistic: self-centred	

Source: compiled by author (2014)

Table 2 presents anthropocentric and eco-centric value orientations identified in the literature, with further nuances indicated from right to left. A first observation is that authors have begun to distinguish Eudaimonistic Value—basic condition for good life—from Instrumental Value—functional utility. Lockwood (1999) explains how economics rests largely on Western philosophic traditions where the natural world is only of Instrumental Value or direct utility to human needs. Researchers in the last decades continue to challenge these views, and the ecosystem services concept employs consumptive and non-consumptive values within Cultural, Regulating and Provisioning Services. Biodiversity can be associated with Intrinsic Value within the ecosystem services framework but is more closely with the concept of Fundamental Value. As pointed out, some authors do not acknowledge biodiversity as an ecosystem service (Wu 2014), precisely since it is not seen as a direct use or non-consumptive use value. Biodiversity importance is recognised separately in these system models.

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A noteworthy distinction therefore is the difference between the Intrinsic Value—in and for itself—and Fundamental Value—as a condition for life on earth—of nature (Jax *et al.* 2013). Several authors point out that the existence of an Intrinsic Value in nature is vital for a coherent interspecies ethic (Byrne 2011; Chiesura & Martinez-Alier 2011; Kaplan 2011; Lockwood 1999; Nicholson-Lord 2011), but as yet no consensus has been reached on this topic. Lockwood (1999) expands on the idea and measurement of Intrinsic Value, pointing out the difficulties and shortcomings in studies associated with this value. In essence the concept can refer to inert nature, life forms, species, ecosystems and landscapes. However, of great importance to this study, Lockwood (1999) explains that the identification of Intrinsic Values is imperative for inclusion in stakeholder preference and decision-making processes. "Such identification is important, because, […] Intrinsic Value beliefs are likely to influence the mode by which an individual makes environmental decisions" (Lockwood 1999:386). As Table 2 shows, important sections of human value orientations can be obscured by the way conceptual tools are employed. Institutional contexts often select a priori value framework that can influence value expressions because participants have to construct their values within these imposed limitations (Lockwood 1999). Individuals should be able to express their assigned values in a manner that is congruent with their held values, since "[c]ognitions regarding the essential nature of some functional values, or beliefs concerning an intrinsic value in nature, may influence the manner in which assigned values are constructed and expressed" (Lockwood 1999:396). Callicott (2002) refers to Kantian philosophy to explain the normative roots of Intrinsic Nature Values. Intrinsic Nature Values are important for decisions and behaviour because they are normative; the importance of normative values for pro-environmental behaviour is further explained in 4.2

It is further of significance to note the difference between intrinsic and extrinsically motivated values, as explained in marketing theory (Russell-Bennett *et al.* 2009). These categories coincide with the self-fulfilment versus self-enhancement values distinguished by Steg *et al.* (2014) in the social and behavioural sciences. Intrinsic or self-enhancement values relate to normative values or a moral obligation towards people or nature, while extrinsic or self-enhancement values largely depend on incentives or benefits gained from actions. The next chapter discusses the potential influence of these underlying value orientations on user behaviour and service consumption experiences (refer to 4.2 and 4.3).

In terms of applied studies, there has been little research on how assigned values relate to underlying values for the environment (Ives & Kendal 2014). More research has focused on how

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people assign values to places. This process is relevant for enquiry into professional values that rest essentially on values assigned through cognisance of functional and subjective human values for design response (see 4.7). The large body of work dealing with how people assign values to place reveals aspects of the environment that are discursively related to human senses and emotions. It is useful to consider human inclinations and biases regarding nature, which are often unconscious and socio-culturally shaped.

3.4 Values assigned by humans to place

3.4.1 Place

According to Buell (1995 in Harvey 1996:303), when considering "nature" in the form of environmental issues, it is essential to confront the idea of place. Place is a metaphor related to concepts of space and time that affect how humans comprehend the world (Harvey 1996:208). The idea of place offers a middle ground, hovering between an objective fact and a subjective feeling (Saar & Palang 2009:5). Language constitutes the most important sign system for human society and maintains the common "objectivations" of everyday life; it accumulates meaning and experience, which can be preserved in time and transmitted to the next generation (Berger & Luckmann 1966:50-52). Fisher (1993:31) argues that through these processes language and artefacts can become agents of cultural homeostasis as they transmit past values and meanings continuously into the present, offering certain aspects of permanence. Harvey (1996) identifies several historical groups of thinking on place. In a review of recent studies these approaches seem to remain contemporary metaphors for urban nature. Place is ontologically explained in many different ways: as where environmental qualities reside (Stedman 2003); as the locus of being (Heidegger 1971); as the *genius loci* (Norberg-Schulz 1980); of collective memory (Barthel, Folke & Colding 2010); of community (Colding & Barthel 2013); and of the politics of power (Ernstson & Sörlin 2012). Table 3 provides a summary of the authors cited in the forthcoming section, including the metaphors they employ, the triggers they identify and how this relates to human values. Authors have been grouped in terms of similarity of thought and the potential these ideas hold for environmental management.

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Table 3: Summary of literature reviewed in terms of metaphors of human value related to place and aspects that trigger them

Authors	Metaphor	Trigger(s)	What humans value	Potential
Norberg-Schulz (1980)	Genius loci	Imbued in the setting itself: particularities of place	Spirit of place Environmental distinctiveness	Protection of place
Harvey (1996)	Metaphors	Human imagination	Material social practices	Meaning
Tuan (1977)	Place	Environmental qualities	Lived experience Identify with place	Infuse meaning
Satanaya (1896/1961 in Thompson 1999)		*Sensory aesthetics* *Formal qualities*	Symbolic cultural meanings	Meaning
Ryden (1993:38)		*Environmental qualities: senses and movement*	Colour, texture, slope, quality of light, the wind: sounds and scents	Visual pleasure
Gobster, Nassauer, Daniel and Fry (2007)	Landscape	Landscape patterns Landscape context Situational context	Aesthetic experience	Influence actions that affect landscape
Hull, Lam and Vigo (1994)	Place	Place icons	Symbols of their memories and values	Symbolic meaning
Stedman (2003)	Sense of place	Environmental qualities Landscape attributes	Constructed meaning associated with characteristic experiences Meaning underpin attachment and satisfaction	Attachment and satisfaction
Jorgensen and Stedman (2001) Heidegger (1971)	Place	Environmental qualities	Defining human identity	Attachment
Devine-Wright and Lyons (1997)	Place	Traditional activities	Bond with place	Attachment
Sörlin 1999)		Landscapes	Image and self-understanding of nations and regions	Group identity
Misztal (2003 in Barthel *et al.* 2010)		*Social interaction: language, symbols, events, and cultural context*	Recalled experiences Memory	Individual identity
		Collective narrative constructions: imagery, memory and emotion	Sense of belonging	Social group identity
Fisher (1993)	Artefact	Language and other artefacts	Objectivations accumulating and transferring meaning and experience	Cultural homeostasis
Lefebvre (1974/1991)	Space	Human imagination:	Objects as symbols	Change and appropriation of physical space
Paasi (2001 in Saar & Palang 2009)	Place	Deeply personal vs. Global	Historic reasons Ideologies	Social transformation
Ernstson and Sörlin 2012)	Place and nature	*Globalisation* *Market- driven*		*Erode popular meanings*

Source: compiled by author (2014)

Kuhn (1988 in Harvey 1996:164) points out that metaphors are not purely produced from human imagination; they are also tied to literal meanings. As explained by Cronon (1996a:458) "although ideas of nature may be the projected ideas of men and women, the world onto which we project those ideas is by no means entirely of our own making". Literal meanings, though tied to our thoughts, mainly attach to social and material practices and experiences of the world (Harvey 1996:164). Due to this importance of environmental qualities in terms of human experience, discussion of place is often expanded to how and why humans connect to or value nature. The conclusion reached by Cronon (1996a) is based on the formulation of Williams (1980), who posits that "nature" becomes the meeting place between the external world and "the culturally

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constructed ideas and beliefs and values we project onto that world" (Williams 1980 cited in Cronon 1996a:458). Human imagination seeks to change and appropriate physical space, making symbolic use of its objects (Lefebvre 1974/1991:39). Attempts to relate humans and human values to nature for this reason often employ the term "sense of place", precisely because it combines aspects of the physical environment, human behaviours, and social or psychological processes in its definition (Stedman 2003:671).

According to social sciences research, humans create identities by defining themselves in relation to places (Jorgensen & Stedman 2001). This notion of identification with place is also shared by Heidegger (1971) and connects to the position of Tuan (1977), which posits lived experience as an infuser of meaning and a constructer of place. Tuan (1977:6) suggests: "[w]hat begins as undifferentiated space becomes place as we get to know it better and endow it with value". A very concrete position in terms of lived experience is that of Ryden (1993:38) whose studies emphasise the environmental qualities that humans appreciate through senses and movement such as "colour, texture, slope, quality of light, the feel of wind, the sounds and scents carried by that wind''. Sense of place is in this way conceived as encompassing meanings and attachment but also satisfaction (Stedman 2003:672), which relates to Eudaimonistic Value discussed in the previous section.

Hull *et al.* (1994) connect aspects of the above findings by showing that people enjoy specific places due to the place icons that serve as symbols of their personal memories and values and connect to the self. Here the sense of place is based on symbolic meanings attributed to the elements of the setting (Stedman 2003:672). On a broader scale, Sörlin (1999) illustrates that landscapes are profoundly part of the image and self-understanding of nations and regions, relating to collective identity. Saar and Palang (2009) suggest that place meaning unites different processes—from the deeply personal on a micro scale to the macro scale that equally entails global change. However, the importance of locality is undeniable, since similar outside forces of global change can bring about dissimilar outcomes depending on the local context (Molotch, Freudenburg & Paulsen 2000). Place meaning is not similarly influenced by outside forces everywhere; this has been attributed to social transformation, historic factors and ideologies (Paasi 2001 in Saar & Palang 2009:10) (see also the related discussion on landscape types in section 3.4.2). Ernstson and Sörlin (2012) warn against the politics of globalisation that may erode these nuanced popular "meanings" of place and nature, irrespective of the location, due to the market-driven importance of environmental politics that mostly use economics as a universal language and fail to address environmental justice.

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In the constructivist perspective, meaning does not come from nature itself. Even basic ideas in the current paradigm were constructed through social processes. Misztal (2003 in Barthel *et al.* 2010:256) explains how individual memory processes and identity are derived from social interaction facilitated through language, symbols, events, and cultural contexts. Social groups also build their own agreed upon images of the world through negotiation, not private remembrance. This is termed collective memory and is constituted through a stable social framework of verbal conventions (Misztal 2003 in Barthel *et al.* 2010:256). Devine-Wright and Lyons (1997) claim that the more actively an individual is involved in traditional activities the stronger is the bond between the individual and places. Ernstson and Sörlin (2009 in Ernstson 2013:12) posit: "[n]o object or biophysical process carries inherent value, and there is no innate order of value between objects—values are constructed and hierarchized through social processes, which can be empirically studied". Similarly Harvey (1996:164) points out that values are part of metaphors (not of nature) strongly tied through human imagination, back to material social practices (see also the discussion on cultural landscapes in section 3.4.2).

This study conforms to the position of Stedman (2003), which shows how constructions of place are not exclusively social, but that people relate to landscape attributes directly to construct meanings. Attributes of the environment are associated with characteristic experiences (Stedman 2003:671). Symbolic meanings are produced from these experiences, and these meanings in turn reinforce place attachment and satisfaction (Stedman 2003:675). Stedman (2003) argues that in this way landscape characteristics underpin both place attachment and satisfaction, but in very different ways. He further claims that the effects of landscape change on human attitudes and behaviours can be modelled. In his study, people were more satisfied with deep lakes that have less shoreline development, clearer water, less public access and lower chlorophyll levels (Stedman 2003). The effect on place attachment is more complex, but modelling reveals the indirect effects of symbolic meanings. More developed lakes are less likely to be "escape places" and more likely to be "social places". Because each of these meanings is positively associated with attachment, shoreline development changes the symbolic base of attachment without affecting overall attachment (Stedman 2003:682). Stedman's theories (2003) coincide with those of Satanaya (1896/1961 in Thompson 1999) that emphasise sensory aesthetics, formal qualities and symbolic cultural meanings.

Sense of place and land cover are important for integrating social and ecological systems (Zipperer *et al.* 2011), as pointed out in Chapter 2. The ancient Roman concept of *genius loci*—described as a

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spirit of place imbued in the setting itself (Stedman 2003:675)—provides a powerful example. This concept has been actively used and taught among design disciplines, especially landscape architecture (Dee 2001). Upheld by the writings of Alexander Pope (1731/1995) and Norberg-Schulz (1980), respectively, the concept of *genius loci* has urged designers to respect the particularities of place or local distinctiveness. Sense of place, described as environmental distinctiveness and respect for particularities (Thompson 1999), has proven important for maintaining the quality of the environment since landscape perceptions may lead to protection of places (Gobster *et al.* 2007; Sörlin 1998 in Ernstson 2013).

Contemporary scientific metaphors allow for new understandings of the human-nature relationship and new landscape characteristics, but need to be tied to existing meanings in order to create attachment and satisfaction. Landscape designers do not only intuitively react to these notions but can also actively employ them in design endeavours. As is to be expected, landscape designers prefer the use of the term "landscape", which embodies historic references with specific potential to integrate social and ecological aspects.

3.4.2 Landscape

Several authors allude to the cultural and linguistic interpretation of the word "landscape". These authors differentiate between the Dutch term "*landskip*"—used for paintings, which suggests landscape as image—and the term "*schaffen*"—originating in old English, old German and Nordic, which suggests to shape, or landscape as interaction between people and place (Corner 1999a; Tengberg, Fredholm, Eliasson, Knez, Saltzman & Wetterberg 2012; Whiston Spirn 1998/2002). Whiston Spirn (1998/2002) argues that the terms "environment" and "place" are not interchangeable with the term "landscape", as they do not acknowledge people or connect them with place. However, similarly to the word "environment", the term landscape has derived many popular meanings. Davoudi (2012) explains from a British perspective how the term environment is associated with a number of concepts: local amenity, heritage landscape, nature reserve, storehouse of resources, tradable commodity, problem, sustainability and risk. Equally, Qvistrom (2013) illustrates the discursive use of the term landscape, which can be interpreted as: scenery, area, nature, topography, polity, space, recreation, land use, an assemblage of nature/culture or a local/historical perspective. On the surface the argument of Whiston Spirn (1998/2002) rings true; from the comparison above there are fewer negative interpretations of landscape by Qvistrom (2013) in Sweden than of environment by Davoudi (2012) in Britain—for example, interpretation of environment as a "problem" or "risk". However, these findings are place specific and cannot be so

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arbitrarily compared; nonetheless, the visual and social connections associated with interpretations of landscape are arguably important cultural value aspects.

Pertaining to the visual aspect of landscape, biological theories are abstract theories that aim to trace universal reasons for the affinity of all humans with nature to a biological basis (Kellert 1993 in Özgüner & Kendle 2006:141). These theories attempt to explain the general formal and symbolic aspects of the environment that benefit humans when "recognising meaningful patterns" (Thompson 2009). These theories include the *biophilia* hypothesis (Kellert & Wilson 1995), savannah hypothesis (Orians 1986), information processing theory (Kaplan & Kaplan 1989) and prospect refuge theory (Appleton 1984). Though appealing, these theories remain highly speculative, and only the last two have been formally adopted in terms of landscape design principles (see Dee 2001). The Kaplans' four characteristics of landscapes of rich information—namely, complexity, coherence, legibility and mystery—have proven to be the most useful of these theories in terms of landscape design (see Dee 2001).

Table 4 groups the ideas of authors around landscape discussed in this subsection in terms of similar thinking. Aspects of human affinity towards landscape are identified, as well as their potential for linking aspects of social and ecological importance.

Table 4: Summary of landscape related metaphors and human affinity as expressed by authors

Author	Metaphor	Human affinity	Potential
Qvistrom (2013)	Landscape	· Scenery, area, nature, topography, space, · Polity, recreation, land use, · An assemblage of nature/culture, or a local/historical perspective	An assemblage of nature/culture
Gobster *et al.* (2007)	Landscape	· The physical patterns humans perceive as making up our surroundings · Perceptible realm · Aesthetic experience	Scale at which humans intentionally change environmental processes Landscape aesthetics provides a critical linkage between humans and ecological processes.
Kaplan and Kaplan (1989)	Nature	Information processing theory (visual)	Provoke spontaneous interest
Appleton (1984)	Landscape	Prospect refuge theory	Provide comfort in exploration
Turner (1989 in Tengberg *et al.* 2012)	Landscape	Structure, function and change Memories and identifications	Ecosystem management has been shown to also prevent the loss of heritage values
Tengberg *et al.* (2012)	Cultural landscape	Cultural heritage	
MEA (2005)	Cultural ecosystem services	Heritage values, cultural identity, spiritual services, inspiration, aesthetic enjoyment	Stimuli for owning, managing, and conserving land Potential for multifunctionality

Source: compiled by author (2014)

In terms of socio-cultural interpretation of landscapes, Gobster *et al.* (2007) explain landscape types as land use interpretations influenced by social norms and personal expectations (see also Zipperer

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et al. 2011 who relate this idea to land cover). Landscape types are influenced by a combination of land ownership, land use, cultural history, and spatial extent, and in return influence the observer's intentions (Gobster *et al.* 2007). Gobster *et al.* (2007) point out another dimension of context. The interaction of landscape and situational contexts includes personal, social and cultural factors that influence observer familiarity or mood (as discussed in 3.4.1). These considerations lead to recognition of human affinity towards landscapes and arguments of landscape as cultural heritage promoted in the contemporary construct of "cultural landscapes".

Cultural landscapes are defined as the result of the action and interaction of natural and/or human factors (Tengberg *et al.* 2012:17). These studies are bound to the social sciences and therefore concerned with concepts of social construction of meaning. These constructivist theories contest intuitive and instinctive biological theories. Since cultural landscape studies have up to now been largely concerned with heritage, the themes of memory, identity and commemoration are central. Cultural heritage includes natural or cultural features within landscapes that are significant in some way to the present, not only as tangible historical objects but also in terms of the intangible (Tengberg *et al.* 2012:17) that resides in the mind. This aspect is also useful in terms of environmental protection and ecosystem services, which are not all tangibly perceived by humans. Several charters have been drafted that relate to natural and cultural heritage (for example, Burra Charter, ICOMOS Ename Charter), with strategies and tools to create consensus on how this heritage should be regarded and treated.

Landscapes are sites of importance for people's memories and identifications, whether individual and collective, which challenges current research on the changing character of landscapes (Tengberg *et al.* 2012). According to Turner (1989 in Tengberg *et al.* 2012:16), three fundamental characteristics of landscape as a spatially heterogeneous area are structure, function and change. Marcus (1992 in Barthel *et al.* 2010) emphasises the role of memory, as recalled experiences continue to shape current place meanings. Memories are argued not to represent documentaries of events, but interpretations for narrative constructions, which are strongly connected to emotions, thus holding the possibility of distortions (Misztal 2003 in Barthel *et al.* 2010:255-256). "Cultural heritage is thus not only what former generations built-up but also the way it is interpreted, valued and managed by contemporary society in our everyday life" (Tengberg *et al.* 2012:17). These charters and guidelines may provide existing lenses that can be useful when considering cultural and public perceptions and how they influence and should influence natural resource protection and

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landscape change in a highly urbanised future. Linking cultural landscapes and cultural ecosystem services is a potential avenue for integrating these objectives (Tengberg *et al.* 2012).

Heritage values and cultural identity are two of the six categories of cultural ecosystem services recognised by the MEA (2005), along with spiritual services, use of nature to inspire art, aesthetic enjoyment of natural and cultivated landscapes, recreation and tourism. Methodological challenges lead to cultural ecosystem services rarely being fully considered in ecosystem services assessments (Plieninger *et al.* 2013; Wu 2014). Syrbe and Walz (2012:87) argue: "given the complexity of modern landscapes, it is perhaps not necessary to give simple values for all services and in all cases. Cultural services, in particular, such as scenic beauty, ethic values, or educational values can therefore be described multidimensionally or qualitatively". Here, in particular, existing cultural heritage methods may be usefully applied. Planning and management of cultural heritage and ecosystems needs to both include different local perceptions and values (Tengberg *et al.* 2012:17), and shows potential in terms of linking the management and conservation of cultural heritage with that of landscapes and ecosystems (Plieninger *et al.* 2013; Tengberg *et al.* 2012). A potential further synergy between heritage value and environmental management is the concept of transdisciplinary and different knowledge systems as promoted by the MEA (2005) and Hansen and Pauleit (2014). Indigenous Knowledge Systems in landscape and ecosystem management have been shown to prevent the loss of heritage values and cultural landscapes (Wu & Petriello 2011 in Tengberg *et al.* 2012:14) and can have similar value for ecosystems.

Importantly, Cultural Services cannot be treated independently because they rest on Provisioning, Regulating and Supporting Services (refer to 2.2.6). Moreover, it is the way cultural ecosystem services manifest that affects the way ecosystems and other services are seen and managed (MEA 2005 in Tengberg *et al.* 2012:15). Cultural Services are often related to landscape features and land cover forms. Therefore, in contrast to most Regulating and Supporting Services, Cultural Services are directly experienced and instinctively appreciated by people (Daniel *et al.* 2012). In a study by Plieninger *et al.* (2013), respondents relate miscellaneous Cultural Services and multiple local-level sites to their personal well-being; these include aesthetic values, social relations and educational values. For this reason Cultural Services are ideal stimuli for owning, managing and conserving land (Chan *et al.* 2012 in Plieninger *et al.* 2013). Furthermore, Cultural Services are often enjoyed in "bundles" and therefore encourage positioning of ecosystem services management towards multifunctionality, which is a much desired outcome in land use science and policy (Plieninger *et al.* 2013). The promotion of multifunctionality in urban landscapes and the inclusion of multiple

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ecosystem services (including biodiversity), however, often requires changes to existing landscape patterns of aesthetics. This highly valued visual aspect offers a further pertinent opportunity for environmental management.

Gobster *et al.* (2007) illustrate the importance of aesthetics of place in terms of human instigated landscape change. Recognised as a cultural ecosystem service, the authors argue that the perceived aesthetic value of landscapes can influence the attention people give to ecological quality. The authors reason that public support and compliance with pro-ecological landscape change is strongly influenced by the perceived and experienced beauty of these landscapes (Gobster *et al.* 2007). Figure 14 illustrates the direct link between the perceptible realm of landscape patterns and affective reactions (as also discussed in 3.4.1) and the potential it holds for linking human and environmental phenomena. This is the fundamental argument behind the powerful influence that contemporary landscape design could have in sensitising clients and the general public with regard to the environment. Landscapes manifest in urban spaces and could potentially change public perceptions and expectations leading to a new style. To achieve this, design experiments (Ahern 2012; refer also to 2.3.6.1) need to present "novelty coupled with a basic idea, which grasps […] what most members of the community feel and are trying to express" (Lazlo 1973 quoted in Fisher 1993:34). Figure 14 indicates the importance of ethical values, socio-cultural systems and knowledge that influence the aesthetic experience by means of triggering affective reactions stimulated by the perceptible realm. This is important since it implies that values and knowledge can change aesthetic appreciation, while landscape patterns or qualities can influence human actions that affect landscapes.

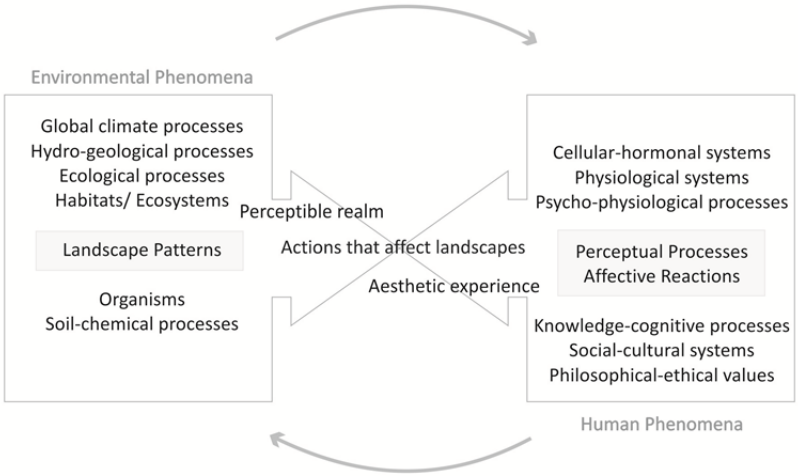


Figure 14: Model of human-environmental interactions in the landscape

Source: by author, adapted from Gobster *et al.* (2007:963)

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The term landscape opens up a variety of ways in which people are connected through values to "nature". These are important to consider in terms of desired landscape change and desired human behaviour for social-ecological resilience. The next section considers studies that have aimed to spatially map these Landscape Values and their potential application.

3.5 Place-based mapping

Two studies have spatially mapped Landscape Values using Public Participation Graphic Information System (PPGIS) software (Alessa, Kliskey & Brown 2008; Brown & Reed 2012; Van Riper, Kyle, Sutton, Barnes & Sherrouse 2012), relating social values to specific areas. This information is useful for diminishing conflict around diverse land use categories or taking advantage of the tolerability of ecological management actions (Ives & Kendal 2014:70). These studies focus on public user perception of nature and its relation to biodiversity protection.

Recent place-based mapping studies make use of ten Landscape Values, compiled by Rolston and Coufal (1991) and adapted by subsequently by Brown (2005). According to Alessa *et al.* (2008), Brown (2005) introduced the concept of Landscape Value in order to provide a functional connection for land use planning between the geography and the psychology of place. Table 5 provides a summary of these Landscape Values and their definitions.

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Table 5: The concept of Landscape Values as defined and grouped by different authors

Landscape Values		
Rolston and Coufal (1991)	**Alessa *et al.* (2008)* Van Riper *et al.* (2012) adapted from Brown (2005)**	**Alessa *et al.* (2008)**
Biotic diversity	Biological, provide places for a variety of biota *I value these places because they provide a variety of fish, wildlife, plant life, etc.*	Tangible values
	Cultural, associated with the passing down of knowledge and traditions *I value these places because they allow me to continue and pass down the wisdom and knowledge, traditions, and way of life of my ancestors.*	
Natural history	Historic, places and things of natural and human history *I value these places because they have natural and human historical significance that matters to others, the country, or me.*	
Recreation	Recreation, outdoor, recreation activities and experiences *I value these places because they provide opportunities for outdoor recreation.*	
Economic	Economic valued for economic opportunities like tourism and fisheries *I value these places because they provide useful resources (e.g., fisheries, tourism opportunities).*	Intermediate values
Wildlife	Wilderness, because they are wild*	
Aesthetic	Aesthetic, valued for the scenery *I value these places because I enjoy the scenery, sights, sounds, smells, etc.*	
Intrinsic	Intrinsic, just because they exist and unrelated to humans *I value these places in and of themselves, whether people are present or not.*	
Life support	Life sustaining, produce, preserve, and renew air and water *I value these places because they help produce, preserve, clean, and renew air, soil and water.*	
	*Subsistence provide necessary food and materials for humans**	
Scientific	Learning about the environment *I value these places because we can learn about the environment through scientific observation or experimentation.*	Intangible values
	Future, allowing future generations to know and experience *I value these places because they allow future generations to know and experience Hinchinbrook as it is now.*	
Spiritual	Spiritual, sacred, religious, spiritually important *I value these places because they are sacred, religious, or spiritually special to me or because I feel reverence and respect for nature there.*	
	Therapeutic, make people feel better, physically and/or psychologically *I value these places because they make me feel better physically or mentally.*	

*Asterisk refers to added value categories only referred to by Alessa *et al.* (2008).

Source: compiled by author adapted from Alessa *et al.* (2008) Van Riper *et al.* (2012)

Alessa *et al.* (2008) undertook a spatial approach to match areas with physically measured high levels of biodiversity with those perceived by humans to have biodiversity value in the Kenai Peninsula in Alaska. Although the study is useful for identifying areas that merit special attention, the real challenge, according to the authors, would be to identify human activities and land uses that are "consistent with protecting the identified Landscape Values" (Alessa *et al.* 2008:36). Based on research by Rolston and Coufal (1991), the authors identify 13 typical values that are given to landscapes by human users (see Table 5). The hotspot mapping method employed by the authors allows for the combination of expert knowledge with local community knowledge and preferences, as well as for the identification of components that lend resilience or vulnerability to a system (Alessa *et al.* 2008:37-38).

Adding a novel approach, the authors distinguish between tangible values that have a physical anchor—in a feature, setting or activity—and include values such as historic, cultural, recreational and biological values, on one hand, and intangible values that relate to spiritual, learning, future and

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therapeutic values, on the other. "[F]or example, recreation value may be linked to fishing in a particular lake or river, and biological value may be linked to specific vegetation or wildlife, [… while in contrast] spiritual value may result from a feeling gained at a location from phenomena other than the particular location" (Alessa *et al.* 2008:35). There is also a group of intermediate values associated with value for the intrinsic, aesthetic, life, subsistence and economic aspects (Alessa *et al.* 2008:35). The study of the Kenai Peninsula points to a connection between intangible values and specific locales, while tangible values cover broader spatial areas.

Van Ripen *et al.* (2012) conducted a place-based mapping study in Hinchinbrook Island National Park in Australia that connects social values to natural resource conditions, with the goal of representing non-material values in decision-making. The authors adapted 12 values from Brown and Reed (2000 in Van Riper *et al.* 2012:167) that correspond to those used by Alessa *et al.* (2008). The spatial hotspot areas identified as high value by visitors coincided with areas with high visitor activities such as fishing, hiking, swimming and kayaking. The three most important social value types were aesthetic, biological diversity and recreation, with the majority of the categories in the cultural ecosystem service group (Van Riper *et al.* 2012:169). According to the study, the social values of ecosystem services were mainly shaped by consumptive and non-consumptive activities. In terms of consumptive and non-consumptive users, the consumptive subgroup assigned values to a greater spatial area than did the non-consumptive subgroup, which suggests that different users may appreciate or utilise different natural resource conditions. These results can help focus attention on hotspot areas with high value and raise awareness of cold spot areas that may be promoted or preserved, and may also reduce conflict between different user groups and competing activities (Van Riper *et al.* 2012:171).

The studies have contributed to valuable findings of the relationship between human values and nature and the potential this holds in terms of management decisions and actions. These studies reiterate the importance of both land use and land cover when coupling humans and natural systems (Zipperer *et al.* 2011). Brown (2005) and Zipperer *et al.* (2011:300) argue that Landscape Value mapping could lead to analysis of appropriateness in terms of design and management, conflict management, conservation planning and the identification of local knowledge. The a priori use of a standard set of Landscape Values in surveys could be argued as articulating a potential existing spectrum or possibly influencing the selection process (Lockwood 1999). A limiting factor is that the above two studies were conducted in "natural" conservation areas. Studies focusing on urban settings and human values are less frequent and tend to deal with user preference. A few

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such studies are reviewed in the next section particularly considering alternative and newly developed research methods.

3.6 Measuring human preferences in urban landscapes

This section considers more quantitative research instruments used by three studies in different urban centres that map and consider the implications of user preferences with regard to urban nature. The first Zurich-based study by Di Giulio, Holderegger & Tobias (2009) takes a unique angle. From a literature review, the authors deduct that human presence is positively related to biodiversity, which suggests people prefer to live in areas of high biodiversity (Di Giulio *et al*. 2009). Furthermore, the presence of natural elements, such as trees, and the existence, quality and access of natural areas has been positively correlated to human well-being and preference (Di Giulio *et al.* 2009:2963). Based on these findings, Di Giulio *et al.* (2009) looked at how habitat fragmentation—which has a negative influence on biodiversity—influences human perception and well-being. The research instrument is a literature review with a focus on European studies. The authors found that the loss of semi-natural areas had a more drastic effect on both humans and biodiversity than fragmentation. The findings suggest that the amount and accessibility of semi-natural areas needs to be enhanced in densely populated areas for both recreation and as habitats for plants and animals. The authors further argue for the importance of ecological quality of remnant patches for both human well-being and biodiversity, which indicates the importance of well-designed semi-natural areas to meet both these goals. Both humans and biodiversity also seem to prefer heterogeneity, which is deemed worthy of further exploration (Di Giulio *et al.* 2009:2965). Important for this study, the authors recommend that in densely populated landscapes a shift from responsive planning to an intentional design of environments is needed. However, the method used is found limiting in terms of understanding human values in context.

A user preference study on recreational facilities in urban park used surveys to relate preference to structural diversity (Voigt, Kabisch, Wurster, Haase & Breuste 2014). The authors developed a mapping tool based on urban parks' multi-dimensional structural diversity. Voigt *et al.* (2014) suggest that park users appreciate a mix of three elements: (1) biotic—for example, trees and ground vegetation; (2) abiotic—such as, topography and water elements; and (3) man-made park infrastructure elements and qualities—such as, active recreation and relaxation facilities. The authors argue that these three dimensions of structural diversity influence the way people use and value urban parks (Voigt *et al.* 2014). Conducted in Berlin and Salzburg, the study emphasises that the ecosystem services approach suggests that ecosystem functions and biotic elements offer the

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basis for Cultural Services supply. Yet, infrastructural facilities and amenities sway the recreational value of an urban park (Voigt *et al.* 2014). The study highlights important considerations for studies based on ecosystem services with regard to data interpretation. However, the study purely focuses on human recreational preference and gives preference to visual aspects, which is limiting for interpretation of values.

Shwartz, Cheval, Simon and Julliard (2013) mapped relations between humans and biodiversity in facilitated landscapes in Paris, testing user preferences by means of a software programme called Virtual Gardens. The software allowed people to design green spaces and add preferred elements to their garden space, which is argued to reflect the relation to people's real life affinity for biodiversity. Additionally participants completed a questionnaire. The findings of the study reiterated the importance of knowledge and childhood experience in terms of people's preferences to nature (Palmer & Suggate 1996 in Shwartz *et al.* 2013:9). Older and more educated people preferred greater biodiversity than younger and less educated participants, while older participants also preferred more native species. The authors suggest that this tendency is related to exposure to more natural areas especially in childhood, confirmed in previous studies by Kaplan and Kaplan (1989). The study further suggests that the biodiversity people experience on a daily basis not only affects their knowledge of nature but also influences preferences and attraction towards nature. These findings are significant for this study and tie in with arguments posed in 3.4.2 with regard to landscape aesthetics and change. Interestingly, less wealthy people preferred gardens with greater biodiversity, which may indicate differing exposure to diverse areas across socio-economic groups (Shwartz *et al.* 2013). This study offers greater scope for value interpretations, yet relies on user preferences to do so, rather than in depth understanding.

The studies reviewed in this section made use of quantification to illustrate tendencies on user preferences in urban areas. Each study developed a unique research method or combination based on the desire to relate human preference and biodiversity considerations more effectively in response to the literature. Data was captured by: a literature review with a unique focus, a new mapping tool and surveys, questionnaires and special software. Some general findings of these studies were important to consider for other contexts but limiting in terms of understanding the implications of held or assigned values. Ives and Kendal (2014:70) argue that understanding the held values in a community can improve the effectiveness of policies on management since messages can be more accurately received by the audience while the sentiments of users can be respected. The

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next group of studies considers more qualitative fieldwork, which provides an in depth understanding of how values lead to engagement in biodiversity protection.

3.7 Effects of civic involvement in green space

This section reviews a number of qualitative studies that aim to find out how humans are motivated towards pro-environmental actions. Benefits from nature have been shown to have intellectual, social, emotional and physical causes, including a sense of escape from an urban setting (Mostyn 1979 in Özgüner & Kendle 2006:141). This chapter does not specifically elaborate on the extended body of work on physical and psychological benefits of nature (for a list of works see Tzoulas, Korpela, Venn, Yli-Pelkonen, Kaźmierczak, Niemelä & James 2007). It is however important to acknowledge and state these benefits that can be physical, psychological or social. From their review, Matsuoka and Sullivan (2011) summarise nature health benefits to include overall-wellbeing and satisfaction though attention restoration, stress reduction, physical activity, social interactions, and reduction of incivilities. Tzoulas and Greening (2011) add mood regulation and children's cognitive, physical and emotional development to psychological health, while they define aspects of physical health to include preventative and curative effects of obesity, cardiovascular disease and type II diabetes. This chapter concentrates on the causes for, and consequences of, civic involvement in urban nature. Table 6 provides a summary of the studies reviewed in this section, identifying motivations and barriers and aspects that hold potential for pro-environmental behaviour.

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Table 6: Summary of qualitative studies reviewed and motivating factors for action

Authors	Identified human actions	Positive effects for biodiversity/humans	Motivation/barrier for action	Potential/ Lack of potential
Avlonitis (2011)	· Plant choice: indigenous and rare species · Control alien invasive species · Improved green area connectivity · Soil quality (organic content)	· Improve ecosystem functionality and make the ecosystem more stable or resilient · Benefited pollinators · Soil refuge and nesting opportunities	· Personal inclination	· Local knowledge · Educational and catalytic role in promoting biodiversity · Civic involvement
Goddard, Dougill and Benton (2012)	· Wildlife gardening		· Personal well-being · Moral responsibility towards nature · Untidiness and unkemptness	· Desire and own values · Neighbourhood mimicry · Local champions · Cues for care · Sign that explains untidiness · Harnessing existing social norms · Schools · Top down managements (unlikely)
Nassauer (2009 in (Goddard *et al.* 2012)	· Landscape decisions		· Conform to socio-cultural norms · Socio-economics and lifestyle behaviour	· Marketing (framing of messages)
Maiteny (2002 in (Goddard *et al.* 2012)	· Wildlife gardening			· Information and passive incentives (including financial) is unlikely to foster sustainable behaviour in the long run
Hunter & Hunter (2008 in (Goddard *et al.* 2012)	· Ecologically sensitive management		· Householder mimicking public landscapes	· Local authority
Barthel *et al.* (2010)	· Garden management coordination with neighbours through · Rituals · Oral communications · Rules (institutions) · Physical form/artefacts · External sources of support	· Sense of community · Community cohesion · Fertile soils · Flowers and vegetables · Pollination · Pest control · Prevent erosion of critical ecosystem services	· Interpersonal meaning is revived and reinvented · Shared rituals: meetings, social gatherings, shared habitat, imitation of practices, oral communications · Abstractions: objects or metaphors	· Social-ecological memory: tools, artefacts and concepts in sustainable management · Participatory actions · Tacit knowledge: habits and behaviour in particular environments · Physical evidence as knowledge · Institutions: social structure and norms · Political power: external connections and support (media, markets, networks) · Laws that can be enforced · Engagement through lived experience
Plieninger, Ferranto, Huntsinger, Kelly and Getz (2012)	· Improvement of habitat and environmental objectives	· Improvement of habitat and environmental objectives	· Live near natural beauty	· Ownership type (producers versus residential) · Cultural ecosystem services · Quality of life aspects

Source: compiled by author (2014)

The power of civic engagement in terms of biodiversity protection and green area maintenance is receiving increased attention. A recent study of the ecological value of social management and intervention in urban green spaces in Cape Town, South Africa found that social interventions can improve ecosystem functionality and integrity (Avlonitis 2011). The study makes use of ecological indicator measurements and social interviews to show how plant choice influences by local residents can drastically improve ecosystem functionality and make the ecosystem more stable or resilient. In the case study, citizens selected rare species for planting in the urban spaces, while controlling

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invasive aliens. The planting of indigenous species led to improved soil quality in terms of organic content, while refuge and nesting opportunities combined with increased connectivity of green areas showed that social actions benefited pollinators. Interestingly, species and functional diversity, at the civic-led greening intervention of Bottom Road Sanctuary in Cape Town, came about through the plant selection of a person with no botanical or ecological training based on personal inclination and observation of bird preferences. This indicates the potential of local knowledge or IKS through individuals that are passionate about the value of nature in their local environment. It also shows the power of civic-led greening interventions in terms of their educational and catalytic role in promoting biodiversity (Avlonitis 2011:81).

Goddard *et al.* (2012) investigate the reasons behind wildlife friendly biodiversity management in residential landscapes in the United Kingdom (UK) by means of questionnaires, interviews and ecological surveys. Several studies have indicated that private landscaping decisions are often influenced by the desire to conform to prevailing socio-cultural norms; in addition, socio-economic factors and lifestyle behaviour influence human decisions (Goddard *et al.* 2012). In the Leeds-based study, personal well-being and moral responsibility towards nature were identified as the main motivations for wildlife-friendly gardening (Goddard *et al.* 2012). The current preference for tidy gardens acts as a barrier towards wildlife gardens. The study identified neighbour mimicry or local champions as ways of overcoming this; a suggestion is to place a plaque on the garden that explains the untidiness, encourage competition among neighbours and give some status to the undertaking (Nassauer 1995 in Goddard *et al.* 2012:268). In terms of public green space, "[u]nkempt public green spaces are unlikely to garner public support, but given appropriate cues for care—for example, by maintaining a short mown area around a longer patch of meadow—ecologically sensitive council management practices are more likely to be mimicked by householders and bring wide-ranging benefits to urban biodiversity" (Hunter and Hunter 2008 in Goddard *et al.* 2012:268).

Two additional themes surfaced in the study. Firstly, the lack of knowledge was not perceived as the main reason why people did not participate in wildlife gardening but rather personal motivation born out of desire and own values. Maiteny (2002 in Goddard *et al.* 2012:268) suggests that information and passive incentives, including financial, are unlikely to foster sustainable behaviour in the long run, this coincides with the arguments of Pretty (2003). Additionally, top-down planning and management is also unlikely to motivate residents' behaviour for greening. Instead, "[m]echanisms for increasing the uptake of wildlife gardening would benefit from harnessing

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existing social norms whereby ecological practices are spread by a process of neighbourhood diffusion" (Goddard *et al.* 2012:269).

Garden management coordination with neighbours can lead to a sense of community. In the UK, the resurgence of the grow-your-own movement is evident. Sharing of produce and plants can increase community cohesion and well-being, and potentially benefit wildlife (Goddard *et al.* 2012:268). In Stockholm, Barthel *et al.* (2010) use the term social-ecological memory to describe the participation of communities over time that leads to the establishment of tools, artefacts and concepts in sustainable management practices of ecosystem (Wenger 1998 in Barthel *et al.* 2010). This continuous learning process leads to communities-of-practice where interpersonal meaning is revived and reinvented through emergence and persistence, as conditions change (Wenger 1998 in Barthel *et al.* 2010:256). The authors make use of surveys and open-ended interviews performed over a four-year period with several hundred gardeners. The findings indicate that ecological practices of allotment gardens are kept in place and transmitted through participatory actions that shape experience and meaning; these include shared rituals like meetings and social gatherings, shared habits, imitation of practices and oral communication (Barthel *et al.* 2010:258).

Habit and behaviour fitted to a particular environment forms tacit knowledge that is not passive but creative and transmitted in different ways (Barthel *et al.* 2010:262). Contributing factors include physical gardens, artefacts like booklets or photographs, and current rules of practice or institutions that facilitate the management process. Institutions founded and managed by gardeners provide social structure for participation. They also entail norms for collaboration and decision-making, and guide sustainable behaviour towards ecosystems (Barthel *et al.* 2010:260). Barthel *et al.* (2010) further refer to the role of "reification", which can be objects or metaphors (refer to the structure of significance in 2.3.2) that either function as shortcuts to communication or serve as knowledge in the form of physical evidence of a process of participation (see also "objectivations"[5]). External support also facilitates sustainable management via personal connections to other organisations, the media, markets, and social networks (see Ernstson 2013:81). The law is another external support but is only effective if enforceable (Barthel *et al.* 2010:261).

In urban Stockholm, Barthel *et al.* (2010:263) describe allotment gardens as "dynamic libraries of social-ecological interactions" that can deliver fertile soils, flowers and vegetables, and other

[5] Objectivations are described as: "products of human activity that are available to their producers and to other men as elements of a common world. Such objectivations serve as more or less enduring indices of the subjective processes of their producers, allowing their availability to extend beyond the face-to-face situation in which they can be directly apprehended". Source: Berger, P. & Luckmann, T. 1966. *The Social Construction of Reality – A Treatise in the Sociology of Knowledge.* London: Penguin Books. p. 50.

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ecosystem services, like pollination and pest control. People involved in the upkeep of urban green areas, and the social memory that they convey, can help prevent the erosion of critical ecosystem services (Barthel *et al.* 2010:264). Similarly, in a rural environment, Plieninger *et al.* (2012) investigated "working landscapes" in California by means of a statewide survey. The study shows the importance of cultural ecosystem services and quality-of-life aspects to encourage forest and rangeland ownership irrespective of ownership type. In the study, the most important motive for both landowner groups was to live near natural beauty. Curiously, producers were found to be more active in the management of the improvement of habitat and environmental objectives than residential owners.

These studies identify motivations and barriers for pro-environmental behaviour in diverse scenarios and show valuable social practices and cues for fostering civic cooperation.

3.8 Summary and conclusions

This chapter considered a large volume of work from different disciplinary backgrounds regarding human values in order to assess psychological and philosophical antecedents that influence the behaviour of professionals. The main focus of the chapter was on aspects of value and valuation also referred to as axiology (Jax *et al.* 2013). This section provides a summary of the key points of importance for this study.

Values are more stable than attitudes, beliefs and social norms (Ives & Kendal 2014). Held values are based on deeply engrained standards, while assigned values refer to the relative worth of things. Assigned values apply to management goals and actions but are underpinned by held values, which shape these management preferences (Ives & Kendal 2014). Functional values should be distinguished from preference related values, since the former exist in spite of human attitudes and awareness (Lockwood 1999). Functional values can also influence management preferences through cognition. Cognition refers to factual understanding of Functional Value where knowledge plays an active role. Knowledge obtained on Functional Values can construct other types of values (Lockwood 1999). These concepts summarise the importance of held, assigned and Functional Values, as well as knowledge for professional practice.

Value orientations represent typical groups of held values. The chapter distinguished seven different disciplinary related frameworks of environmental value orientation. In essence these groups distinguish between anthropocentric and biospheric values. In landscape design, there are three

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important aspects of the analysis: (1) the value categories of environmental ethics that distinguish Intrinsic, Fundamental, Eudaimonistic and Instrumental Nature Values (Jax *et al.* 2013); (2) the value divisions of environmental psychology between self-transcending values that are intrinsic or normative, and self-enhancing values that are extrinsic and based on material incentive (Steg *et al.* 2014); (3) lastly, the very important concept of Intrinsic Value that influences environmental decisions and is thus fundamental to include in decision-making processes (Lockwood 1999).

Critically, for considerations in landscape design, people also assign values to place for three main reasons: (1) environmental or physical qualities (Stedman 2003), including aesthetics (Gobster *et al.* 2007) and spirit of place (Norbert-Schultz 1980); (2) lived experiences that can relate to self-identity (Hull *et al.* 1994; Jorgensen & Stedman 2001); and (3) social interactions that lead to collective identity (Barthel *et al.* 2010; Sörlin 1999). Environmental qualities thus trigger symbolic reasons of meaning (Hull *et al.* 1994), memories and associated meanings (Tuan 1977), and physical experiences (Stedman 2003). In essence, these affect place attachment and satisfaction (Stedman 2003). The designer is similarly influenced towards place meaning, whether consciously or unconsciously, responding to visual stimuli, experiences, symbols and memories. For designers, these can serve as sources of inspiration for design, or reasons to value or discriminate against a particular place.

Landscapes connect people to place (Whiston Spirn 1998/2002), which is the basis for concepts of heritage in cultural landscapes (Tengberg *et al.* 2012). Human intuitive responses to landscape patterns inform biological theories that offer landscape design principles of complexity, coherence, legibility and mystery (Dee 2001; Kaplan & Kaplan 1989). Landscape patterns or aesthetics can influence human actions that affect the environment. Landscape pattern influences both the perceptible realm and affective reactions, but these affective reactions are also influenced through knowledge and values (Gobster *et al.* 2007). This has significant implications for landscape designers, since it implies that values and knowledge can change affective reactions for aesthetic appreciation, which influences human behaviour with regard to the environment.

Landscape pattern, landscape context and situational context all influence the social construction of meaning with regard to landscape (Gobster *et al.* 2007), yet not all influences are tangible. Landscape pattern includes land cover (Zipperer *et al.* 2011). Landscape context involves social and historical aspects. Situational context refers to observer mood and familiarity (Gobster *et al.*2007). These aspects are summarised by the three qualities of landscape—structure, function and change

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(Tengberg *et al.* 2012). These aspects are of importance for heritage and cultural landscapes, but bear reference to landscape design and environmental conservation. There are two important concepts in common with cultural landscape approaches, namely, *transdisciplinarity* that recognises different knowledge systems and the concept of *multifunctionality* in design. These two concepts can be combined in a landscape through cultural ecosystem services due to their recognition of important human sentiments towards aesthetics and cultural heritage. Cultural Services offer potential in four ways: (1) they depend on Provisional, Regulating and Supporting Services and affect in their manifestation the appreciation and management of all services; (2) they are directly experienced and instinctively appreciated (Daniels *et al.* 2012); (3) they are stimuli for owning, managing and conserving land; (4) they are enjoyed in bundles, which makes them ideal for promoting the concept of multifunctional landscapes (Plieninger *et al*. 2013). Thus, this section has articulated the importance of interrelation and opportunities between tangible and intangible aspects of landscapes.

Former studies identified 13 Landscape Values that provide a reference of possible sentiments of humans towards landscape, which can be useful for comparisons. As a fieldwork instrument, predetermined Landscape Values may be argued to influence participants when used in surveys. A variety of novel mixed methods have been developed by researchers to capture and map human preference. The research instruments used for quantification include Public Participation Graphic Information System (PPGIS) software, surveys using predetermined value categories, a literature review, a mapping tool for structural diversity in parks, questionnaires and computer software (Virtual Garden). These instruments are limiting in terms of understanding the implications of held or assigned values. The in depth qualitative interviews are more convincing for distinguishing preferences and beliefs from held values.

Several qualitative studies capture the subjective reasons why people are motivated towards civic involvement in green space. These motivations include: personal inclination (Avlonitis 2011); quality of life; Cultural Services (Plieninger *et al.* 2013); personal well-being; moral responsibility; socio-cultural norms; socio-economic factors and lifestyle; mimicry (Goddard *et al.* 2012); abstractions; and shared rituals and meaning (Barthel *et al.* 2010). Although many reasons are personal, they are still applicable to professionals. Aspects of moral responsibility and socio-cultural norms are specifically relevant to landscape designers; however, it is the opportunities revealed by the shared rituals that may hold greater potential for this study. Communal social practices that shape beliefs, perceptions and norms through collective experiences can exercise powerful influences on assigned

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values. It thus appears that qualitative methods have better potential for addressing the research questions posed by this study.

Figure 15 summarises some key aspects from the discussion in this chapter. The figure indicates the strong connection between formative education, cultural values and held values. Adult values change over time due to experiences and the influence of social institutions, discourse and ideology, which can also trigger cognition of new factual information. The process of value creation towards behaviour is discussed in the next chapter, which specifically focuses on the concepts of value creation and value change. The aim is to understand the complexity behind the operationalisation of values.

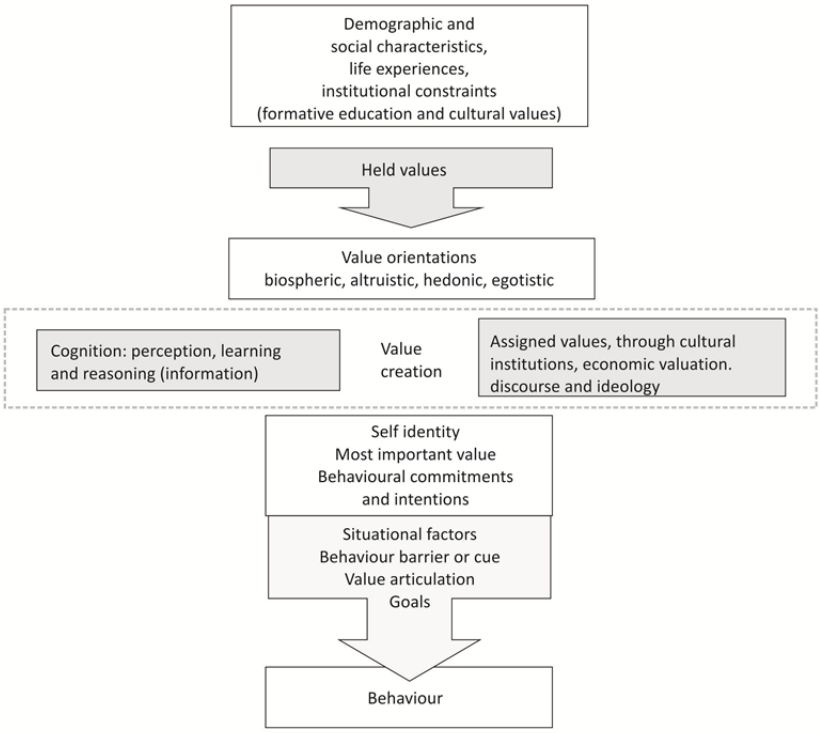


Figure 15: Diagram that summarises value considerations discussed in terms of antecedents for behaviour of professionals

Source: by author, based on Lockwood (1999) and Steg *et al.* (2014)

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Chapter 4



tourism

ESS image by Jan Sasse (TEEB 2011)

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CHAPTER 4: Operationalising Professional Values

4.1 Introduction

Different societies and time periods have shown the "historically negotiated, constructed and contingent value of nature and its properties" (Ernstson & Sörlin 2012:277). Forbes *et al.* (1997 in Özgüner & Kendle 2006:140) are of the opinion that in the last 30 years, there has been an increased interest and appreciation of 'nature in cities' by urban green space designers and managers, as well as the general public. In northern Europe, the production of natural landscapes within urban areas can be observed since the early 1980s (see Özgüner & Kendle 2006:140 for a list of works). According to the authors, this shift goes hand in hand with the work of environmental psychologists, which reveals the benefits of nature for human well-being (for example, Rohde & Kendle 1994). The actions of scientists to reveal nature's benefits can potentially influence nature-oriented attitudes.

This chapter brings together studies on value creation and value change in order to comprehend the dynamics behind value operationalisation. Figure 16 graphically presents the grouping of reviewed studies and themes. The chapter commences with a discussion on a recent model developed by Steg *et al.* (2014) that summarises three different theories of pro-environmental behaviour. It follows with subsections on value creation and value change. The next three subsections expand on this theme by contemplating value articulation, economic valuation, governance and ethics. There are historic and current concerns with regard to the economic valuation of nature and ecosystem services. Ives and Kendal (2014:67) explain that the application of values can raise questions of scientific legitimacy and objectivity, which often complicate research outcomes. Development in the fields of economics, political sciences and ethics has revealed contested areas between pro-environmental action and human values.



Figure 16: Graphic showing chapter layout and groupings of value-related studies

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Most studies consider the values and perceptions of the general public as the main user and stakeholder. More contemporary studies also consider those in management positions as stakeholders whose values should be considered. However, less emphasis has been placed on the values of professionals. The last subsection discusses the knowledge, discourse and values of landscape design and landscape design professionals. The chapter closes with a summary of the main points on values change and critical considerations for operationalisation.

4.2 Values and pro-environmental behaviour

Since behaviour ultimately affects environmental outcomes (Wesley Schultz 2001), it is important to understand how behaviour relates to underlying values. Although cognitive structures are good predictors of behaviour, many behavioural barriers come into play between intended behaviour and actual behaviour (Ives & Kendal 2014). According to Ives and Kendal (2014), two main theories are employed to explain behaviour: the theory of planned behaviour (Ajzen 1991) and Values-Belief-Norm (VBN) theory (Steg & Vlek 2009; Stern 2000). According to these theories, people's held values influence their general beliefs about the environment (for example, human lives are superior to plant and animal lives) and their specific beliefs about the potential consequences of environmental change on what is of value to them (for example, personal comfort) (Ives & Kendal 2014). These beliefs affect people's perceptions of their power to lessen the potential danger to that which they value, which influences typical actions taken through personal norms. VBN theory demonstrates that pro-environmental behaviour can be supported by diverse value orientations. People with different value orientations may take the same behavioural action. For example, a person with an egoistic value orientation (towards self-benefit) may take the same action as a person with a biospheric orientation (towards environmental benefit) (Ives & Kendal 2014:69).

Steg *et al.* (2014) seek ways in which pro-environmental behaviour can be encouraged by analysing variables and processes. They define pro-environmental behaviour as “any action that enhances the quality of the environment, either resulting or not resulting from pro-environmental intent” (Steg *et al.* 2014:104). Steg *et al.* (2014:104) make use of goal framing theory (Lindenberg & Steg 2007) and identify three reasons why people engage in pro-environmental behaviour: hedonic goals, gain goals and normative goals (see Figure 17). Hedonic goals are related to feelings of excitement and pleasure, or a desire to avoid effort. Gain goals refer to personal resources such as money or status. Normative goals refer to social appropriateness of actions and right or wrong behaviour. According to Steg *et al.* (2014), these goals influence what information people notice, the most cognitively reachable knowledge, what actions are considered and ultimately how people act in a particular

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situation. The most prominent goal influences decision-making but is also influenced by the other two goals either positively or negatively depending on whether there is conflict or compatibility between them. Goal strength is not a conscious process and can be steered through different cues without individual awareness (Steg *et al.* 2014).

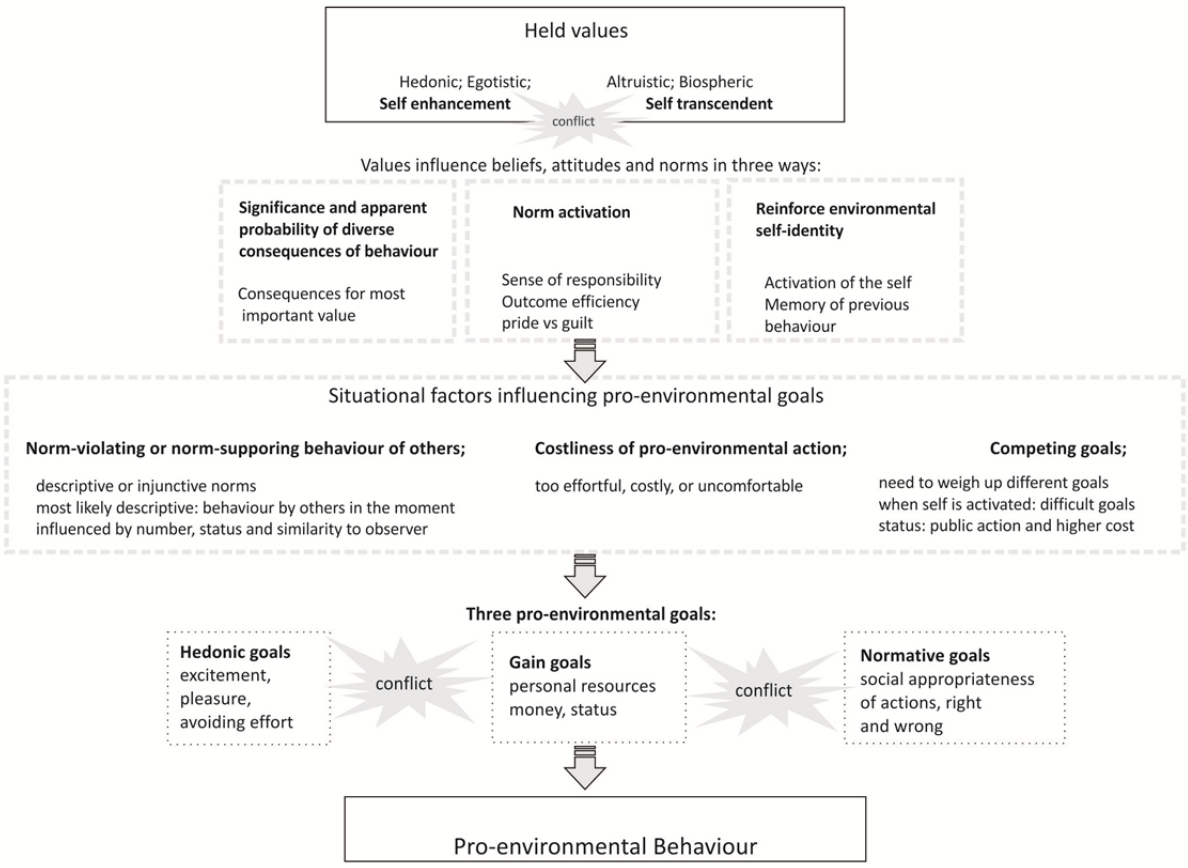


Figure 17: Factors influencing pro-environmental behaviour

Source: by author, based on Steg *et al.* (2014)

Unfortunately, many pro-environmental goals conflict with hedonic goals, gain goals and normative goals. Though considered the right thing to do, following correct environmental behaviour often costs more and may also require more work, effort and time (Steg *et al.* 2014). To change this predicament, Steg *et al.* (2014) suggest two strategies to change the perceived outcomes of pro-environmental behaviour. Firstly, remove or reduce conflict between hedonic, gain and normative goals, such as, reducing the perceived costs and increasing the perceived benefits. Secondly, strengthen normative goals by weakening the relative strength of hedonic and gain goals.

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Steg *et al.* (2014) explain that conflict between the pleasure (hedonic) and status (gain) of doing the right environmental thing (normative) is often removed through changing actual costs and benefits by means of financial incentives or taxes, legal regulations or physical changes (Steg & Vlek 2009). The perceived cost and benefits can also be changed by providing information to correct misperceptions of facts (Steg & Vlek 2009; see also Aaron *et al.* 1994), which relates to cognition as argued by Lockwood (1999, see 3.2). However, in the long run, placing emphasis on hedonic or gain goals in terms of decision-making can erode normative goal motivations for pro-environmental behaviour, which is not desirable. People may only act pro-environmentally when pleasurable or financially advantageous and may cease to act pro-environmentally when incentives are removed. This can also lead to moral hypocrisy, where people only follow norms for gain. In all cases actions are temporal and not long lasting, forming an unstable basis for pro-environmental behaviour (Pretty 2003; Steg *et al.* 2014).

The strengthening of normative goals has been proven to better encourage sustained pro-environmental behaviour (Steg *et al.* 2014). The authors propose using the social endorsement of certain values and situational factors to strengthen normative goals. Values need to be activated by cues when decisions are made. Values refer to what people find most important in life and are relatively stable, while goals are influenced by situational factors (Steg *et al.* 2014). Hedonic values, egoistic, altruistic and biospheric values often stand in conflict with one another (Steg *et al.* 2014:108). This often makes us think that people can at times not “afford” to care for the environment because of competing goals and values. However, environmental beliefs and actions have been shown to relate strongly with self-enhancement values—specifically hedonic and egotistic—as well as self-transcendent values—in particular altruistic and biospheric (Steg *et al.* 2014:108).

Steg *et al.* (2014) point out that biospheric values are endorsed worldwide as part of people’s morality. In developed and developing countries, people value the environment, which seems to cast doubt on Inglehart’s (1977 in Steg *et al.* 2014) theory that basic survival and material needs should be fulfilled before biospheric values can emerge. Reliance on environmental systems and evident environmental degradation has also been shown to influence values despite unfulfilled material needs (Steg *et al.* 2014). The preoccupations of the Bruntlandt Report (WCED 1987) that equated rising poverty with potential environmental threats and degradation has further been proven to be contradictory, since urbanised people in the developing world tend to live less

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sustainably compared to populations in developing and rural areas that do not rely on as many commodities (Douglas & Ravetz 2011; McDonald & Marcotullio 2011:201).

Studies also indicate that values influence behaviour through behaviour-specific beliefs, attitudes and norms. Steg *et al.* (2014:107) identify three theoretical explanations of how values strengthen normative goals and pro-environmental behaviour. Firstly, values affect the significance and apparent probability of diverse consequences of behaviour. This affects how people evaluate various options and the choices they make (as mentioned in 4.2 as part of the theory of planned behaviour and VBN theory). Secondly, values affect pro-environmental behaviour via a process of norm activation. Thirdly, values reinforce the environmental self-identity that has an impact on pro-environmental behaviour. These are discussed in brief and are illustrated in Figure 17.

Studies indicate that people predominantly consider aspects with significant consequences for their most important values (Steg *et al.* 2014). Values affect goals but also the perceived importance of consequences of behavioural options and their likelihood through beliefs. Furthermore, people are inclined to emphasise advantages and to soften disadvantages of behaviour options that have positive consequences for their prime values, while the contrary is true for options that have negative effects. Findings of a study by Bolderdijk, Gorsira, Keizer and Steg (2013) imply that increases in environmental knowledge through cognition will only motivate people who consider caring for the environment to be a central personal value. This explains why values are often more important for decision-making than information or knowledge when it comes to human behaviour.

Values also affect awareness. This in turn affects people's sense of responsibility and their perceived potential of affecting or changing these issues in terms of outcome efficacy (Steg *et al.* 2014). These feelings affect moral obligations to be triggered in terms of pro-environmental behavioural actions across cultures (Steg *et al.* 2014). Acting in line with personal norms results in pride, while the opposite results in guilt. Values affect behaviour via environmental self-identity, or the extent that a person sees him/herself as a pro-environmental person (Steg *et al.* 2014). Values more strongly influence behaviour when the self is activated, meaning that identity mediates the relation between values and behaviour (Steg *et al.* 2014). Environmental self-identity can also be influenced by previous environmental behaviour and reminders thereof, which strengthens the implication of normative concerns (Steg *et al.* 2014). Lastly, Steg *et al.* (2014) argue that situational factors influence people's inclination to act in congruence with their values. When values are activated or endorsed in a specific situation it will positively influence people's inclination to act on these values

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through cues in the context in which decisions are made. Again, this may happen without people being aware of it. Steg *et al.* (2014) further identifies three relevant situational factors, signs of norm violating or norm-supporting behaviour of others, the costliness of pro-environmental actions, and competing goals (see Figure 17).

When descriptive norms (i.e., perceptions of the behaviour shown by others in that situation) are in conflict with injunctive norms (i.e., the behaviour generally approved by others), normative conduct theory predicts that individuals will act on the most prominent norm, which is likely the descriptive norm (Steg *et al.* 2014). The number, status and similarity to the observer will affect the degree to which transgressors influence individual behaviour through norm inhibition. Descriptive norms may even affect behaviour that is not directly related to that norm; for example, neglected urban green spaces are associated with increased crime (E. J. Cilliers 2010). Conversely observing others respecting injunctive norms reinforces normative goals and raises the prospect that people act upon other injunctive norms and their values. Further, Stern (2011) suggests that even though situational cues may weaken the power of normative goals, the latter may still be key and direct decision-making amid those with prominent biospheric values.

Research reveals that biospheric values and normative deliberations are less predictive of behaviours when these behaviours require much effort, are too costly or compromise comfort. Here, interventions that decrease behavioural costs of pro-environmental actions may be necessary (Steg *et al.* 2014). Situational factors can increase the need of the individual to weigh up different goals and result in prioritising hedonic or gain goals (such as safety or time saving), thereby constraining the effect of biospheric values and normative considerations on behaviour. Pro-environmental actions can also support hedonic and gain goals next to normative goals (Steg *et al.* 2014).

Personal contentment has been shown to be associated with pro-environmental action especially if the behaviour is difficult and when the self has been activated (Steg *et al.* 2014). People are also more likely to choose environmental products if their status is activated. This implies that higher cost and public action will favour pro-environmental behaviour since it is associated with status (Steg *et al.* 2014). Pro-environmental action can in this way be promoted through the status of the products or services, such as sustainable innovations (for example, Green Star Ratings), which are high in cost but improve the status of corporates or individuals.

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Steg *et al.* (2014) point out that the normative route for pro-environmental behaviour is often undervalued but these moral approaches seem to hold promise. In their review, Ives and Kendal (2014:70) identify five constant findings in terms of environmental values that are consistent with those of Steg *et al.* (2014): (1) values change over time; (2) values differ between groups of people; (3) multiple values can be assigned to the same places; (4) multiple pathways exist between values, attitudes and behaviours towards ecosystems; and (5) values influence people's judgement of management decisions. Some of these findings are discussed later in this study.

4.3 Value creation and operationalisation

Schultz and Zelezny (2003) identify three routes of working with underlying values to achieve positive environmental outcomes. Firstly, environmental appeals should be reframed, since traditional pro-environmental messages largely imply self-sacrifice. Although this may be appealing to those with self-transcendence values, this framing is unconvincing to those with self-enhancing values (refer to 3.3). Knowledge of underlying values can thus aid in framing messages in different ways. Thus, managers should pay attention to design of communications around environmental issues (Ives & Kendal 2014:70; Schultz & Zelezny 2003).

A second approach involves altering the cost-benefit ratio, as pointed out by Steg *et al.* (2014) in the previous section regarding competing hedonic and gain goals. Pro-environmental decisions should not be more difficult to take or should have some incentive to encourage this behaviour (Schultz & Zelezny 2003). A third option recognises the need to change people's values. Many researchers consider this approach to be an ethical minefield (Gobster *et al.* 2007; Thompson 1999; Schultz & Zelezny 2003). "While we agree that changing values may be the only effective long-term solution, this change will be gradual and brought about by experiences that confront the veracity of our existing beliefs and value" (Schultz & Zelezny 2003:134). The consideration of ethical questions like this is elaborated on in section 4.6. For the purpose of this study, significantly, in all three these scenarios, the understanding of local underlying values can aid actions to maximise the social acceptability and minimise potential conflict of environmental management actions (Ives & Kendal 2014:70).

The marked importance of values raises the question of how values can be purposefully created through social processes, which is less of an ethical issue in the fields of policy and marketing since they recognise that preferences are already manipulated every day (Costanza & Folke 1997:53). Research by Aaron *et al.* (1994:12-13) indicates five researched approaches to encourage change in

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public values in terms of public policy. These include economic incentives, improved child rearing, correction of misperceptions of facts, persuasion by public figures and norms of frequent associates. These actions are part of societal patterns but potentially involve relations of trust and questions of legitimacy of persons and information. These actions imply sharing of knowledge and effective communication strategies, and relate to findings by Barthel *et al.* (2010) and Goddard *et al.* (2012) (refer to 3.7).

Although changing values may trigger ethical questions regarding agenda setting, the concept of co-creation in marketing may provide an alternative. According to Russell-Bennett *et al.* (2009), for government social marketing purposes, one needs to understand the value creation process and how it changes throughout the service consumption process. In terms of marketing and consumption, "[v]alue creation is a process whereby the organisation and the customer interact at various stages in consumption to co-create the product or service" (Prahalad & Ramaswamy 2004 in Russell-Bennett *et al.* 2009:2015). Co-creation contrasts with top-down social structures of paternalism that fall within the traditional reductionist mindset and are inconsistent with contemporary contextualist theories (refer to 4.6 on governance and contextualist approaches). Value creation refers as much to products as to services and might be applied in terms of ecosystem "services" thinking.

The creation of value in the consumption process is only meaningful for social marketing when it accompanies behaviour change (Russell-Bennett *et al.* 2009:215). These theories can thus hold value in terms of environmental behaviour as related to ecosystem services and their consumption. Figure 18 illustrates a model of how value change might be created at each stage of the consumption process and can lead to specific outcomes, such as satisfaction, behavioural intentions and sustained behavioural change (Russell-Bennett *et al.* 2009:215).

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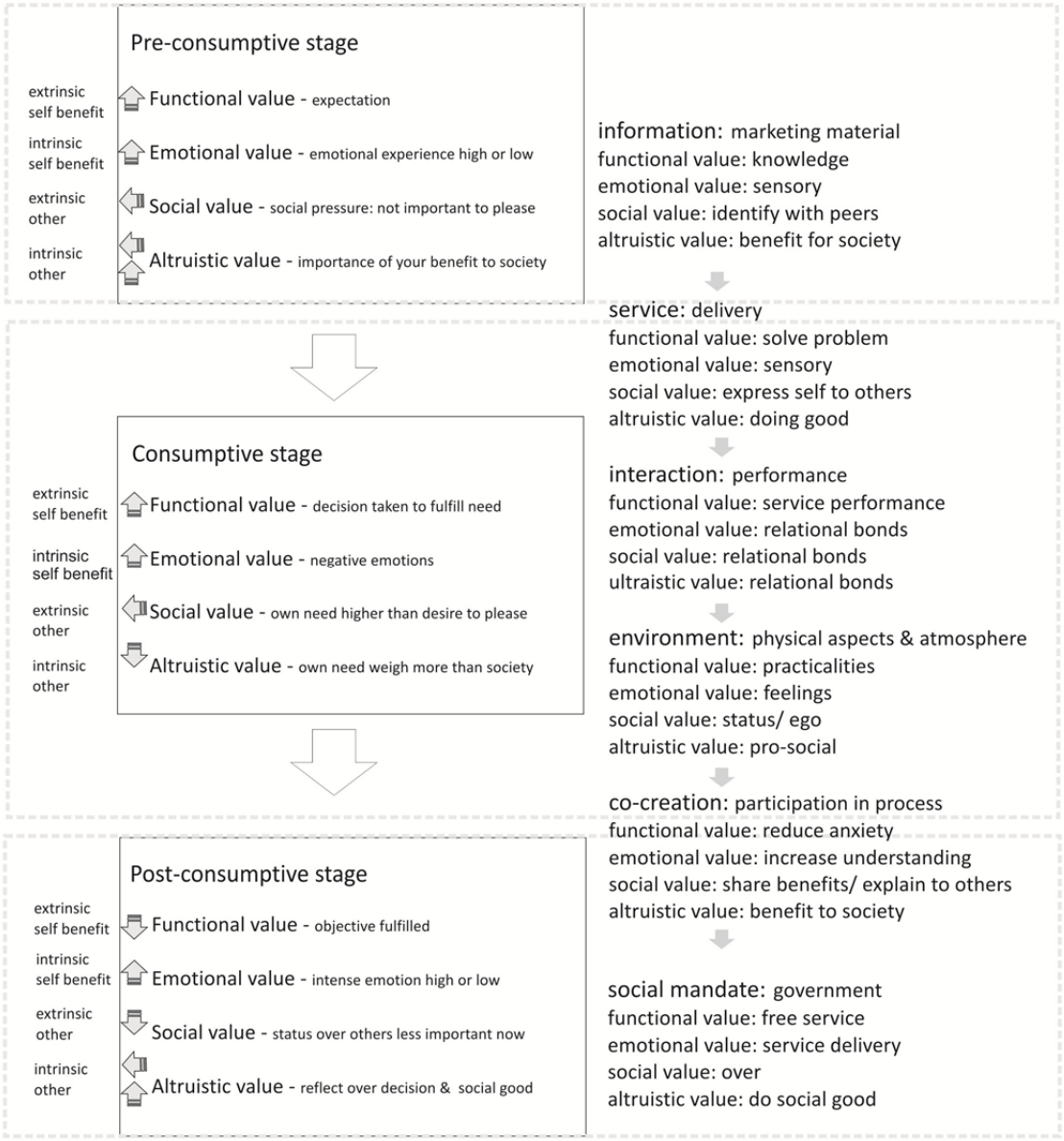


Figure 18: Value creation process for service consumption

Source: by author, based on Russell-Bennett *et al.* (2009:2013)

The authors distinguish between functional, emotional, social and altruistic values (which also relate to the environment, see 3.3) and how these are influenced by information, service, interactions, environment, co-creation and social mandates in the three stages of consumption (see Figure 18). These social environmental factors that influence behavioural outcomes, relate to the situational factors of Steg *et al.* (2014) (refer to 4.2). Similarly Latour (2005) identifies the theory of value articulation (refer to 4.4).

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To encourage people and organisations to pioneer change, Box (2011:309) identifies three drivers of change in human behaviour that also coincide with previously discussed authors. These are: (1) direct economic benefits (incentives) for people and businesses (Aaron *et al.* 1994; Gobster *et al.* 2007; Schultz & Zelezny 2003); (2) legislation, regulation and official guidance (Aaron *et al.* 1994; Barthel *et al.*); and (3) targets of tangible achievements. Considering the potential of these with regard to value change, Mansbridge (1994:147-8) explains that moral or altruistic motivation is less susceptible to compromise than punishment or material benefit. Legislation and regulation by government is considered punitive and usually seen as a last resort. Yet official guidance and standards have been able to motivate individuals and businesses towards desired change (Box 2011). Cost-minimising behaviour has an influence on short-term financial decision-making, but fails to effect long-term changes in social norms and values (Pretty 2003). Thus, Box (2011) reasons for targets of tangible achievements as encouragement to hold the best potential. Design produces artefacts that can be measured against targets, such as rating systems, which can be combined with the media or public recognition of good work, such as awards. This driver could be of particular interest for this study.

Challenging conventional economic models and predictions of market and media dominated consumerism, James (2011:318) argues that behavioural economics has proven that people are concerned about the effect of their actions on others; that humans are not always rational in terms of decision-making; and that people tend to follow the actions of others. This coincides with Aaron *et al.* (1994) regarding the correction of misperceptions of facts, persuasion through public figures and learning from co-members. Research by Mansbridge (1994) shows how existing forms of social organisation rely on both moral motivation and material sanctions, but material sanctions can erode moral motivation. In line with this, Steg *et al.* (2014) propose to rather strengthen normative goals through value cues and situational factors that influence the accessibility of these values.

Returning to the idea of following the actions of others (James 2011), it connects to influence from the norms of frequent associates (Aaron *et al*. 1994) and neighbourly mimicry (Goddard *et al.* 2012, refer to 3.7). The allotment garden example of Barthel *et al.* (2010 refer to 3.7) rings true with this observation by Mansbridge (1994:148): “[h]uman beings often spend considerable effort making their duty, love and self-interest coincide”. This can also be the case for professional practice with potential to lead to the development of “epistemic communities” that evolve consensual knowledge (Haas 1989) and develop the practice on the basis of shared interests and values. Studies show that public spirit can be created through emotions related to a sense of justice, participation in small

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groups and well-designed deliberation processes that produce a commitment to decisions (Mansbridge 1994:156). Based on these studies social practices within the landscape design industry could be powerful for operationalising values in terms of consensual knowledge sharing and development of practice.

Byrne (2011:63) and the authors Byrne cites demonstrate that our interactions with urban nature are formative in how we see the world and how we relate to fellow humans and our environment. Kaplan (2011:388) comments: "[b]oth what surrounds us and what is stored in our heads affect our perceptions of subsequent information". This underlines the importance of the existing values regarding urban nature but also shows the potential that a changing landscape design aesthetic holds as a gradual improvement of public acceptance and understanding of required services as part of urban nature. An opportunity for landscape design practitioners is not only to design urban green areas as ecological entities that generate and distribute ecosystem services as part of larger green infrastructure (Alberti 2005), but also as sites for social-ecological interaction. In this way, green areas can nurture ecological knowledge (Ernstson, Barthel, Andersson & Borgstrom 2010) and collective action to articulate values of urban green and public space (Ernstson & Sörlin 2009; Ernstson *et al.* 2008).

In general, the visibility of linkages between natural resources and importance of ecosystem services decrease in urban and modernised areas (MEA 2005:57). This is a particular area where landscape designers can make a difference. Colding (2011) argues for nature to play a pedagogic role in urban areas in terms of ecological illiteracy. The visible and measurable examples landscape designs could provide for human and ecosystem interaction include novel property rights and land management practices. Kaplan and Kaplan (1989) argue that people need to experience early and regular exposure to nature; otherwise they will have weak emotional ties to nature and lack motivation to support environmental efforts. Colding (2011) argues that top-down planning initiatives of compact cities growth are less viable than civic support initiatives around urban activities like allotments and gardening, including participation in management and design. These are opportunities to be pursued within landscape design practices in terms of educating and influencing urban space users.

Table 7 summarises the ideas of different authors presented in this section regarding value reorientation practices. It identifies 11 cues and situational factors with the best potential to operationalise values and other important considerations that are referred to again in later chapters.

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Table 7: Influences on human values and behaviour towards the environment

Value cue or situational factor	Pro/Counter argument
Direct economic benefits (Aaron *et al.* 1994; Box 2011)	No long-term effect for norm change (Pretty 2003) Can erode and replace normative values (Mansbridge 1994)
Some sort of pay off/incentive (Schultz & Zelezny 2003)	Cost counteracted through incentives
Costliness (reduce, unless aligning with environment self-identity) (Steg *et al.* 2014)	**Should not be too difficult and costly (competing goals) (Steg *et al.* 2014)**
Competing goals (reduce) (Steg *et al.* 2014)	Act congruent with most important values, aim to reduce competition where possible
Significance and probability of diverse consequences of behaviour (Steg *et al.* 2014)	**Aligns with actor-network theory (see section 4.4)**
Correction of misperceptions of facts (Aaron *et al.* 1994) Awareness—norm activation process (Steg *et al.* 2014)	Only effective if it can be aligned with most important values (Steg *et al.* 2014)
Persuasion by public figures (Aaron *et al.* 1994; Sörlin 1999) Official guidance (Box 2011)	Depends on centrality of network position (Ernstson 2013; Latour 2005) Aligns with reframing of messages (Schultz & Zelezny 2003)
Reframing of messages/environmental appeal (Schultz & Zelezny 2003)	**Appeal to a variety of value orientations**
Situational value cues **Signs of norm violation/support (Steg *et al.* 2014)** **Follow action of other (James 2011)**	**Influenced by number, status and similarity to the observer (Steg *et al.* 2014)** **Descriptive versus injunctive** **(also aligned with actor network theory) (Latour 2005)**
Norms of frequent associates (Aaron *et al.* 1994; Goddard *et al.* 2012)	**Play on number, status and similarity to the observer (Steg *et al.* 2014)**
Epistemic communities (Haas 1989; Mansbridge 1994)	Consensual knowledge creation (Haas 1989) Based on shared interest and values
Civic support initiatives (Barthel, Parker & Ernstson 2013; Colding 2011)	
Co-creation (Russell-Bennett *et al.* 2009)	
Childhood education (Aaron *et al.* 1994) Childhood exposure (Colding 2011; Kaplan 2011)	Only affective for children
Reinforce environmental self-identity (Steg *et al.* 2014)	If there is an environmental self-identity
Activate the self (Steg *et al.* 2014) Cost/effort positive	Self-identity inclusive (childhood formation)
Memory of previous behaviour (Steg *et al.* 2014)	If there has been previous positive behaviour only
Targets of tangible achievement (Box 2011; Alberti 2008; Ernstson 2013)	**Experiences that confront the veracity of our existing beliefs and value (Schultz & Zelezny 2003)**
Physical environment (Byrne 2011; Kaplan 2011)	**Experiences that confront the veracity of our existing beliefs and value (Schultz & Zelezny 2003)**
Legislation, regulation and official guidance (Box 2011)	If there is no trust in governing bodies or no regulation in place, this is mostly unsuccessful as it is seen as punitive.
Activation of status (public action/high cost) (Steg *et al.* 2014)	Not long term
Both extrinsic and intrinsic (Mansbridge 1994)	

Note: Shaded cells indicate value cues with the best potential.

Source: compiled by author (2014)

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4.3.1 Knowledge and change

Before continuing the exploration on value change and operationalisation, it is important to discuss the theme of knowledge and its relationship to pro-environmental behaviour. Knowledge featured several times throughout the first two chapters but has not been pertinently discussed. Scientists have gradually realised that the wealth of knowledge available on sustainable living and pro-environmental practices are not achieving paradigmatic change in society (Alberti *et al.* 2008; Cilliers 2010; Niemelä 2011). The desire to motivate change is also what has been driving the discussion in this thesis. In the previous sections various authors have been cited that recognise the role of values. For example, Aaron *et al.* (1994) note the importance of childhood education, while Lockwood (1999) mentions the role of Functional Values in modifying other types of values. However, Bolderdijk *et al.* (2013) has confirmed that knowledge is value dependent, implying that values favour what knowledge people accept, especially adults. This concept is illustrated clearly by a case study cited in 6.4 on evidence-based knowledge. Regardless of the limitations of knowledge for value change, the role of knowledge in emphasising conservation learning, the use of information and the development of an ecological aesthetic, as promoted by Zipperer *et al.* (2011), certainly forms part of the intent of this thesis. As discussed in the previous section, the correction of misperception of facts (Aaron *et al*. 1994) and the significance and probability of diverse consequences of behaviour (Steg *et al*. 2014) can affect professional thinking and actions. Chapter 5 undertakes the identification of an appropriate framework of functional knowledge.

The MEA (2005) acknowledges three types of knowledge: (1) scientific knowledge derived from a formal method; (2) local knowledge that is based on experience; and (3) traditional knowledge or IKS, which includes cultural concepts and historic factors. Knowledge has three valuable impacts for positive pro-environmental outcomes (refer also to 4.7.2 later in this chapter): firstly in terms of formative shaping mainly of young people during childhood, and secondly by continuous shaping of humans through experience. Furthermore, IKS is seen as a cultural resource of wisdom that often guides action in non-logical intuitive ways but yet has the desired outcomes (refer to 3.7, case study by Avlonitis 2011).

Due to the fact that formal knowledge is mainly directed at academics or those enrolled in formal educational institutions, adaptive systems have focused more attention on experiential learning pertaining to adults. These have manifested in design as concepts of “learning-by-doing” (Kato & Ahern 2008, see 2.3.6.1). As set out by Kolb (1984), experiential learning has four steps: (1) immediate concrete experience; (2) observation and reflection; (3) formation of abstract concepts;

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(4) testing of concept in new situations. These four steps are important for "design experiments" (Nassuaer & Opdam 2008)—offering designers the opportunity to test and learn, starting with the immediate experience. The formation of abstract concepts (refer to 2.3.2 on structures of significance) is also cardinal to this process and actively employed in science and design. Another very important point of the experiential knowledge process is the fact that best practice examples (Ahern *et al.* 2014) are also accessible to the general public. The experiential impact of landscape coincides with the arguments of Gobster *et al.* (2007), which argue that landscape patterns and aesthetics have an influence on affective reactions and influence people's actions. This is an important point, as experiences can also confront the veracity of existing beliefs (Schultz & Zelezny 2003).

Many authors cite the potential power of landscape examples to influence public perception and foster pro-environmental behaviour (Ahern *et al*. 2014; Box 2011; Colding 2011; Steiner 2014; Swaffield 2013). Section 3.4 has explored the many reasons that people value landscape and place. Physical features, symbols and experiences have all been identified as important aspects for human memory, meaning, identity and attachment (Hull *et al.* 1994; Stedman 2003; Tuan 1977). This allows people that experience green spaces to be influenced by them and can affect their values and perception. Memory and meaning also affect human emotions, while the role of emotions in transformative learning is emphasised in education (Groen & Jacob 2006:79). Real-life involvement, personal experience, action and reflection all enhance the possibility of transformation (Groen & Jacob 2006:79). In this way, knowledge combined with emotions can also serve as a powerful form of value articulation. The next section further discusses the importance, opportunities and challenges of value articulation.

4.4 Value articulation

A study by Sörlin (1999) evidences that humans perceive landscapes and species as valuable when actors name their values and make these apparent. Ernstson (2013) explains that for biophysical processes of nature to attain value in human decision-making, a social practice of value articulation is required. Ernstson and Sörlin (2012:277) define articulation as "an empirical body of practices that is played out in, for example, science, media, policy, and through the action of identifiable social actors that make use of technologies and artefacts to establish, or articulate values". In this way urban nature is seen as entangled in social and political processes and not as "objectively existing 'out there'" (Ernstson 2013:8). The debate and struggle over land use practices is guided by

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discourse, power and institutional procedure that also influence the social production of ecosystem services (Ernstson 2013:8).

Ernstson (2013) reveals social production processes that affect urban land use decisions. His work builds on the Actor-Network Theory (ANT) developed in the field of sociology in the 1980s (Ernstson 2013; Latour 2005) as a constructivist theory. When applied to the built environment, ANT posits that actors produce artefacts in the form of buildings, artwork, books, scientific reports, etc., which can be purposefully aligned by the actors to construct narratives, which help to promote the value of a phenomenon and give it credibility. Ernstson (2013), based on Latour (2005), describes actor-networks as humans coupled with non-humans to construct narratives and powerful explanations of the value of certain favoured considerations. In this alignment, material objects give power to ideas (Ernstson 2013:12). Ernstson (2013:12) provides an example from the field of ecology—environmentalists use red data species lists to protect land, but developers see these as an obstacle.

From a political ecology perspective, urban land is profit. How to use land and articulate its value is a matter of political struggle, which is in part regulated through urban planning and regulations (Ernstson 2013:9). Land politics have two consequences. On the one hand, they distribute human benefits and problems within the city (Harvey 1996 in Ernstson 2013:9), and at the same time, they result in a variety of land uses. Research shows that land use influences ecological processes and how they connect across space (Alberti 2005; Bodin & Norberg 2007; Ernstson 2013:9), allowing for seed dispersal, species movement and flow of nutrients and water (Ernstson 2013). Ernstson (2013) explains that in this way urban planning decisions, management practices and other institutions that influence land use also affect the quality of habitat and ecological processes in urban green spaces.

Several actors act intentionally with urban ecosystems. These include landscape designers, landowners, park managers, municipal planners and public users. Ernstson and Sörlin (2009) show that actors with great social network centrality and access to social arenas have a higher potential to be active in putting together social networks. A network position allowing for contact with diverse role players also makes actors more influential (Ernstson 2013). Thus, a network position allowing for contact with developers, the state, the public, plant growers, built environment professionals and ecologists provides landscape designers with opportunities to influence green infrastructure decisions. According to Ernstson and Sörlin (2009), a central network position could also provide actors with abilities to lead processes of finding and positioning evidence for arguments in such a way to strengthen certain viewpoints and values. Actors could position “artefacts” that support their

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arguments and values (Ernstson & Sörlin 2009). Actor-networks have the potential to wield knowledge to a specific purpose, influencing extended networks of decision-making (Ernstson 2013; Latour 2005). In South Africa, landscape designers can potentially be influential in this way, as they are identified as leading figures and trendsetters in the green industry (Middleton 2012).

Despite the potential of landscape design professionals to influence land use struggles and decisions, in South Africa, too little attention is given to green infrastructure. Built environment professionals compete with other actors in the process of value articulation (Ernstson 2013). Developers, the state and private clients have their own established cultural values and project objectives, employing artefacts such as reports or laws, and social arenas such as meetings or conferences. In this way, Ernstson (2013:8) argues: "[a]rticulation is the practice and process through which for instance local groups or biologists construct their arguments to protect urban parks, creeks or wetlands and engage in planning processes—often in contestation to developers that articulate opposing values and arguments for how to use land". The production of ecosystem services and their citywide distribution becomes the result of social protection and management capacities (Ernstson 2013:12). The ecosystem services concept can be seen as one among many possibilities to articulate value in urban contexts and hence inherently political (Ernstson 2013). The role that value articulation plays in terms of urban green space protection and management is illustrated in three case studies below.

In a peri-urban landscape study in Svendala, Sweden, Qvistrom (2013) reveals how governmental ambitions and technology inertia can lead to the legacies of former planning to frame current discourses by guiding the rationale for what is considered and how. A combination of policy documents, planning discourses and representations influence stakeholder interpretations and their subsequent actions in shaping the landscape. In this way Qvistrom (2013:1551) argues, "ideas from out-dated and forgotten documents linger in the landscape". This is congruent with structuration theory (see Giddens 1984, refer to 2.3.5).

Qvistrom (2013) illustrates how a selective storyline on peri-urbanity has framed the discourse and left traces, either on the land or in current policy documents. The author argues for the need to critically examine this discourse and to unravel other stories in order to facilitate a planning debate on the open future. Qvistrom (2013) indicates how, for example, British methods for Landscape Character Assessments (i.e., *Natural England*) adopted in Sweden in 2007 focused upon the categories of: visual quality, integrity, identity and uniqueness. However, the short descriptions provided for each category reveal that all four categories are based on visual qualities. Qvistrom

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(2013:1551) reasons that this tension surrounding the landscape concept gives rise to a corresponding range of interpretations, sometimes bridging unexpected perspectives, sometimes creating a contested terrain. Qvistrom (2013) recommends that embedded landscape ideals need to be discussed within the light of contemporary planning to enable new strategies to come to the fore. The study reveals hidden power relations that downplay the importance of the open landscape. Key documents claim to take a new and 'enlightened' perspective on landscape, only to revert to a visual and static conception supported by the nature-culture divide.

Ernstson (2012; Ernstson 2013) uses two case studies—the *Stockholm Ecopark* and *Princess Vlei* in Cape Town—to show how the construction of a protective narrative through the practices of value articulation created a solid identity for an urban park and granted it protection.

> *A narrative, emerging verbally and materially out of a relational practice of linking different artefacts, spaces and organisations, was taken into social arenas created by the activists—exhibitions, debate forums, op-ed articles, and Internet pages—or retold by journalists in newspapers, and forming part of parliamentary bills and debates* (Ernstson & Sörlin 2012:278).

The case studies illustrate that nature's values "emerge and become realised in relational processes and require social articulation to become perceived and stabilised, which in turn impacts on how they are treated and acknowledged in procedural decision-making" (Ernstson & Sörlin 2012). In this way, social practices of articulation are pluralistic but also interest-driven and purpose-oriented.

According to Ernstson (2013:12), "[t]he protection of urban land is about whether to sustain or keep a green area, while ecosystem management is about choosing (consciously or not) which ecosystem services to prioritise in certain spaces". Although scientists prefer to have logic and rational choice determine the selection of trade-offs between ecosystem services, benefits are not always objectively measurable and thus become contested (Ernstson 2013:12). As Ernstson (2013:12) argues, this process is inherently political. Actors with different abilities and power positions compete in constructing values around different and even opposing ecosystem services. Despite fair stakeholder representation, Wilson and Howarth (2002:433) explain the challenge that "people often hold unequal social positions and possess differential strengths in political bargaining because of their different natural abilities and/or access to power—contingencies that often distort the process of collective decisions about the worth of ecosystem goods and services".

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Ernstson argues that 'elite' professionals often have greater skill in the crafting of artefacts for decision-making purposes and also points towards the role of active civil societies in ecosystem service protection (Ernstson 2013:14). A study by McEwan, Hughes and Bek (2014:213) in South Africa, points towards high and even unrealistic expectations created through the use of technology, particularly the opinions of experts, even when studies or data inputs are still incomplete. Human value perceptions and political agency thus play an active role in what is considered of value or not. The concept of value articulation is crucial for management and protective agency regarding professional practice. However many researchers consider monetary valuations as an equally powerful narrative, which is reflected on in the next section.

4.5 Economic valuation: incommensurability and commodification

Natural resources and services were seen as a free gift for centuries with economic theory preoccupied with labour as wealth. In the second half of the 20th century, a new wave of environmentalism caused the value of economic impact on the environment to begin featuring in decision-making in terms of cost-benefit analysis. Ever since, a range of methods has been developed for external environmental cost-benefits and neglected benefits are continuously added. These models deal with use and non-use values (refer to 3.3) in terms of "expected" consumer behaviour (Gómez-Baggethun *et al*. 2010:1212).

There are two general economic approaches in terms of the environment: Environmental Economics, which works within the neoclassical economic framework and still assumes substitutability between natural and manufactured capital, and Ecological Economics, which works with the ecosphere and exchange of energy, materials and waste flows and sees natural and manufactured capital as being complimentary rather than interchangeable (Gómez-Baggethun *et al.* 2010:1212). Ecological Economics expands neoclassical theory beyond market-driven efficiency to include the concepts of equity and scale; it challenges economic models where natural resources are absent since it is required for the reproduction of capital (Daly 1996 in Gómez-Baggethun *et al.* 2010:1213).

Since traditional environmental narratives have failed to influence economic decision-making, many scientists have been converted to economic valuation[6] of ecosystem services. Market-based policy design has improved chances to influence decision-making and be implemented in policy (Gómez-Baggethun *et al.* 2010). Ecosystem services are increasingly used for economic decision-making in

[6] Assigning monetary value to environmental factors that are normally taken for granted

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markets for ecosystem services (Bayon 2004 in Gómez-Baggethun *et al.* 2010) and so-called Payments for Ecosystem Services (PES) schemes (Pagiola 2008). The term is also used for government and non-governmental organisation (NGO) policy (TEEB 2011). The idea behind these schemes is that beneficiaries compensate service providers (Gómez-Baggethun *et al.* 2010:1214).

However, these exchanges have brought about conflicting valuation languages and the phenomenon of incommensurability. This lack of common measurements for different values often reduces the values of ecosystem services to one common measurement and simplifies complex social-ecological processes. As a result, cost-benefit analysis methods are criticised (Matinez-Alier *et al.* 1998 in Gómez-Baggethun *et al.* 2010:1213). Furthermore, as pointed out by Kosoy and Corbera (2010:1229), marketing ecological function as a service, finding ways to quantify it in a single exchange-value, and developing institutions for market exchange between providers and users constitute a commodification process. Jhally (1987 in Kosoy & Corbera 2010) builds on the Marxist concept of "commodity fetishism"—when entities esteem the value that humans imprint on them. Many view this act of expanding the neoclassical economic model of the market and individualist capitalism, which has caused the current environmental predicament, with suspicion (Kosoy & Corbera 2010:1229). Kosoy and Corbera (2010:1229) name three elements that are hidden as part of the commodification of ecosystem services: the complexity of natural ecosystems, the incommensurability of values (through the use of a single exchange-value) and the social relations underlying the process of production.

The mainstreaming of ecosystem services has led to its framing as a commodity. Gómez-Baggethun *et al.* (2010:1209) argue that this "utilitarian framing of ecological concerns and market strategies can modify the way humans perceive and relate to nature". The institutional structures created by ecosystem services commodification can modify social behavioural patterns and motivations (Vatn 2005 in Gómez-Baggethun *et al.* 2010:1216). Kallis, Gómez-Baggethun and Zografos (2013:100) further claim that monetary valuations are part of broader commodification processes and "involve symbolic, institutional, intellectual, discursive, and technological changes", which actively engage with the ways people regard and interact with nature. Market-based mechanisms may favour individualism and corrupt community values in developing countries towards economic self-interest, and in so doing undermine conservation efforts (Gómez-Baggethun *et al.* 2010:1216). Furthermore the phenomenon of extrinsic incentives driving out Intrinsic Values is well documented (Mansbridge 1994:151; Steg *et al.* 2014)—i.e., when material reward is removed, people cease from acting in the

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desired way, despite previous conformity to behaviour for intrinsic or nonmaterial reasons. Material rewards can thus replace former motivations and become the sole reason for behaviour.

Since valuation processes are culturally constructed, they act as value articulating institutions on how to relate to the environment (Gómez-Baggethun *et al.* 2010:1215). As Adam (1996:320 in McEwan *et al.* 2014:213) argues, the imposition of capitalist time on the variable and rhythmic temporality of nature creates a discordant time-politics in terms of capitalism and sustainable environments. McEwan *et al.* (2014:12) explains that linear notions of time and progress often have little importance when viewed from outside Western cultures, where processes of change and progress are negotiated in multifaceted ways. This again emphasises the importance of IKS that may hold very different value orientations from Western thinking and may not be compatible with standard economic valuations employed. In South Africa where 11 official language groups are recognised and people were politically segregated for the best part of the last century, IKS entail diverse cultural groups and perceptions of nature. This reality implies different urban nature expectations and consequent challenges for landscape designers to meet public expectations.

Economic and social power struggles determine ownership of ecosystem services and similar to the concept of commodity fetishism, "prices for ecosystem services do not follow changes in the quantity or quality of these services, but they are socially constructed and reflect the intensity of social preferences towards them" (Kosoy & Corbera 2010:1233). Commodification can in this way lead to the exploitation of nature as pointed out by McEwan *et al.* (2014). Furthermore, participants in PES trade depart from a position of limited knowledge, while actions like reduced consumption, growth limiting and reconsidering the relationship between humans and nature play a more direct part in policy formation and economic development (Kosoy & Corbera 2010:1234). The next section discusses an alternative consideration of governance and its ethical implications.

4.6 Governance and ethics

4.6.1 Questions of governance

Goulder and Kennedy (1997:28) are of the opinion that arguments for the value of ecosystem services conform partially to a utilitarian approach, which favours economic valuation. Conventional economic valuation adheres to the concept of "consumer sovereignty[7]" in terms of relative value (Costanza & Folke 1997:53). Historically social, political and cultural factors played a role in people's

[7] "By consumer sovereignty it is meant that consumer choices are paramount, and that individual consumer preferences, whatever they happen to be and how they are formed, should determine relative value" (Costanza & Folke 1997:53).

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willingness to adapt to more sustainable living. At the same time, certain factors may prevent environmentally sustainable development from occurring "[b]ecause natural systems have no moral authority and environmental science claims about urban ecosystems are formed and transformed through a range of cultural, social and political processes, strategies for environmental education and communication need to be informed by a range of intellectual and political processes" (Harrison & Burgess 2003/2008:476). Furthermore the economic market regime has no moral or ethical basis for inclusivity of all people's values, including caring for the earth and rightful distribution of resources (Dominelli 2012:135). Yet, the above moral objectives can be achieved through governance involving social institutions and role players in decision-making, guided by interrelationships and social frameworks (Swaffield 2013). Swaffield (2013) explains that governance is concerned with the shaping and projection of values and aspirations but also with effectiveness, participation and legitimacy. In light of environmental loss and degradation (MEA 2005), communication strategies to influence the way people live are required in order to improve environmental and social well-being (Harrison & Burgess 2003/2008).

Demands concerning rights and responsibilities, however, raise queries about the role of structures and norms in society in governing people regarding these concerns (Harrison & Burgess 2003/2008). "Structures" guide social, economic and political life within a society (refer to 2.3.5). These include commerce, education, and planning, together with their modes of organisation (Harrison & Burgess 2003/2008). From a government perspective, policies often aim to 'improve' or change public behaviour, for example, in terms of pro-environmental behaviour. Social structures are inherently normative and have ethical implications (Gobster *et al.* 2007). Institutions develop a socio-cultural status and influence whether people trust or find legitimate information that comes from them (Harrison & Burgess 2003/2008). If people do not observe value in government services, they are unlikely to adopt the conduct promoted by government. As explained by Russell-Bennett *et al.* (2009, refer to 4.3), the process by which "value is created" becomes an important part of understanding behaviour.

The way we comprehend individual response to information has been informed by different social theories and stances over several centuries. In dominant reductionist social theory, individuals are influenced by a cause-and-effect model (Harrison & Burgess 2008/2003). Individuals are perceived to act rationally on their preferences to maximise self-interest and need to be guided by government experts in terms of appropriate behaviour. This goes along with traditional marketing approaches that measures cost-benefit in terms of utility gained. In contrast, contextualist theory sees

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individuals as influenced by a stimulus-response model where people engage critically with new information and interpret it within a social-cultural context. Individuals are seen as ethical citizens who act on normative judgements especially concerning communal resources (Harrison & Burgess 2003/2008). Contextualist theory resides with the experiential value approach that takes into account interactive, relativistic, preference experience (Holbrook 2006 in Russell-Bennett *et al.* 2009:212). This study resides with the contextualist view that people learn from experience, and as part of this process modify their values (Aaron *et al.* 1994:20). However, a desire for change calls for criteria on what is 'optimal' (Costanza & Folke 1997:53).

As argued by Wilson and Howarth (2002), "meaningful" value for ecosystem services is not reflected by adding up individual preferences but rather by group consensus through public debate. Efforts to resolve problems of ecological sustainability and social fairness have led to the emergence of concepts of "democratic preference change" (Costanza & Folke 1997) that adhere to principles of "co-creation" (Russell-Bennett *et al.* 2009). Wilson and Howarth (2002:436) argue that the public nature of ecosystem services, like global biodiversity, makes procedures towards their valuation in a public arena more appropriate. This discourse-based valuation method ties in with the thinking of a contextualist approach, favouring small groups (2-20 people) to reach an informed understanding by following set rules of engagement (Wilson & Howarth 2002:436). Similarly, the contextualist approach favours equity in terms of rights and responsibilities and leans towards stakeholder approaches, participative forms of democracy and respect of a wider range of knowledge (as captured by the contemporary term "transdisciplinary"). Inclusionary forms of decision-making hold transformative potential as they allow for questioning existing understanding and social norms (Harrison & Burgess 2003/2008). Furthermore, face-to-face discussions can engender new social relations and understanding due to mutual respect and trust (Harrison & Burgess 2003/2008; Mansbridge 1994:155). The goal is for new knowledge not to replace existing knowledge but rather to add to it (Harrison & Burgess 2003/2008).

According to Harrison and Burgess (2003/2008:483), the contextualist approach encourages educational strategies that are diverse in nature; locally specific; action-led; encouraging of participatory democracy in terms of forums and arenas; and inclusive of knowledge, experiences and understandings. Collaborative approaches can lead to conflict resolution, which mediates plural values (Swaffield 2013:1195), but can also lead to the creation of public spirit and evolution of consensual knowledge (refer to 4.3, Haas 1989) that also enhance commitment to decisions (Mansbridge 1994:156).

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Wilson and Howarth (2002:435) argue for the need to formalise procedures to achieve free and fair deliberation. The aim of discourse-based valuation is to bring about meaningful consensus-based value statements, which are convincing to those committed to the outcomes (Wilson & Howarth 2002). Recent studies suggest that the discourse method has potential to reveal the multiple loci of social interest that relate to social issues around ecosystem services. In this way ethical questions with a public nature can play an integral role in defining a sustainable future (Wilson & Howarth 2002:438). The next section discusses a number of ethical questions raised around pro-environmental behaviour and professional conduct, before entering the realm of professional values in the last section.

4.6.2 Ethical questions of social production

The contextualist concerns for participatory and democratic, action-led, locally specific and inclusive processes (Harrison & Burgess 2003/2008) are reflected in ethical questions formulated by various authors. Table 8 provides a summary.

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Table 8: Summary of ethical questions raised by different authors, aspects of value and implications

Author(s)	Ethical questions	Aspect considered of value	Implications/goals
Jax *et al.* (2013:263)	Who makes the choices regarding use?	Defining types of value held towards the environment for a good and meaningful life: contextual difference	Include all stakeholders and contextual definitions
	Which values are included or highlighted and which are excluded or obscured? (also Ernstson & Sörlin; Kosoy & Corbera)	Value pluralism and commensurability	Incorporating multiple valuation languages when considering trade-offs
	Who is impacted? (Ernstson & Sörlin; Kosoy & Corbera)	Local benefit and cost versus regional stability and resilience: distributive justice	Consider local and regional scale
Ives and Kendal (2014)	Whose values are relevant?	Relevancy	Which stakeholders should be considered?
	What kinds of social values are relevant? How can they be measured?	Accuracy	What kind of values should be considered?
	Which values do management goals reflect?	Congruency	How are actions put to practice and messages conveyed?
Swaffield (2013)	Local versus experiential versus scientific knowledge	Transdisciplinary	Particularity of knowledge
	Questions of knowledge validity to context	Legitimacy	The contextual application of knowledge and expertise
	Unforeseen outcomes	Ambiguity	Intent and uncertainty in decision-making
Ernstson and Sörlin (2012)	Who produce discourse and who can use these terms?	Silencing other ways of knowing	***Social production:*** Competitiveness of diverse values versus scientific discourse
	Depoliticising and homogenising local differences	Power	Abstraction and uniformity of values and actions
	Service versus disservice	Accuracy	Balanced representation
	The framing of a value in a specific moment	Acknowledge change over time	Projected future values versus current values
Ernstson (2013:15)	How are ecosystems managed?	Motives	Justice and equity
	Which ecosystem services are prioritised?	Preference	Plural values
	Who benefits from these services?	Self interest	Justice and equity
Steiner (2014)	How to account for value of ecosystem services that cannot be translated to monetary terms?	Incommensurability	Value pluralism required
	How to apply the concept across cultures? (also Ernstson & Sörlin; Jax *et al.*; Kosoy & Corbera)	Contextual definitions	Cultural nuances
	How do rating systems or certified projects advance the concept of ecosystem services?	Operationalisation	Legitimacy
	How do good ideas spread and how can knowledge be better communicated?	Articulation	How to harness what we know into action? Operationalisation

Source: compiled by author (2014)

Some authors refer mainly to issues around knowledge, while others regard concerns around values. Bearing in mind value considerations, Jax *et al.* (2013:263) explain that as ecosystem services enter policies and management decisions, voices of direct beneficiaries of ecosystem service use are not often included. This relates to questions of equity and justice in terms of defining types of value held towards the environment and how this impinges on the idea of a good and meaningful life (Ernstson & Sörlin 2012; Kosoy & Corbera 2010). Thus, different stakeholders must be included in participatory approaches in terms of definitions and applications in policy and management. Inclusion does not always establish equity, but a "constructive approach assumes that people do not have well-ordered preferences for unfamiliar objects like ecosystem goods and services and that the elicitation process itself can help people form and express preferences in terms suited to the decision problem" (Wilson

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& Howarth 2002:438). The authors suggests that testing ones values, opinions, knowledge and political arguments in an open debate may be a useful means to develop preferences on unfamiliar topics (Jacobs 1997 in Wilson & Howarth 2002:438), while different backgrounds and training of group members allows for more informed choices (Winquist & Larson 1998 in Wilson & Howarth 2002:439). It is, however, important to include mechanisms that push group members to reveal unshared information to the rest of the group, especially in the presence of experts (Wilson & Howarth 2002:439).

The concept of ecosystem services inevitably entails judgements about human actions influencing nature, and how and what people value in nature (Potschin & Haines-Young 2006 in Jax *et al.* 2013:262), which makes it difficult to apply across cultures (Ernstson & Sörlin 2012; Kosoy & Corbera 2010). It is thus value-laden and normative. Ernstson and Sörlin (2012:275) explain: "when ecosystem services appear as objects of calculated value—guided by the ambition to attain influence in decision-making—they cannot be viewed as reflecting an objective biophysical reality, but should be understood and researched as a social practice to articulate value". According to the authors, the concept of ecosystem services has been operationalised as quantitative, universal, objective, and science-based, which places it in a different league in terms of its gesture in comparison to other locally articulated values. As a result, the ecosystem services approach risks of silencing other ways of knowing; depoliticising and homogenising local differences through abstraction and uniformity of values and actions; and being used by those who have it in their interest to market ecological complexity (Ernstson & Sörlin 2012:275). Economics often become this universal language of value (Ernstson 2013).

A related concern pointed out by Jax *et al.* (2013:264) is the monetisation of ecosystem services in terms of valuation due to the ease of reference and universal utility in the capitalist system, which then often dominates cultural, aesthetic or symbolic values. As explained by Kallis *et al.* (2013:100) "there are bio-physical, political, and ethical limitations to monetization." The adoption of PES and cost-benefit analysis thus holds the threat to reduce Eudaimonistic and Fundamental Values to instrumental utility values that renders them replaceable (refer to 3.3). Equally, payment to service providers may lead to extrinsic values driving out intrinsic ones (Mansbridge 1994:151, refer to 4.3). The ethical argument is thus a question of incorporating multiple valuation languages when making decisions and considering trade-offs between ecosystem services (Ernstson & Sörlin 2012; Jax *et al.* 2013:264; Kosoy & Corbera 2010).

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Furthermore, ecosystem services can benefit some and cost others, while at the same time stability and resilience need to be managed. This raises ethical questions and the need to consider stakeholder opinions in participatory processes at a local and regional scale (Jax *et al.* 2013:265). This can allow synergies, trade-offs and conflicts to be clarified between affected parties, across ecosystem services, taking into account different dimensions of value (Martin-Lopez *et al.* 2013 in Jax *et al.* 2013:266). As a recent study by Gómez-Baggethun, Kelemen, Martin-Lopez, Palomo and Montes (2013:1202) suggests, "multilevel governance regimes that promote coordination and institutional diversity across scales while respecting local sovereignty over ecosystem management" are likely to produce less environmental conflicts and better outcomes in the long run for ecosystem services.

Ernstson and Sörlin (2012:276) summarise critiques of the ecosystem service framework (briefly mentioned in 2.2.6) in four points. Firstly, there is a bias in the use of the word "service". The framework neglects to place emphasis on the disservices of nature. The second and third points relate to equity, social diversity, distribution and measurement of services (also noted by Jax *et al.* 2013 and Kosoy & Corbera 2010). Fourthly, the economic value of services varies over time in an unpredictable way, which makes the framing of a value in a specific moment a potentially poor representation of its worth. Jax *et al.* (2013:26) recommend applying greater transparency when using the concept by adhering to definitions according to context and purpose; addressing different types of values and valuation languages; and considering and mediating possible conflicts and trade-offs in terms of distributive justice.

For professionals in practice, Ives and Kendal (2014:71) have identified three useful questions to consider when working with values in environmental studies. Firstly, whose values are relevant, when considering stakeholders? Secondly, what kinds of social values are relevant and how can they be measured? An understanding of underlying values may be best if pursuing to clarify why certain groups think or act the way they do, while the assigned values within a management unit may be more beneficial to determine how to manage certain resources. Thirdly, which values do management goals reflect? Knowing the underlying values behind management goals can have meaningful suggestions for how actions are put to practice and messages conveyed (Ives & Kendal 2014). While management goals should reflect broader values in society rather than those of individuals, at times they are fashioned by managers' own values (Ives & Kendal 2014).

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Gobster *et al.* (2007:968) posit that from a professional perspective to change human preferences is controversial from both a practical and an ethical perspective. Likewise, Swaffield (2013:1195) identifies questions for professional practice involving the "particularity of knowledge, the contextual application of knowledge and expertise and related questions of legitimacy, and the inevitable ambiguity of intent and uncertainty in decision making."

As pointed out by Jax *et al.* (2013:261), the field of ethics does not only deal with value and valuation (axiology) but also encompasses duties and obligations (deontology). Moral obligations can be direct in terms of interactions or indirect consequences of actions and their results. The viewpoint that nature is replaceable and refundable does not accurately reflect the relation of many people towards nature and their reasons for protecting it (Hargrove 2000 and Tayolor 1986, both cited in Jax *et al.* 2013:262). Kosoy and Corbera (2010:1234) point towards environmental ethics as an alternative and a deliberate attempt to not price the environment but rather recover its character as a public good. Kallis *et al.* (2013:100) argue that value pluralism is not only an ethical stance but also a political one; it requires political action to compete against unwanted commodification and enable plural values and institutions to exist and succeed. They recommend four useful criteria for consideration in engagement: environmental improvement, distributive justice and equality, maintenance of plural value-articulating institutions, and confronting commodification under neo-liberalism Kallis *et al.* (2013:100).

For professional practice, this study conforms to the recommendation of Costanza and Folke (1997:57) that mathematics and economics require low levels of scientific input and discussion; social fairness demands medium levels of scientific input and high levels of discussion; and questions of sustainability oblige medium levels of discussion with high levels of scientific input. In terms of incorporating this scientific contributions and inclusionary processes into practice, this study posits with Steiner that "how to harness what we know into action" is probably the most appropriate but difficult question (Steiner 2014:6-7). To answer this question, professional action and values need to be considered.

4.7 Knowledge, discourse and values in landscape design

Landscape designers in their writings emphasise the need and opportunity for landscape to play an active role in bringing together eco-centric and anthropocentric values (Corner 1999b; Meyer 2008; Moore 2010). However, these authors also stress that a one-sided view of landscape design as being only a scenic object, a resource, or an ecosystem does not embrace the complexity and richness that

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is embodied in the process and outcomes (Corner 1999a). This section, therefore, does not attempt to explain the full complexity of landscape design as a practice, nor does it explain the process of design in detail. For a more comprehensive understanding of landscape design as a science and an art consult, for example, Motloch (1991), Girot (1999), Corner (1999a) and Moore (2010). This section, rather, engages with contemporary studies that consider landscape design and values. It emphasises the interplay of knowledge and discourse in the process of shaping professional values. It highlights how changing ideas of nature and landscape continue to inform, and could purposefully inform, human values and the physical practice of design.

4.7.1 Seven debates in landscape design

Several international studies acknowledge the opinions of researchers and practitioners in the built environment regarding pro-environmental action (Hansen & Pauleit 2014; Kirnbauer & Baetz 2014; Young 2011; Yu, Jiang, Kang, Tian & Duan 2011). Although not focused on values per se, these studies refer to the knowledge and experience of professionals regarding processes or their ability to assign values. Some authors see scientific knowledge as objective and unaffected by value (Swaffield 2013), but knowledge acceptance is value dependent (Bolderdijk *et al.* 2013). The landscape design process thus deals with competing values: scientific value that can affect design decisions of professionals, client or public values that influence expected outcomes and the held value orientation of professionals, which may affect the way they respond to the former.

As pointed out by Meyer (2008:16), natural-looking landscapes are not the only way to engage with ecology; natural processes mimicry is most important. Regardless, the tendency to create landscapes that mimic natural plant communities and use less ornamental species has gone hand-in-hand with ecological landscape design. Özgüner, Kendle and Bisgrove (2007) identify several fields of debate for landscape design professionals in the UK regarding the perceived value of "naturalistic landscapes". These debates highlight the importance of certain performative and value considerations generally held in landscape design. The authors distinguish "naturalistic landscape" as being:

> *"a more natural looking landscape marked by: species diversity, structural complexity of plant communities or absence of uniformity; maximised use of natural elements and usually but not always native plants and animal species; minimised use of artificial elements and overt human control in the design and management; and maximised use of natural or spontaneous processes and ecological principles in the design and management"* (Özgüner *et al.* 2007:38).

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On the other hand, they describe "formal landscape" as "a more formal looking landscape marked by: artificial features or geometric or uniform patterns; neat and tidy appearance or intensive maintenance; and obvious human control in the design and management" (Özgüner *et al.* 2007:38). This section briefly reviews the arguments behind these existing professional value debates.

The first area of debate identified by landscape design professionals is concern for aesthetics. Although environmental literature often suggests that people prefer natural landscapes over built structures, several studies in Europe have shown that for many people natural landscapes represent the untidy, ugly and a "compromise of civilised aesthetic values", or can even provoke fear (see Özgüner & Kendle 2006:140). According to Özgüner *et al.* (2007), the most common cause of complaints about "natural" landscapes is their appearance, which has resulted in a number of studies on landscape preference, since public support is regarded as important for urban green planning. A study by Hofmann, Westermann, Kowarik and Van der Meer (2012) shows how residents' preferences may vary from those of designers or planners. The findings show that as a compromise between user preference and ecological integration, if a minimum of maintenance and accessibility is provided, residents will accept "informal" urban green areas as recreational areas (Hofmann *et al.* 2012). A general recommendation for public acceptance is the use of cues of human care and intention or stewardship in design (Özgüner *et al.* 2007).

Gobster *et al.* (2007:970) argue for design that meets ecological goals and provides positive aesthetic experiences "consistent with public aesthetic expectations for a particular landscape context". With disagreements in public and professional values, this can be a challenge to achieve. However, providing information and knowledge about the ecological value of green spaces—similar to information provided in former zoological gardens or museums—can aid long-term appreciation. Gobster *et al.* (2007:970) explain that though knowledge has been shown to be insufficient to change pro-environmental behaviour (Steg *et al.* 2014), knowledge does change aesthetic appreciation by informing people about positive and negative ecological practices through cognition as explained by Lockwood 1999 (refer to 3.2).

Public safety is a second concern for landscape designers in terms of "naturalistic design" (Özgüner *et al.* 2007). In a UK-based study, Özgüner and Kendle (2006) found people felt safer in a formal landscape setting, while naturalistic landscape settings were found to be more peaceful, quiet, and calming, a better place to release stress, and places to experience a sense of recovery. This is also a

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debate between advantages and risks. There are perceived and real threats in terms of lack of visibility that place constraints on the designer regarding vegetation strata. In another example from the UK, Jorgensen *et al.* (2002 in Özgüner & Kendle 2006:142) show how spatial arrangement is the most important factor to determine a sense of safety and argue for the inclusion of naturalistic vegetation for the benefits it has for some, since it does not necessarily result in parks being unsafe. The above study illustrates how research into user preferences can aid designers in terms of acceptable forms of "urban nature".

Although design with native plant communities is arguably more sustainable in terms of adaptation to local environmental conditions, a third debate is whether native plant communities are really better adapted to urban conditions and prone to good performance in the long run (Özgüner *et al.* 2007; Quigley 2011). The argument is around the long-term sustainability that hinges between less input and maintenance versus required public acceptance and care (Özgüner *et al.* 2007). Some studies question the ability of assembled native species to function as communities in urban settings (Quigley 2011, refer to 2.2.5). Hunter (2011) suggests striking a balance between human preferences and native community species, to gain cultural buy-in and ecological response diversity. A fourth debate on the issue of cost goes hand in hand with the idea of sustainability (Özgüner *et al.* 2007). While arguably a low maintenance option, the complex and unusual management operations of native communities do not always result to be cheaper than the savings from reduced amounts of water, fertiliser and mowing (Özgüner *et al.* 2007). The efficiency of this option is therefore questioned.

A fifth debate addresses the need to incorporate community initiatives and involvement in public landscapes, which some argue is easier to achieve in allotment gardens (Özgüner *et al.* 2007). Kendle and Forbes (1997 in Özgüner *et al.* 2007) posit that the activities in and around native communities are more interesting and also stimulating for children, yet the ability of allotment gardens to include many ecosystem services (Barthel *et al.* 2010) makes a combined multifunctional space an appropriate alternative. This relates to the sixth debate, arguing for the increased educational value of native plant combinations (Özgüner *et al.* 2007), which also combine well with community gardens (Barthel *et al.* 2010).

A last debate concerns the successful encouragement of wildlife conservation in native plant communities versus formal landscapes (Özgüner *et al.* 2007). Although more formal areas with native plant species have been found to attract wildlife, in general native plant combinations create

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a greater diversity of habitat options suitable for local species (Özgüner *et al.* 2007). However, not all people appreciate the attraction of fauna to urban areas.

Whereas all the identified debates of Özgüner *et al.* (2007) refer to Functional Values and benefits around urban nature, there are also debates about landscape design as a cultural project. Treib (1995/2002) argues that there is a lack of meaning in the work of McHarg (1969) that focuses on natural processes and "moral imperative". Designers regard ecological processes as limiting their designs to respond to socio-cultural issues and aesthetics. Design, form and aesthetic and how they are brought about are distinguished and elevated from the scientific enquiry of process. In reference to McHarg, Olin states: "This chilling, close-minded stance of moral certitude is hostile to the vast body of work produced through history…" (Olin in Treib 1995/2002:91). Treib (1995/2002) argues that the 1960s and 1970s were dominated by attempts of social utility in architecture and landscape design with a lack of attention to form and meaning which soon after subsequently resulted in a counter reaction of reengagement with aesthetics and semantics. These sentiments held by many designers do also result in criticism of contemporary landscape design examples (refer to 2.3.7 and 4.7.2) indicating plural values held by different professionals and also the public in this respect.

The above discussion on debates in the industry reveals that designers hold different opinions and preferences with regard to urban nature, which inevitably influence the types of design projects they get involve with and the outcomes they produce. The adding of Functional Value involves personal value judgements. This raises questions on which values are relevant and how to determine this relevance. Swaffield (2013:1193) argues that the "integration of landscape science with local governance needs a strategic framework of design values that are relevant to the particular places and landscapes involved." There are, however, no place specific design manuals for South African landscape design, but instead many authors who stake their claims based on their own value preferences. The next section explores the concept of "adding value" within the landscape design process and its various interpretations.

4.7.2 Design as knowledge and value

Design not only refers to the shape, configuration, or appearance of an object, building, or landscape in the simplest sense, but it also refers to a process in the professional or academic sense (Swaffield 2013:1194). The design process engages with ideas, and the artistic practice of design is "to express these ideas and feelings in space, words, shadow, light and form to manipulate and shape the quality of experience" (Moore 2010:9). These ideas often bind argument, opinion and value together and

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capture the hearts and minds of those involved (Moore 2010:221). De Bono (2000:218 in Swaffield 2013:1194) argues that "for design thinking the output is value". When it comes to design, judgement of truth or scientific facts are less prominent (Swaffield 2013). The main objective of design is to deliver value, "[v]alues thus frame the processes of design, management and science as well as the choices they involve, and are embodied in design outcomes" (Swaffield 2013:1194). By means of these ideas and values expressed by landscape designs, Corner (1999b:1) sustains that there is an ability to critically engage with metaphysical and political programmes in a given society to actively shape culture. This potential of landscape design lies both in its physical and experiential aspects and its capacity to contain ideas and engage the mind (Corner 1999b:1). "The experience of landscape can be a mode of learning and inculcating values" (Meyer 2008:20).

According to Swaffield (2013:1194), "design comprises a creative integration of landscape values, form and process at a particular moment in time, which is realised by strategic interventions in the landscape at varying scales." In this way design can be seen as the initiator of change—a combination of science, design and management, which brings value to the public (Swaffield 2013). This leads to design being perceived as a normative activity, which creates desirable outcomes with different motives (Nassuaer & Corry 2004). Gobster *et al.* (2007:970) point out that "[p]olicy, planning, design, management, and education are all inherently normative activities—introducing changes judged to be improvements". Design is thus essentially about place specific goals, values, interest and outcomes and expresses cultural norms and social institutions (Swaffield 2013:1194). It offers an opportunity to align "diverse and competing forces", from the social and political to the ecological and the programmatic (Corner 1999b:2).

Herein lies the potential of design as a form of intentional landscape change with the ability to align aesthetic and ecological goals. Design "…can change perceptible landscape patterns to build a closer correspondence between what is perceived and the valued functions of environmental phenomena outside the perceptible realm" (Gobster *et al.* 2007:969). The main challenge of a designer is to translate general scientific principles into particular unique situations (Swaffield 2013:1195). Nassauer and Opdam (2008) suggest that science be used as general rules and actions and then get configured to suit specific landscapes. This can be achieved through collaborative approaches to design, similar to discursive processes discussed in the previous section (refer to 4.6).

How to deal with "scientific" versus collaborative knowledge in the design process can be challenging. According to McEwan *et al.* (2014:214), "…people have different levels of access to and

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ownership of knowledge and attach different levels of trust to expectations arising from it…" Ernstson (2013:14) warns against seeing knowledge as purely functional since that may silence other ways of knowing connected to different social classes and cultural processes. Swaffield (2013:1196) identifies various important sources of conflict within knowledge: balancing expert and local knowledge in landscape design; competition between experts from different disciplines for legitimacy; and complexity, ambiguity and uncertainty around social and political deliberation that is inherently shaped around competing narratives and metaphors. The ideologies behind policies influence the nature of "good science" and designers have a challenging task of reconciling science, politics and social legitimacy through design (Swaffield 2013:1195).

Both Nassauer and Opdam (2008) and Swaffield (2013) propose procedural models. Nassauer and Opdam (2008) suggest separating the science of landscape process from the generation of landscape pattern rules since the latter is more value sensitive and locally situated. This can be achieved in three steps: (1) generalised landscape process knowledge; (2) generalised pattern rules in the context of societal values; and (3) place-specific design responses responding to specific values (Nassauer & Opdam 2008).

Swaffield (2013) suggests embedding the scientific process within the value framework. Values that guide landscape design need to reflect both legal and institutional frameworks, as well as the place of implementation. Swaffield (2013) explains his process as follows, identification of value categories within relevant social institutions (for example, legislation) and by workshops with professionals and local communities. This forms a landscape strategy that is applied and adjusted as it deals with specific places. There is noted similarity to that of Nassuaer and Opdam (2008). Swaffield (2013) argues that landscape science is hence framed to deliver values rather than values being seen as a variable of science. Values here are seen as set above individual preference. In the definition of Dewey (1939 in Dietz *et al.* 2005) "values enable resolution of conflict over preferences precisely because they transcend the individuality of preference." This refers to the concept of Functional Value explained by Lockwood (1999, refer to 2.2.2). The above models recognise many valuable complexities around professional knowledge but do not acknowledge the influence of underlying values on assigned values and behaviour of professionals or that these processes are often unconscious (Ives & Kendal 2014). The knowledge landscape designers obtain in their training or in practice about Functional Values also motivate the construction of these other value types, such as held and assigned values (Lockwood 1999:382). These values are to some extent specific to personal background and circumstance. However, part of landscape training also includes specific discourse

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and ideology regarding aesthetics—which is additionally embedded in the specific cultural milieu—these strongly shape the thinking of professionals and the way they assign values. This philosophical influence is considered in the next section.

4.7.3 Discourse, ideology and professional values

Based on an historic review of green space in London, Nicholson-Lord (2011:379) offers three lessons: as our ideas of nature change, so does the need arise for a design language to respond to this; design tends to destroy all sense of naturalness; and both these tendencies are influenced by social, cultural and economic trends. Thompson (1999:35) agrees that, in a sense every formal garden can be argued to represent humankind's dominance and control over nature. Potteiger and Purinton (1998/2002) point out, that narratives and meanings employed in design form and aesthetics throughout time can be read in three ways: by the designer's intentions, the role of the reader or user, and as a discourse of ideologies and world views. Western philosophy has inevitably played a major role in not only the value given to nature but also practices in terms of shaping the cultural landscape. Although this cannot be representative of pluralistic cultural values everywhere in terms of the environment, the political power of the West has allowed Western thinking to transcend Western boundaries. This cannot be ignored when considering current international practices. Prevailing paradigms influence not only scientific thinking but also artistic expression (Fisher 1993). Different views of professionals on nature are hence not only based on the purpose and function nature is intended to serve, but also on diverse experiences and training of designers (Kaplan 2011: 385).

The review given here merely introduces some references to current manifestations in landscape design thinking and practices. Table 9 provides a summary. In South Africa, there is an acknowledgement of diverse cultural histories and philosophies related to landscape; and an attempt by training institutions to include African cultural thinking in the formation of designers. Yet the main emphasis in design education, which is additionally proclaimed through contemporary international case studies as references, remains the foundations of Western culture.

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Table 9: Influence of Western philosophies on concepts of nature and landscape gardening (derived from Thompson 1999)

Period	Central concept	Implication for landscape design
Platonic times	Nature as perfect order to be imitated	Landscape gardening as art
Thomas of Aquinas	Nature = beauty = goodness	Aesthetics and ethics linked
18th Century	Improvement of nature, personal preference, Sublime	Emotions and drives as provoking aesthetic reactions Wilderness = fear and power
Picturesque	Everyday experience of nature and the arrangement of painterly compositions	Associated today with the naturalistic approach
19th century empirical studies and environmental psychology	Deep seated instincts, functionality and symbolic meaning	Biological theories: meaningful patterns
Genius loci	Spirit of place from old Greek and Roman origins	Respecting particularities of place or local distinctiveness
20th century, aesthetic experience (Satanaya 1896/1961)	Associated with picturesque movement	Sensory stimulation, formal qualities and meaning or symbolic qualities (cultural values)
21st century, creative personal way of seeing (Bourussa 1991)	The influence of biological meaningful patterns in the landscape and cultural values can be transcended	Individualism: instinct and culture as limitations to individual creativity and meaning;

Source: by author, based on Thompson (1999)

Western philosophy strongly influenced tendencies in art and design, some implications are summarised in Table 9. Through the ages the arts approached nature in various ways, which often still echo in contemporary thinking. In Platonic times, nature was seen as the perfect order to be imitated and equated to beauty. This led to the consideration of landscape gardening as a sister art to painting, sculpting and poetry. Thompson (1999) points out the identification between beauty and goodness, by St Thomas of Aquinas, for example, which later led to parallels drawn between ethics and aesthetics that remains an underlying current in popular discourse. In the 18th century, beauty was abandoned as the defining property of art; thus, the idea of "nature" as the "perfect example" was also discarded. Instead, philosophies focused on ways of improving nature, personal preference and the sublime, which considers the role of emotions and drives in provoking aesthetic reactions. Subsequently, the picturesque movement broke away from qualities of regularity. Though associated today with the naturalistic approach, its origins were found in the everyday experience of nature and the arrangement of painterly compositions (Thompson 1999). A concept that is strongly connected to the sublime movement is the idea of wilderness (Cronon 1996b). Cronon (1996b) explains how wilderness is a cultural invention that represented the antithesis of order and good pre 19th century while post 19th century it became associated with an emotional experience of power and beauty. Subsequently most of human effort has been preoccupied with domestication of wilderness (Cronon 1996b).

Since the 19th century empirical studies and environmental psychology have steered thinking around landscape preference, mainly through considerations of deep-seated instincts, functionality and symbolic meaning (refer to the biological theories discussed in 3.4.2). The age old concept of *genius*

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loci was resuscitated and manifested in design as respecting particularities of place or local distinctiveness, which has remained an important theme in landscape design (Dee 2001; Thompson 1999). Twentieth century thinking revolves around the aesthetic experience, which includes sensory stimulation, formal qualities, and meaning or symbolic qualities (Satanaya 1896/1961 in Thompson 1999:25). The work of Bourussa (1991 in Thompson 1999:26) takes this further, suggesting the influence of biological "meaningful patterns" in landscape and cultural values as being transcended through a "creative personal way of seeing".

Besides the influence of philosophy on art, Gandy (2013b) explains how prevalent ideas and metaphors are often picked up and borrowed between the sciences and other social milieus in philosophy or literature that become social discourses. He indicates how the idea of emptiness or void has been romanticised in literature, poetry, psychiatry, science and ecology since Pascal in the 17th century, and not only in Western contexts. According to Harvey (1996:163), scientific investigation cannot be detached from social metaphors, as these metaphors are continuously deployed in the production of knowledge. This is especially true in the case of value enquiries towards nature: "…the interplay of socially grounded metaphors and scientific enquiry is such as to make it extremely difficult to extract from the scientific findings any socially untainted information on the values that might reside in nature" (Harvey 1996:164).

Table 10 provides a summary of the 17th to 20th century ideas as described by (Gandy 2013b). Gandy's (2013b) explanations are useful as they bring together cultural and scientific phenomena related to landscape design taking into account the rise of urban ecology.

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Table 10: Influence of science and society on concepts of urban nature 17th century to 21st century (derived from Gandy 2013b)

Period	Ideas and actions
Pascal in the 17th century science	emptiness or void
18th century art	semi-wild picturesque
19th century	reformulation of metropolitan nature
Mid twentieth century.	The regularisation of urban nature as an interface between nature, science and society
Spontaneous flora: 17th-20th century ecology	unintentional nature was seen as the antithesis of urban space
1960s urban ecology (Sukkop 1973/2008)	the study of cosmopolitan ecology of cities and introduced species
McHarg (1969)	principles of ecological design for landscape planning
Fiscal crisis of the state since the 1970s (Landscape practices versus politics and economics)	affected labour intensive municipal park: neglected urban spaces reflect the dislocation between designed landscapes and capitalist urbanisation
1970s urban ecology	independent dynamics of nature
Whiston Spirn (1984)	ecological criteria for landscape
1990s urban political ecology	aesthetic, epistemological, and ideological limitations of existing approaches to the interpretation of landscape
Landscape as art meets political geography	familiar is rendered mysterious dislocations in terms of class, gender, and ethnicity
	wastelands exist in dynamic tension with human intentionality; they also challenge unified conceptions of the cultural landscape and other ideological motifs
21st century urban ecology	new synthesis between nature and culture
21st century landscape design	semi-natural aesthetic linked to more diverse conceptions of public culture
Reworking of the sublime: Art	a focus on visual encounters or nature as space for spectacle
	materiality bounded up with human finitude and our perceptions of time
Socio-scientific and political criticism of landscape as art	implicit spectacularisation of landscape far removed from direct cultural or scientific practices
21st century urban ecology meets landscape design	aesthetic appeal invoked by these landscapes imbedded in cultural and ecological complexity
Landscape as art meets science	scientifically enriched public culture allows for changing perceptions
	increasing interest from landscape professionals to include exotic annuals and herbaceous perennials in naturalistic plantings

Source: by author, based on Gandy (2013b)

According to Gandy (2013b:1303), the formation of urban ecology as a discipline has led to "alternative conceptions of urban landscape and design as part of a new synthesis between nature and culture in the contemporary city". Although interest in spontaneous flora has been recorded since the late 17th century, the first recording of spontaneous urban flora occurred in the early 20th century by Paul Jovet in Paris and in the 1960s by Herbert Sukopp in Germany (Gandy 2013b:1303). Until very recently unintentional nature was seen as the antithesis of urban space; the modelling of biophysical processes was seen as contrasting with the production of urban space (Gandy 2013b:1303). The science of urban ecology has in this way served to both enhance and protect alternative social and cultural discourses about urban nature through political ramifications (Gandy 2013b:1307).

Since the 1990s the field of urban political ecology was critiquing nature-based metaphors in urban discourse (Gandy 2013b:1305). After the second world war the study of cosmopolitan ecology of cities and introduced species was in contrast and critique of nativist approaches (Gandy 2013b:1304). This critique was aimed at the "aesthetic, epistemological, and ideological limitations

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of existing approaches to the interpretation of landscape" (Gandy 2013b:1305). Marginal spaces are today recognised as part of the green infrastructure of cities, mitigating flood and climate control. However, there is tension between technical expertise and contested political demands in urban space (Gandy 2013b:1305).

According to Gandy (2013b), since the 1970s, the independent dynamics of nature have dominated alternative approaches to design in urban spaces, combining the enhancement of biodiversity with a less formal aesthetic of urban nature. Gandy (2013b) distinguishes between the 18th century's purely visual fascination with the semi-wild picturesque and a more recent interest steered by scientific knowledge of spontaneous nature. In this way, the powerful yet elusive concept of biodiversity serves for new approaches to design of urban space and its ecological usefulness (Gandy 2013b). Distinctive urban habitats are seen to mimic natural features in contemporary design. There is an emphasis on semi-natural aesthetic linked to more diverse conceptions of public culture (Gandy 2013b:1306). At the same time these multifunctional and optimal landscapes have different manifestations, as Gandy (2013b) marks that most parks become designed fragments of nature inscribing social and political power in the "spontaneous" urban landscape. A few exceptions to these are sites where the spontaneous attributes have been preserved like Templehof Airport and Sudgelande Railway Station in Berlin, Germany.

Gobster *et al.* (2007:962) suggest that people interpret their aesthetic experience of landscape to be indicative of its ecological quality and tend to associate appealing aesthetics with a good ecological state, which is often not an accurate reflection. This reminds of the equation of ethics and aesthetics by Aquinas, as remarked earlier in this section. Gobster *et al.* (2007) further posit that although ecological knowledge may help nurture an intellectual understanding of changed management policies, they are of the opinion that such knowledge may not necessarily lead to the aesthetic appreciation of ecologically valuable landscapes. Gandy (2013b), however, explains that there is an aesthetic appeal invoked by the above-mentioned landscapes as imbedded in cultural and ecological complexity. He points out that there is a relationship between knowledge and experience in these landscapes: "[t]he more detailed and engaged our knowledge of such spaces—and their ecological dynamics—the more sophisticated our grasp of their aesthetic characteristics" (Gandy 2013b:1307). This is the relationship between scientific knowledge and aesthetics by means of cognition. Yet, in a culture of immediacy, Gandy (2013b) concurs that complex concepts of biodiversity are overtaken by simplified metaphors of resilience and sustainability.

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In terms of behavioural psychology applied to biophysical science to convey human preference of nature aesthetics, Gandy (2013b) remarks that, "the idea of the aesthetic in these science-led reformulations rests on a cognitive or behavioural model of human interaction with landscape that lacks any clearly articulated engagement with the historical production of cultural meaning" (Gandy 2013b:1308). This is a valid point, since many studies regard and analyse user preference as biologically instinctive rather than a cultural response. Consequently there are technical definitions of scientists for nature (see Pickett *et al.* 2011:255)[8], while in the social sciences nature is predominantly seen as a social construction (Stedman 2003, refer to 3.4.1).

According to Gandy (2013b), neglected urban spaces reflect the dislocation between designed landscapes and capitalist urbanisation. The fiscal crisis of the state since the 1970s has affected labour intensive municipal parks originating from the 19th century reformulation of metropolitan nature. The reformulations entailed changes in zoning laws, infrastructure improvements, formal landscape design, etc. As an interface between nature, science and society, the regularisation of urban nature including obsessive control of weeds, reached its apogee in the mid-20th century. The unravelling of these relationships has implications for design, maintenance and meaning in urban landscapes (Gandy 2013b:1309). The ecological landscape design of McHarg (1969) began to influence the thinking of design professionals in North America and Northern Europe at around the same time. This continued through the work of Whiston Spirn (1984). These approaches evolved to question more traditional horticultural maintenance, suggesting alternatives of vegetation management by means of the application of ecological awareness and knowledge to design and management of landscape (Özgüner *et al.* 2007). The creations of conventional design were regarded for the first time as restricted, artificial and expensive (Özgüner *et al.* 2007).

In 21st-century landscape design, the use of native plants has seen an increasing interest by landscape professionals in the use of exotic annuals and herbaceous perennials in combination with native species for visual effect (Özgüner *et al.* 2007). Gandy (2013b) remarks how in recent times the sensuous aspects of nature as ambient have been downplayed by a focus on visual encounters or nature as space for spectacle. Another recent philosophical approach sees materiality bound up with human finitude and our perceptions of time, making independent processes in nature seem eloquent and enchanting (Gandy 2013b:1308). According to Callicott (2002), the emphasis on aesthetic pleasure created by "natural aesthetics" distorts priorities in conservation from places that are less spectacular, strengthening aesthetic values over ethical values. The recent reworking of the

[8] Picket *et al.* (2011:255) define nature as "organisms, structures, and functions that reflect their own evolutionary history, inborn behaviours, and the working out of unmanaged interactions".

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sublime similarly replaces ecologies with aesthetics through implicit spectacularisation of landscape, far removed from direct cultural or scientific practices (Gandy 2013b:1310). Representing the familiar in an unfamiliar way can also be a kind of radical cultural and political praxis. Spontaneous spaces of urban nature can either be seen as sites of unease or places of creative expression (Gandy 2013b:1311). The challenge is to find workable alternatives within nature as autonomous without relying on human interest (Gandy 2013b). Cronon (1996b) proposes that the idea of wilderness presents this opportunity since it allows for the seeing of otherness in the unfamiliar and in the familiar. Based on the thinking of Cronon (1996b) it can be argued that wilderness in public spaces can demand a respect for otherness or a critical self-consciousness of the urban dweller that needs to consider the possibility of non-use in a capitalist society, not out there, but right here.

Scientifically enriched public culture allows for changing perceptions that may accept previously incongruous elements that enhance biodiversity (Gandy 2013b:1308). In view of the above, wastelands exist in dynamic tension with human intentionality; they also challenge unified conceptions of the cultural landscape and other ideological motifs. According to Gandy (2013b:1312), the “intrinsic worth” of the seemingly useless is as much a political question as an aesthetic or scientific one. Popular acceptance and appreciation of wastelands is important because it promotes urban biodiversity and in this way holds implications for the development of a scientifically enriched public realm. This rests both on a combination of greater affinity for nonhuman life in cities along with new forms of knowledge production (Gandy 2013b:1312).

The consideration of ideology throughout history indicates drastic changes regarding landscape design thinking which has also had an effect on landscape design in South Africa. The manifestation of landscapes in Europe and North America and the ideologies attached to and discussed along these artefacts are often regarded as the “avant-garde” due to greater technological advance associated with these countries. The fact that these countries experience less social-economic challenges often results in greater investments and budgets connected to landscape design projects, which appear more impressive. These projects often proclaim strong Western ideologies and hence influence South African landscape design thinking. What is most apparent though is the adoption of form and aesthetics, since images and the mimicking of style travels faster than the cultural meaning embedded in these. These are important considerations to keep in mind in a globalised world. The dual influence of science and art thinking on the industry and the way it deals with concepts of aesthetics provides opportunities for social ecological integration. The last section looks at studies

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most similar to this one which consider professional values in landscape design and suggests a way forward.

4.7.4 Studies on values of landscape designers

This section considers the two studies most similar to this enquiry regarding the values held by landscape design professionals. Both studies were conducted in the UK, which, although it is a developed country with a very different climate, does have strong colonial ties with South Africa. The UK also has a multi-ethnic and multicultural population similar to South Africa.

The first study investigated the sources of value in landscape architecture specifically in Britain. Thompson (1999) conducted a review of literature and interviewed 26 practitioners on their personal motivations to unravel main sources of "positive values" in the profession. The interviews were recorded, and computer software was used to identify satisfactions, dissatisfactions and motivations. Thompson identifies three value systems, which influence landscape architectural practice, namely: aesthetics, social concerns and ecological considerations. Aesthetics as "the improvement of visual amenity" formed the heart of landscape architecture but interviewees in Thompson's study rarely referred to the body of theory on aesthetics in conversations (Thompson 1999:53). Most practitioners did not see themselves as artists, while some considered art as elitist. There was a more common reference to the concept of "good design" that was associated with function (but not functionalism); space and scale as qualities of place; and love for detail as special characteristics (Thompson 1999:83). Social concerns included concepts of improving quality of life, providing relief, economic reconstruction and identity, crime prevention and public consultation for consensus building. Ecological concerns involved aspects of sustainability, reclamation, an ecological approach, and habitat creation. Of the three values ecological design produced the most mixed feelings and was perceived as superficial and tokenistic, not good for all circumstances and less important than social and aesthetic concerns (Thompson 1999:173-4).

Thompson's study looks at the relationship between aesthetics and ecology, mediated by human agency, and seeks to discern the role the profession should play in the present and future of the planet. Thompson (1999) explores philosophical and historical dimensions of values in the profession, seeking the origin and development of values and the justification of value position and their relations. He identifies responsibility of the profession to include personal ethics, or moral beliefs and values; business ethics, as honesty and fairness; environmental ethics; and then aesthetic and social values (Thompson 1999:6). The study assumes that values in literature and practice bear

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some resemblance and for the same reason focuses on exemplary works, geographic spread and a variety of practices to make a balanced enquiry. The study found that sometimes values are similar to the literature and at times they depart markedly.

Thompson (1999) concludes after the political theory of Isaiah Berlin Gray (1995 in Thompson 1999:8) that the conflicting nature of different values "cannot be arbitrated by an overarching standard". Different cultures will generate different values, which may be conflicting and incommensurable. This, according to Berlin in Thompson (1999:8), does not lead to scepticism, relativism or subjectivism but rather to "agonistic liberalism" which refers to human choice between values without recourse to any overarching standard. For this reason Thompson (1999) suggests that his concluding value framework is utilised for critical appraisal of works in the profession. He does admit to the normative force that this may hold in terms of maximising these three aspects for positive effects in landscape design practice.

In a second study, Özgüner *et al.* (2007) consider the attitudes of landscape design professionals regarding "naturalistic planting" (see definition in 4.7.1) in the UK. The self-administered survey of 500 professionals rendered an overall response of 53%. The survey included a stratified sample of landscape designers working in parks and recreation departments of local authorities, private landscape practices and conservation trusts (Özgüner *et al.* 2007). The survey contained 20 questions on preferences around "naturalistic" versus "formalistic" landscape design, including aspects of aesthetics, safety, sustainability, community involvement, environmental education, cost and wildlife conservation (Özgüner *et al.* 2007). The questionnaire also enquired as to the style professionals work with predominantly, what they feel more comfortable working with and which style they would make use of in an urban environment (Özgüner *et al.* 2007).

In the findings, more than 90% of respondents from all the groups were of the opinion that naturalistic design has a place in urban landscape (Özgüner *et al.* 2007). The majority from all groups valued naturalistic landscape for wildlife conservation, environmental education, sustainable development and as cheaper to manage, in that order. Just over 50% of respondents valued naturalistic landscapes for encouraging community involvement, while less than 50% valued it for seasonal changes and easier maintenance (Özgüner *et al.* 2007:39). Twenty-five per cent of respondents valued naturalistic landscapes as more positive experience than formal landscapes (Özgüner *et al.* 2007:40). The three main reasons for the use of formal design were "public demand", "appropriateness of formal design in urban environment" and "experience in formal design"

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(Özgüner *et al.* 2007:41). Some designers did not prefer one style over the other and felt that "public/client demand", "site characteristics", "appropriateness of design" and "availability of funding" determined the selection of an appropriate style (Özgüner *et al.* 2007:42). The authors conclude that professional preferences for landscape styles are complex and depend on a variety of factors, and that in general there is a desire for both styles to co-exist in the urban landscape (Özgüner *et al.* 2007:44).

Neither one of the studies considers the role that professional values play in the production of ecosystem services, yet they acknowledge the changing emphasis of the industry and a required need for change in the profession. Thompson specifically recognises the potential of a value framework for appraisal of work, yet does not want to impose this. According to Özgüner *et al.* (2007:44), "[t]he urban landscape is characterised by the complex diversity of goals and objectives that may need to be reconciled, and developing a clear perspective on what should be done is often the hardest task facing professionals who are responsible planning and management of urban landscapes." An important predicament is thus a question of whether professionals can ethically influence the public in terms of what they feel the relationship with nature should be. This is viewed with suspicion by some authors (Gobster *et al.* 2007; Thompson 1999). Both Gobster *et al.* (2007) and Swaffield (2013) argue that there is ambiguity and uncertainty in environmental knowledge and based on this they question the ethics and effectiveness of using persuasive information to alter environmental perceptions and behaviour. Gobster *et al.* (2007:971) reason, "[i]n design as well as knowledge interventions, openness to public discourse, a clear ethical purpose, and acknowledgment that we might be wrong must guide decisions for what and how interventions are made".

Conversely, several authors argue that scientists have a responsibility to suggest positive pathways to change (Costanza & Folke 1997; Gobster *et al.* 2007; Harrison & Burgess 2003/2008). Gobster *et al.* (2007:971) also acknowledge "…we need strategies for making decisions that bring human values and ecological goals into better alignment". In line with complex adaptive systems thinking, human interaction and feedback with the environment should aim at self-regulation (Zipperer 2011:306). This can only happen if the normative values of those involved are reviewed and projected towards the future (Redman 2011). As our understanding changes, the aesthetic design language used to incorporate nature into settlements also requires change beyond mere socio-cultural and economic trends (Nicholson-Lord 2011:379). Costanza and Folke (1997:55) add that, "[f]or short-run problems,

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it may seem reasonable to assume that preferences are given, but it is less reasonable for long-run problems, and in particular not for problems related to ecological sustainability and social fairness,"

Techniques of separating landscape process from landscape pattern making as suggested by Nassauer and Opdam (2008) and Swaffield (2013) see designers as not being influenced by underlying values of their own or being able to distance themselves professionally from these. Although Functional Values through knowledge can influence our other values (Lockwood 1999), studies have also revealed the value dependency of knowledge (Bolderdijk *et al.* 2013). Based on the literature reviewed, this study posits that design interventions are always partially and sometimes completely guided by a designer's underlying values towards meaning and perceived value, consciously or unconsciously. Since underlying values have been shown to influence beliefs, choices and behaviour in unconscious ways (Ives & Kendal 2014), it is argued that value considerations in design should be a conscious matter.

> *"Values inhere in socio-spatial processes, furthermore, and the struggle to change the former is simultaneously a struggle to change the latter (and vice versa). And it is precisely at this point that the human imaginary has to be deployed to its full force in the quest for progressive socio-ecological and political-economic change"* (Harvey 1996:12).

Other professions that are perhaps more acquainted with ethical questions, have taken quite a strong stance with regards to their professional ethics as a response to global issues. Such an example is Dominelli (2012:3) who argues that social workers have a vested interest in attending to environmental issues, due to the profession's "embeddedness in life-enhancing micro-practice in everyday routines". She maintains that social workers have a holistic understanding of environments and how they impact on people's behaviour. Figure 19 illustrates this holistic practice and highlights different scales and spatial construction that somehow reflects constructivist and post-structural models. The holistic practice chart of Dominelli (2012) indicates socio-cultural relations as separate from physical space and environment (similar to Lefebvre 1974/1991, see Figure 26) and further shows socio-cultural relations apart from political and economic forces (different to Lefebvre 1974/1991). These four components unite the individual to society at different scales, and are connected by means of human agency, reflexivity, power relations, and resources.

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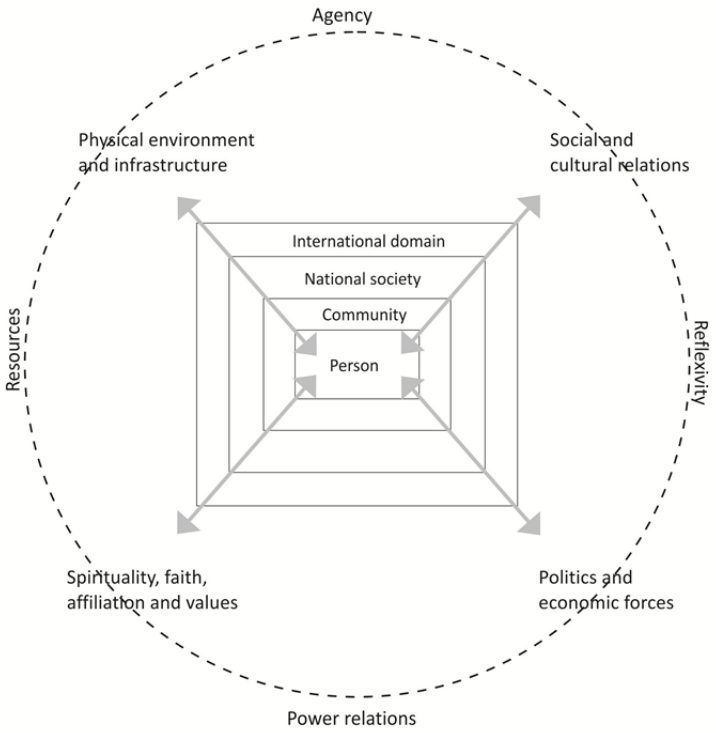


Figure 19: Holistic practice chart indicating the dynamic relations between different human spatial relationships that allow for negotiation and change

Source: by author, adapted from Dominelli (2002) in Dominelli (2012:197)

Dominelli departs from the point that the environment is socially constructed and though fulfilling therapeutic purposes should not be regarded as a means to an end. Therefore green social work is defined as a practice that protects the environment and enhance people's well-being "by integrating interdependencies between people and their socio-cultural, economic and physical environments," with a specific emphasis on equality (Dominelli 2012:8). Dominelli sees resilience as being effective through endogenous change and internal response, which coincides with the literature focussing on normative and intrinsic values (Mansbridge 1994; Steg *et al.* 2012). Dominelli (2012:196) argues that, "as people negotiate their realities, it allows for change". This quest of Dominelli to mobilize green issues in social work has very similar goals to this study and speaks to related issues in the literature. It offers several thoughts and tools that are equally applicable to landscape designers. Although not historically involved in ethical questions like social workers, the literature review thus far has reiterated the crucial position that landscape design professionals hold for improving environmental and social well-being. Every new or modified facilitated landscape can harness nature's potential to provide maximum ecosystem services that include aspects of biodiversity and ecosystem functions while considering inclusivity and equality for stakeholders. Well considered and designed green spaces can in small incremental ways reduce and overcome many social and environmental ills,

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crises and hardships. These are the daily implications of decisions mediated, driven and implemented by landscape designers.

Dominelli (2012) offers a wheel of knowledge and action that depicts the skills and knowledge required for green social work (see Figure 20). Based on this wheel of knowledge and the discussion in the literature, arguably, the three key drivers influencing professional practice are contexts, skills and values. In the case of a developing environment context, settings and world views influence the expectations and methods employed in practice. These drivers also influence policy and legislation, and academic theory. The former three aspects all influence public and professional ethics and values, but also inform required professional skills in practice. The wheel can, however, be read from a counter perspective. If values are operationalised, they could influence principles and status, on the one hand, and ethics and theory, on the other. Professional and public roles could thus be reconsidered, which may influence required skills, while policy and legislation may play a role in terms of recommended processes and methods for practice. Similarly, theory could change concepts (or metaphors) and influence expectations and world view.

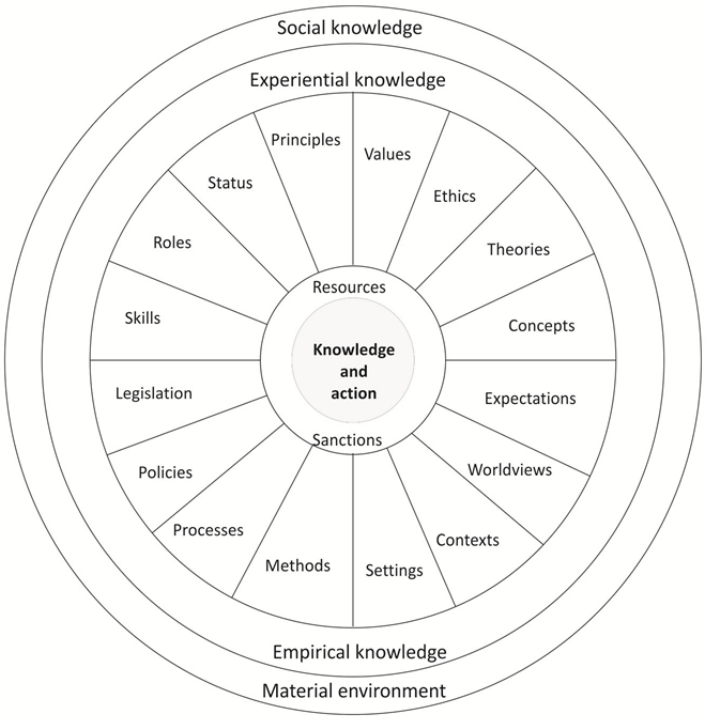


Figure 20: Wheel of knowledge and action, approaching environmental problems from a human agency perspective

Source: by author, adapted from Dominelli (2002 in Dominelli 2012:27)

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In the next chapter these thoughts in terms of operationalisation of professional values are elaborated by means of recently suggested models for design process in practice to include ecosystem services. As important as the process of operationalisation is the consideration of contemporary landscape process knowledge that must provide Functional Values for landscape designers to respond to.

4.8 Summary and Conclusions

This chapter touched on aspects of axiology but was mainly concerned with value in as far as it refers to duties and obligations, also known as deontology (Jax *et al.* 2013). Value creation and value change are controversial themes due to their historical reference to totalitarian regimes that imposed their thinking on citizens. However, values are shaped daily by education and policy; and manipulated though advertising and the media. People also continuously learn from experience and modify their values (Aaron *et al.* 1994), negotiate their realities and allow for change (Dominelli 2012). For professionals specifically, strategies are required to develop and inform preferences which can be done in open and democratic ways (Costanza & Folke 1997).

Pro-environmental behaviour is influenced by held values, situational factors and value cues (Steg *et al.* 2014). For pro-environmental behaviour, held values can influence beliefs, attitude and norms in three ways: (1) by the perceived significance and probability of consequences of behaviour for a most important held value; (2) through norm activation; and (3) through reinforcement of the environmental self-identity (Steg *et al.* 2014). Situational factors are comprised of descriptive norms of others, perceived or real costliness and three competing goals: hedonic, gain and normative. Two exceptions on costliness are: firstly, when the self is activated, more effort will be made, and secondly, when status is at stake, expenses motivate action (Steg *et al.* 2014). Situational factors can be manipulated to increase pro-environmental behaviour by reducing costliness and competition between goals or using prescriptive norms. Steg *et al.* (2014) further suggest strengthening of normative goals through situational factors and value cues that influence the accessibility of values.

Three factors that have proven limited for value change are: knowledge, when not aligned with values (Bolderdijk *et al.* 2013), and material and economic incentives, which erode normative values and cannot effect long-term change (Mansbridge 1994; Pretty 2003). A third factor is punitive action through regulation or legislation (Mansbridge 1994). This is especially important for this study since it considers contemporary profesional values which often look towards the law or economic incentives for motivation. Schultz and Zelezny (2003) recommend the reframing of appeals for pro-

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environmental behaviour. This method identifies held values and align suggested and required changes with those values; for example, self-enhancing values like improved well-being can be aligned with the preservation of green infrastructure.

There is further potential for value operationalisation through moral motivation (James 2011; Mansbridge 1994), descriptive norms of frequent associates or public figures (Aaron *et al.* 1994; Goddard *et al.* 2012; James 2011), official guidance, targets of tangible achievement (Box 2011), and through the consumption process by means of co-creation (Russell-Bennett *et al.* 2009). All of these aspects operate through a combination of value cues and situational factors that can affect the significance and probability of diverse consequences of behaviour (Steg *et al.* 2014). Both intrinsic normative and extrinsic material motivations together have been proven as more successful with regard to value operationalisation for long-term change (Mansbridge 1994). This coincides with the view of Dominelli (2012) that resilience should be through endogenous change and internal response.

As indicated in Chapter 3, qualities of place also affect humans and their behaviour. Interaction with nature from an early age is argued to play an important role in pro-environmental behaviour (Kaplan & Kaplan 1989; Byrne 2011). There are several authors that feel that urban landscapes have an important pedagogic role to play for ecological literacy (Colding 2011; Ernstson *et al.* 2010; Ernstson & Sörlin 2009) and suggest it can take place through civic support initiatives (Colding 2011). This opportunity is the domain of landscape designers who hold a central position in the built environment and have ability to lead processes and position factual evidence (Ernstson & Sörlin 2009). Yet, competing goals on land use often overrule normative objectives and professionals have greater skill and power than the public to engage in this political process. This can be seen as a political process where value cues and situational factors are daily manipulated in processes of value articulation (Ernstson & Sörlin 2012). In the built environment the success of value articulation depends on actor networks (Latour 2005), which make use of artefacts, arenas and network positions (Ernstson & Sörlin 2012).

In a context of free-market capitalism, economic valuation affects perceptions of assigned values (Gómez-Baggethun *et al.* 2010) and is often considered the most obvious way to demonstrate value. Economic valuation is criticised for commodifying nature, disregarding incommensurability, concealing the complexity of nature, and for ignoring the social relations, which are part of production (Kosoy & Corbera 2010). In the same way as free-market logic, Western philosophy often

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dominates cultural thinking on time and progress due to Western market control and the power of technology to symbolise progress (McEwan *et al.* 2014). Meanwhile, social discourse and ideology as part of science and art shape cultural and professional thinking, including that of landscape designers (Gandy 2013b), through their training and in everyday life. These limitations enforce the need for a wider inclusion of different types of knowledge (MEA 2005).

Governance is concerned with effectiveness and participation, as well as shaping perceptions and behaviour through institutional processes, but is often ineffective due to lack of social trust or legitimacy (Swaffield 2013). Although user preferences are held in high regard, concerning the environment and ecosystem services, group consensus is important and can be achieved through discourse-based valuation (Wilson & Howarth 2002). This is also described as democratic preference change (Costanza & Folke 1997), which adheres to principles of co-creation (Russell-Bennett *et al.* 2009).

Scientists and researchers pose several ethical questions, such as fairness, uncertainty around knowledge and unforeseen consequences of actions (Swaffield 2013). Knowledge has so far failed to bring human values and environmental goals in alignment (Gobster *et al.* 2007). Goulder and Kennedy (1997:38) suggest that proposals are made for frames of decision-making in realms of uncertainty. Values are normative, but so is design, often in unconscious ways. Design is more concerned with values than with science or facts (Swaffield 2013). The values of designers consciously and unconsciously can affect the production of ecosystem services in urban landscapes. Nassauer and Opdam (2008) and Swaffield (2013) propose landscape design frameworks that aim to deal with knowledge and values in a procedural fashion, trusting the designer to remain objective in these undertakings. These models do not take into account the influence of held values on designers. They also do not acknowledge the process of value articulation where value cues and situational factors influence decisions taken by designers.

The values of landscape design professionals in South Africa and elsewhere are shaped by discourse and ideology; these factors include Western art philosophy and metaphors from science. Art and science influence greatly the social perceptions of what urban nature can and must be in different historic periods (Gandy 2013b; Nicholson-Lord 2011). A few key moments of importance for landscape design in chronological order are: classic ideas of nature as art, the romantic period of the 18th century, followed by the sublime and picturesque movements, the reformulation of metropolitan nature of the 19th century, modernist functional thinking, the fiscal crisis, McHargian

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ecological design, urban ecology and independent dynamics of nature, urban political ecology, and a new synthesis of nature and art. It is important to acknowledge these culture-shaped meanings to fully comprehend human values for nature and landscape (Gandy 2013b). The discourses related to urban ecology bring new possibilities for scientifically enriched public culture (Gandy 2013b). Concepts of wilderness and wastelands as part of urban nature confront urban users with critical opportunities for self-reflection with respect to non-use and otherness (Cronon 1996b; Gandy 2013b).

Thompson (1999) considers the values of landscape designers in Britain to be influenced by professional ethics, business ethics, and environmental ethics, and suggests that aesthetics and social concerns should be recognised as important professional values. Both Thompson (1999) and Özgüner *et al.* (2007) consider values of landscape designers within the domain of changing ecological thinking and environmental expectations, yet they refrain from proposals of how to engage with these values. Dominelli (2012:8) from a social work perspective reasons that holistic practice together with knowledge and action can create resilience as an internal response where professionals integrate reciprocities between people and their socio-cultural, economic and physical environments. This study argues that landscape designers similarly have an important role to play in integrating currently conflicting objectives in urban nature through holistic thinking, for both human well-being and environmental stewardship. Based on the findings of this literature review, this study posits that there is potential and relevance for knowledge to lead to action; this can be achieved through the operationalisation of professional values.

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Chapter 5



habitat

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CHAPTER 5: Landscape Design Criteria for Social-Ecological Integration

5.1 Introduction

Research on the integration of humans and ecology in cities has taken different approaches. A number of studies employ the concepts of green infrastructure and ecosystem as variables with potential to influence both ecological function and social aspects in planning, design and management. The terms “green infrastructure” and “ecosystem services” feature increasingly in South Africa—in academia, policy documents and professional magazines—but in practice they are seldom employed actively in deliberations on urban land use decisions. As a result, developers, the state and designers typically consider trade-off choices in development.

Much has been written on “ecological design” in the last 30-50 years, including literature on new philosophical approaches such as Landscape Urbanism. The goal of this section is not to reproduce or summarise what has been published on the topic, which is vast, but to demonstrate some practical considerations with regard to vegetation selection in facilitated landscapes that promote green infrastructure, ecosystems and biodiversity in the urban realm. The chapter continues to demonstrate existing models, which aim to integrate this knowledge within social-ecological systems, responding to contemporary social processes and needs. Such considerations need to create opportunities for people, vegetation, animals and insects to share urban spaces with the least potential conflict (Farinha-Marques *et al*. 2011). The design solutions are not difficult to apply; more challenging is the institutional process and compliance with user preferences.

Figure 21 below illustrates the layout of the chapter, which begins by considering models and frameworks for integrating green infrastructure and ecosystem services into planning and design processes. Subsequently it considers the literature on ecosystem services for urban areas, followed by practical considerations on green infrastructure. The chapter then examines plant selection criteria for planting design. The chapter ends with a summary followed by a conclusion.

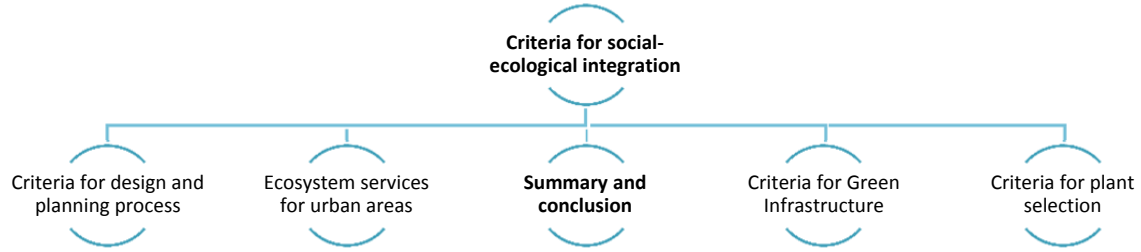


Figure 21: Graphic illustration of the chapter layout

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5.2 Criteria for the design and planning process

Two recent publications present frameworks for integrating green infrastructure and ecosystem services into design and urban management. Hansen and Pauleit (2014) and Ahern *et al*. (2014) see potential in how green infrastructure and ecosystem services research elaborates important characteristics for multifunctional planning, enhances ecosystem services in a useful way and avoids trade-offs. The concepts of green infrastructure and ecosystem services are both considered useful for social and ecological systems since they integrate stakeholder perspectives (Ernstson 2013; Hansen & Pauleit 2014) and function at multiple scales (Ahern *et al.* 2014). These two frameworks or models are briefly discussed below to identify the important steps in terms of a planning and design process for designers to follow.

Hansen and Pauleit (2014) propose a framework structured in four dimensions that can be used by planning and design teams. This section discusses the framework in terms of basic steps (see Figure 22). The first step entails an ecological perspective focused on data collection and analysis in terms of the capacity of the existing green infrastructure network to provide ecosystem services. Ecological functions and ecosystem services are both important. Biophysical structures and processes are what provide ecological functions and these are often the origin of services (Hansen & Pauleit 2014; refer to 2.2.2).

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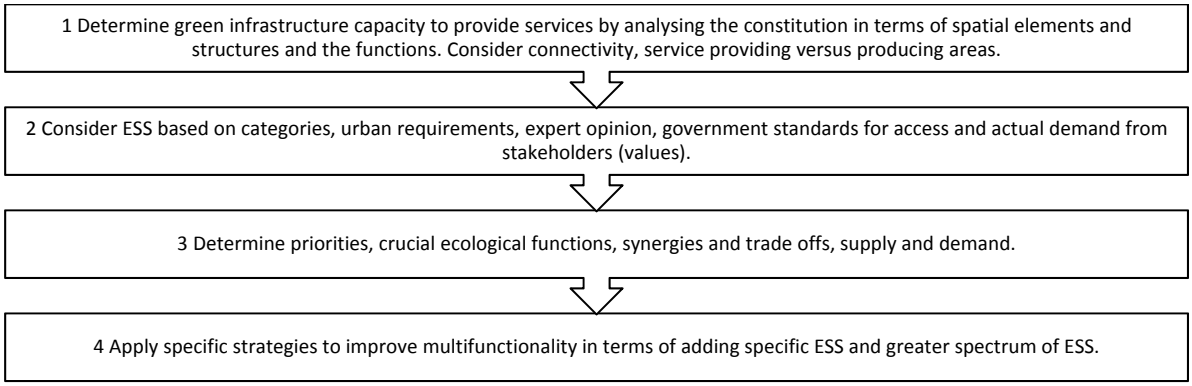


Figure 22: A framework for green infrastructure and ecosystem service integration

Source: by author, adapted from Hansen and Pauleit (2014)

Step one evaluates the condition and constitution of green infrastructure in terms of spatial elements and structures and the functions and services they provide. The authors suggest assessing physical and functional connectivity for relevant physical and functional connections. Syrbe and Walz (2012) suggest identifying "service connecting areas", and to distinguish between "service production areas" and "service benefit areas" (Hansen & Pauleit 2014). This is important due to the different spatial scales at which ecosystems functions versus the scales at which humans function. Next, the team involved decide on the importance of certain ecosystem services based on the four ecosystem service categories (MEA 2005; refer to 2.2.6), those adapted to urban areas (Gómez-Baggethun & Barton 2013; refer to 5.3 for a list of urban ecosystem services) and actual social demand. To assess the supply requires spatial data and appropriate indicators for quantification. There are means to connect services to land cover types. The authors suggest using indicators such as abiotic heterogeneity, biodiversity, or reduction of nutrient loss to determine ecosystem integrity and to represent vital ecosystem functions (Hansen & Pauleit 2014).

Step two takes a social perspective, considering actual demand and access to services. Demand is usually determined by expert judgment or standards agreed upon politically. Typical international standards define the maximum distances to parks or area of green space per population. In addition, stakeholders can be engaged to see how people perceive, access, and use ecosystems, as well as values and priorities they hold for land cover types and ecosystem services. This is important since otherwise the ecosystem service approach can disconnect the value of urban ecosystems from the local polity (Ernstson & Sörlin 2012). Lastly the team must consider access to services (Hansen & Pauleit 2014).

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Step three involves valuation of the above to determine priorities. This step entails identifying crucial ecological functions for the overall functioning and health of the system, which are also relevant for the capacity to supply services of the green infrastructure network. According to the authors this identification can indicate ''hotspots'' for multifunctionality. Synergies and trade-offs between ecosystem services can also determine priorities. Trade-offs can be considered in terms of spatial scale, temporal scale, and reversibility. The team must compare supply and demand. There is also an opportunity to identify stakeholders who can play a vital role in management, knowledge transfer and ensuring environmental justice (Hansen & Pauleit 2014).

The last step entails applying strategies and specific actions to improve the multifunctionality of the green infrastructure network. This step can be achieved by providing particular services, different ecosystem services, or new services on demand. Another consideration is strategies and actions to enhance connectivity in the green infrastructure network, depending on the context (Hansen & Pauleit 2014:520).

Ahern *et al.* (2014) provide a similar framework for realising specific urban ecosystem services integral with urban development in adaptive planning, "safe-to-fail" scenarios (refer to 2.3.6.1). The framework aims to provide specific ecosystem services as an intentional part of routine infrastructure development in cities (Ahern *et al.* 2014). Additional to their framework is a design application, which entails measuring and monitoring of findings, to enable improvement of these "design experiments" (Ahern *et al.* 2014). Based on the TEEB (2011) model[9], the adaptive design and planning model consists of six steps (see Figure 23).

[9] The TEEB (2011) model is not discussed in this chapter. It makes use of qualitative assessment to judge the importance or state the relevance of ecosystem services by indicating connectivity and interrelations between ecosystems and economic systems on a spatial scale. It them identifies future changes that can enhance the ecosystem services and policy and management options that can ascertain this. The focus of the model is to showcase monetary value of ecosystem services, which has been criticised by Ernstson and Sörlin (2012).

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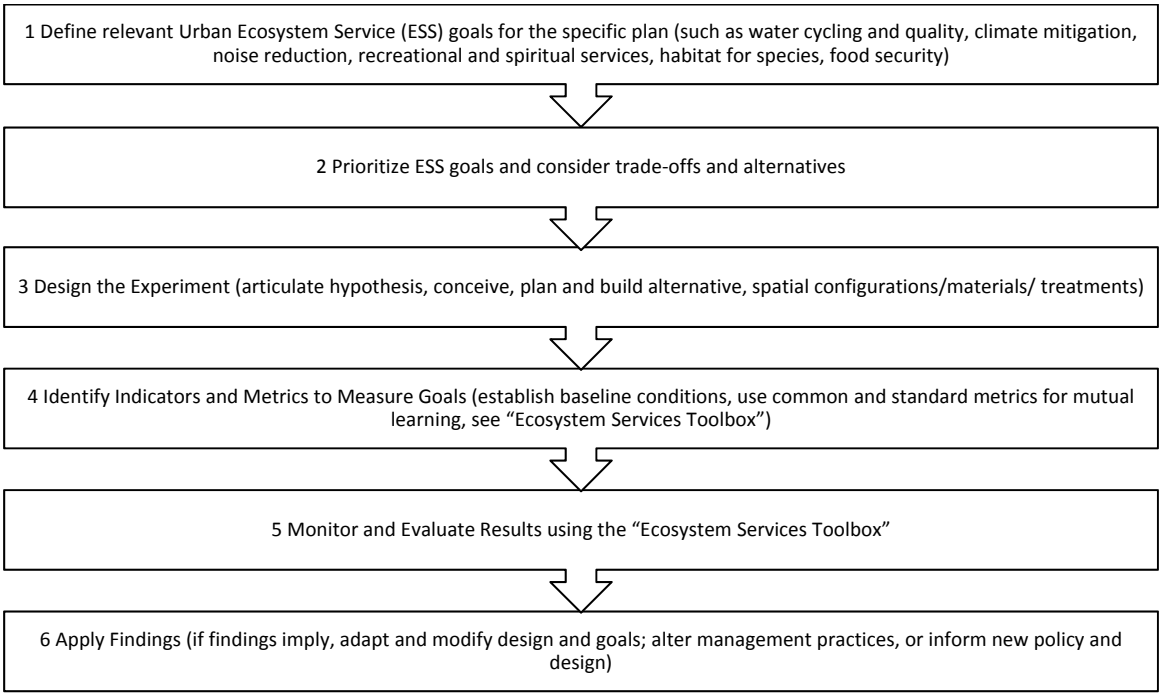


Figure 23: An adaptive design and planning model, which allows for the consideration of ecosystem services

Source: by author, adapted from Ahern *et al.* (2014)

This model aims to bring together knowledge from different professions. Each step of the process engages with a range of actors. The designs (step three) are the domain of planning and design professionals, while the indicators (step four) and monitoring (step five) require the involvement of designers and scientists (Ahern *et al.* 2014). This approach also encourages participatory or civic science through public involvement. The process enables collaboration and results in a more involved, informed and ecologically literate citizenry by allowing the public to make contact with science (Ahern *et al.* 2014:3). The authors argue that good workable examples as "best practice" are direly needed.

Due to their experimental nature, monitoring and corrective measures are a vital part of the adaptive planning framework. Professional activities rely on readily available, existing knowledge and established best practices that often inhibit innovation (Kato & Ahern 2008). As explained (see 2.3.6.1), the safe-to-fail framework integrates different stakeholders in experimental designs of a small spatial extent such that their failure would be manageable (Ahern *et al.* 2014). This can be seen as "learning-by-doing" in a transdisciplinary manner (Ahern *et al.* 2014). According to Ahern *et al.* (2014:3), these design experiments hold the potential to produce evidence-based, "scientifically defensible knowledge" in the course of every day planning and design practice.

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The authors provide references to complex indicators as an "assessment toolbox", but admit that planners and designers seek standardised simplified indicators and metrics that are "understandable, transferable, robust and defensible" (Ahern *et al.* 2014:3). Hansen and Pauleit (2014) recommend that the methods for analysis are adapted according to data availability and the capacity to collect data. In their complexity around indicators and measurements both the frameworks might be challenging to implement and time consuming for professionals. However, the models indicate the required steps and considerations to include ecological sustainable, socially fair and economically efficient decisions at a greater green infrastructure matrix scale that will enhance ecosystem service provision in cities. Of vital importance for this study is the concept of learning by doing, inclusive of different types of knowledge and citizenry, producing good workable examples that serve both professionals and the public to learn from.

Due to the complicated nature of indicators proposed by these models, the following sections in this chapter identify basic criteria for ecosystem services and green infrastructure qualities to serve as guidelines for design decisions. Several authors have compiled lists of appropriate ecosystem services for urban areas. These selections, along with the categories of MEA (2005) can further aid designers in the design process (Hansen & Pauleit 2014).

5.3 Criteria for ecosystem services

A wide range of studies illustrate how multifunctional landscapes are not only ecologically more sustainable and socio-culturally preferable, but also frequently more economically beneficial than landscapes providing few ecosystem services (see list in Hermann *et al.* 2011:18). For this reason Gómez-Baggethun and Barton (2013:235) argue that: "[c]onserving and restoring ecosystem services in urban areas can reduce the ecological footprints and the ecological debts of cities while enhancing resilience, health, and quality of life for their inhabitants". The economic, socio-cultural, and insurance values of urban ecosystem services should be seen as distinct value dimensions that can all be used to inform urban planning (Gómez-Baggethun & Barton 2013). Gómez-Baggethun and Barton (2013) suggest that ecosystem services should be promoted for providing three combined values: economic value, cultural value and insurance value.

Economic valuation (refer to section 4.5) is a way that has been employed by scientists to articulate the value of taken for granted ecosystem services. Costs from a decline in ecosystem services are generally not taken into account in municipal budgets and planning (Schäffler & Swilling 2013). Because these costs are invisible, incentives can arise for the conversion of urban ecosystems into

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grey infrastructure, which leads to the further loss of ecosystem services (Gómez-Baggethun & Barton 2013:238). Gómez-Baggethun and Barton (2013) demonstrate through examples that the loss of ecosystem services involves economic cost; for example, loss of vegetation can lead to an increase in temperature, resulting in rising costs of cooling in summer, as well as health problems due to lack of air purification. Economic valuations, however, need to account for both services and disservices from ecosystem services (Gómez-Baggethun & Barton 2013:238-239). In terms of cost calculations, replacement cost, hedonic pricing and stated preference methods are the most commonly used. Total economic value includes use and non-use values (such as, insurance value), direct consumptive values and indirect values (for example, pollination) (Hermann *et al.* 2011). This study does not see economic valuation as a sole answer for the articulation of the value of ecosystem services. A focus on economic incentive and value can erode normative value towards the environment and commodify nature. Yet in terms of sustainable practices efficiency is still an important consideration especially in the face of socio-economic challenges. Kosoy and Corbera (2010) point out that economic valuation can allow competitive arguments in the design process.

Landscape design is often associated with recreational and other cultural activities. Thus, the social and cultural values associated with cultural ecosystem services can easily be incorporated in landscape design. The socio-cultural values of ecosystem services may include: place attachment (historical, national); sense of place; sense of community and identity; physical and mental health; social cohesion; educational values and ethical or spiritual/religious values (Gómez-Baggethun & Barton 2013:239; Hermann *et al.* 2011:19; MEA 2005). Cultural values regardless are hard to measure and capture (Gómez-Baggethun & Barton 2013:239). They are sometimes hard to reflect in decisions due to cultural diversity in urban areas, but need to be acknowledged as equally important to more tangible values.

The security or insurance value provided by the concept of resilience, or adaptive capacity in cities, is bound to ecosystem services. Critical ecosystem services for resilience in cities include urban cooling, water supply, run-off mitigation and food production (Gómez-Baggethun & Barton 2013:241). Vegetation plays a crucial part in all these services. Food production and the social memory and knowledge it carries increases resilience during crises (Barthel *et al.* 2010). Insurance value can also be seen as ecologically important in terms of integrity, resilience, and resistance, and can include parameters such as complexity, diversity and rarity (De Groot, Van der Perk, Chiesura & van Vliet 2003) or “scarcity value” connected to the idea of an ecological threshold (Batabyal, Kahn & O'Neill 2003).

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Bolund and Hunhammar (1999) show have mapped the ecosystem services that common urban areas in Stockholm, like street trees, parks, streams and lakes, provide. The services include air filtering, microclimate regulation, noise reduction, rainwater drainage, sewage treatment and recreation. Douglas and Ravetz (2011:252-255) provide an inventory of different ecosystem service functions provided by different types of urban green spaces, including green roofs to their list. This gradual acknowledgement of ecosystem services led to the Sustainable Sites Initiative (SITES) rating system adopting ecosystem services as its foundation in 2009.

The Sustainable Sites Initiative (SITES 2014) applies the concept of ecosystem services to landscape design. According to Steiner (2014), the measuring or rating systems provided by the Green Building Council and Leadership in Energy and Environmental Design (LEED) were not suited for exterior landscape practices, although they did promote native species and water conservation. The SITES rating system was developed to address this shortcoming by including ecological concerns and also a focus on human well-being (Steiner 2014). The rating system considers the landscape attributes of a place and the integration of the landscape with nearby buildings. It aims to replicate the ecological performance of natural systems, as promoted by McHarg (1969).

Table 11 lists suggested ecosystem services adapted to urban areas (Gómez-Baggethun & Barton 2013), along with typical ecosystem services found in semi-natural urban areas, such as domestic gardens, allotment gardens and golf courses in Stockholm (Colding 2011). It groups the particular ecosystem services incorporated into SITES guidelines together with the performance benchmarks.

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Table 11: Ecosystems services in urban areas

Ecosystem services and disservices in urban areas (Gómez-Baggethun & Barton 2013:237)	Potential ESS provided by semi natural green areas in Stockholm: domestic gardens, all; allotment gardens, all but firewood; golf courses, all but Provisioning Services (Colding 2011:233)	Ecosystem services integrated in the SITES rating system (2014)
Provisioning Services		
• Food supply: allotment and food gardens for urban food security and resilience.	• Firewood • Food • Ornamental flowers	• Food and renewable non-food products: Producing food, fuel, energy, medicine, or other products for human use
Regulating services		
• Climate regulation: carbon sequestration by shrubs and trees • Temperature regulation: heating from traffic and absorption by built surfaces, trees moderate temperatures by providing humidity and shade • Air purification: filtering and fixation through vegetation leaves, stems and roots • Water flow regulation and run-off mitigation: surface water run-off increases due to impermeable surfaces • Moderation of environmental extremes: heat and water, physical barrier and kinetic energy absorption • Noise reduction: absorption of sound waves through vegetation and water • Waste treatment: effluent filtering and nutrient fixing by urban wetlands • Pollination and seed dispersal: habitat for birds, pollinators and insects	• Microclimate regulation • Air filtration • Surface water drainage • Erosion regulation • Noise reduction • Nutrient retention (in ponds) • Pest regulation	• Global climate regulation: Maintaining balance of atmospheric gases at historic levels; Maintaining healthy air quality; Sequestering carbon • Local climate regulation: Regulating local temperature, precipitation, and humidity through shading, evapotranspiration, and windbreaks • Air and water cleansing: Removing and reducing pollutants in air and water • Water supply retention: Storing and conserving water within watersheds and aquifers • Erosion and sediment control: Retaining soil within an ecosystem • Preventing damage from erosion and siltation • Hazard mitigation: Reducing vulnerability to damage from flooding, storm surge, wildfire, and drought • Waste decomposition and treatment: Breaking down waste; Cycling nutrients • Pollination: Providing for the reproduction of crops and other plants
Cultural Services		
• Recreational and cognitive development: recreation, meditation and pedagogy through urban parks	• Recreation • Aesthetic value • Inspiration • Natural education • Social relations	• Human health and well-being: Enhancing physical, mental, and social well-being as a result of interaction with nature • Cultural benefits: Enhancing cultural, educational, aesthetic, and spiritual experiences as a result of interaction with nature
Supporting Services		
• Habitat: for birds and other animals	• Habitat for fauna and flora • Soil formation • Seed dispersal • Pollination • Water cycling	• Habitat functions: Providing refuge and reproduction habitat to plants and animals, contributing to the conservation of biological and genetic diversity and evolutionary processes
Disservices		
○ Air quality problems: photosynthesis ○ View blockage: tree growth ○ Allergies: movement of floral gametes ○ Damage to infrastructure: growth of roots and decomposition ○ Fear: dense vegetation ○ Accidents: aging vegetation ○ Habitat competition: animal habitat provision (mosquitoes)		

Source: compiled by author (2014)

The ecosystem services listed in Table 12 can potentially be used as a guideline for possible services that can be included in landscape design projects. The question is how to determine, in a qualitative

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way, which services to include in a specific design. According to Steiner (2014:3), several research questions around ecosystem services emerged out of the SITES initiative: How to apply the concept across cultures? How to account for the value of ecosystem services that cannot be translated to monetary terms? The suggested frameworks of Hansen and Pauleit (2014) and Ahern *et al.* (2014) involving transdisciplinary involvement of different types of knowledge and plural values into the process can potentially mediate these questions of fundamental (monetary) and cultural values through discourse-based valuation (refer to 4.6.1). Hermann *et al.* (2011) recommend that approaches to select ecosystem services should: (1) define the overall aim/purpose of the assessment and area of interest; (2) be aware of the target addresser; (3) be clear about the meaning of the core terms used; (4) determine which services and indicators are important for the final assessment; (5) avoid double counting; and (6) propose a final suggestion that is balanced between different ecosystem service groups (Hermann *et al.* 2011:22).

This section concludes from the literature that besides the site specific considerations, the most basic point of departure recommended is to include ecosystem services from all four categories while involving inclusionary social processes with regard to the selection of ecosystem services.

5.4 Criteria for green infrastructure

The concept of green infrastructure developed as a system of approaches to secure the provisioning of ecosystem services in anthropocentric landscapes (Ahern *et al.* 2014; Colding 2011). Green infrastructure is more a synthesis of different planning approaches than a totally new approach (Hansen & Pauleit 2014). The approach addresses two main factors at the urban matrix level that affect biodiversity and ecological processes; firstly, it discourages habitat fragmentation, and secondly, it promotes heterogeneity of land use (Farinha-Marques *et al.* 2011:255).

Hansen and Pauleit (2014) developed eight approaches to green infrastructure (refer to 2.2.5) developed along with a design framework (discussed in 5.2). The discussion here investigates practical decisions that can be taken during the landscape design process to improve green infrastructure.

5.4.1 Connections

Corridors for ecological connectivity between landscape components mitigate fragmentation (Brown & Freitas 2002). It is difficult to realise effective corridors in dense urban areas that serve all taxonomic groups; however, vegetated streets enhance bird diversity and their dispersal ability,

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while complex communities of especially indigenous bird species respond to indigenous vegetation (Paker, Yom-Tov, Alon-Mozes & Barnea 2014). Hydrological networks play an important role in the ecological process as they provide natural corridors (Aminzadeh & Khansefid 2010).

Spatial planning considerations can be drawn from the relation between fragmentation and biodiversity. These include maintaining a high quantity and diversity of habitats and improving their quality (Di Giulio *et al.* 2009); maintaining a few larger habitat patches, yet adding to the interpatch habitat diversity with smaller habitat patches (Bodin & Norberg 2007); and ensuring short distances between habitat patches, which are necessary for species dispersal and colonisation to occur (Farinha-Marques *et al.* 2011:255).

5.4.2 Land use and landscape heterogeneity

Current density of species in cities and the loss in density of species as contributed by research to conditions of: land use (Dobbs, Escobedo & Zipperer 2011; Grimm, Morgan Grove, Pickett & Redman 2000), land cover (Alberti *et al.* 2008; Aronson *et al.* 2014) and city age (Aronson *et al.* 2014; Dobbs *et al.* 2011). Patch age and habitat diversity both enhance biodiversity (Honnay, Endels, Vereecken & Hermy 1999). These findings call for careful consideration of soil disturbing and sealing practices, and maximising “soft” landscaping in design projects.

In terms of habitat diversity, landscape heterogeneity affects the spatial distribution of species, which is an important consideration for designing sustainable production landscapes (Pryke *et al.* 2013). A recent study conducted in a timber production area in South Africa assessed the value of landscape elements and the variation within landscape elements for biodiversity. Landscape elements are patches with similar structure and vegetation components (Forman 1995 in Pryke *et al.* 2013). The study highlights the need for conservation of similar remnant patches of regional natural vegetation in addition to conserving broad landscape elements or different vegetation types (in this case, grasslands or natural forests). This study confirms the importance of supporting as much habitat heterogeneity as possible for biodiversity conservation. Furthermore, a wide variety of natural elements should be conserved across areas, rather than trying to conserve all elements at a single location. The required conservation does not necessarily only apply to different landscape elements but can also relate to other variables that affect vegetation, such as elevation, soil and moisture gradients. The study also indicates the operation of dung beetles over the whole area, even in transformed pine plantations, which shows positive results for this ecosystem function to be preserved despite disturbances under current conditions (Pryke *et al.* 2013). This study is significant

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because it considered productive urban spaces in combination with remnant vegetation and more natural conservation areas, which all form part of urban green infrastructure.

Various authors argue for the term "ecosystem services" to be enlarged to "landscape services" (Hermann *et al.* 2011; Syrbe & Walz 2012), due to the importance of spatial arrangements of functional units, habitats, landscape elements and land use constraints on the generation of ecosystem services and their benefits to mankind (Syrbe & Walz 2012:87). Landscape research is focused on spatial pattern and scale. "The central notion in landscape development has always been that people are part of the landscape and that landscapes are changed for their benefit" (Hermann *et al.* 2011:5). People need to realise that the services they depend on are tied to complex processes in diverse, often far away areas; this realisation can enable a better understanding of the sustainable use of nature (Syrbe & Walz 2012:87).

5.4.3 Multifunctionality

Multifunctionality aims to explicitly increase and combine different functions, using limited space to the maximum (Ahern 2011). Different functions thus need to be defined explicitly (Hansen & Pauleit 2014). As discussed above, heterogeneity of land use is regarded positively in terms of plant diversity and abundance, and relates to different green space typologies. Diversity of green space is important for meeting people's diverse needs and influencing their emotions (Farinha-Marques *et al.* 2011:255) and can thus be combined with the concept of multifunctionality and heterogeneity. This can be challenging when mitigating potential conflicts between different ecosystem services (Hansen & Pauleit 2014:527). Cultural ecosystem services connect concepts of multifunctionality with heritage and cultural landscapes (refer to 3.4.2) and provide stimulus for managing and conserving land. If designers deliberately define and consider multifunctional landscapes and the services they can provide in design, many pressing urban problems could be addressed through left over spaces.

5.4.4 Public demand and access

Public demand and access are important in terms of social justice and in general can be addressed through small initiatives without overriding long-term ecological resilience objectives. On the contrary, the distribution and access of green space across the urban structure are important for resilience provided by human use and stewardship. For example, in very densely populated areas, access to green space should be given for pedestrians within walking distance. Research illustrates that green areas are used far less when their distance from dwellings becomes more than 100

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metres (Nielsen & Hansen 2007). Urban green space management plays an important role in structuring habitat diversity and complexity. According to a study by Hofmann *et al.* (2012), if a minimum of maintenance and accessibility is provided, residents will accept "informal" urban green areas as recreational areas. A further recommendation for public acceptance is the use of cues of human care and intention or stewardship in design (Özgüner *et al*. 2007). Unofficial cultures of greening in private and allotment gardens also need to be acknowledged and encouraged for both human and environmental benefit it provides (Barthel *et al.* 2010; Schäffler & Swilling 2013).

5.4.5 Management of surrounding areas

Hostetler *et al.* (2011) argue that even if green infrastructure is in place, the management of surrounding areas can dramatically affect habitat qualities and biodiversity. City planning needs to buy into systems thinking. In addition, more participatory and collaborative processes are required for planning and management (Schäffler & Swilling 2013). Developers and the public must therefore be engaged and made aware of the importance of citywide actions, while planners and researchers should be active in proper design and management (Hostetler *et al.* 2011). Plans and policies to protect biodiversity also need to be updated (Qvistrom 2013). The authors encourage incentives for biodiversity initiatives, including the use of trained built environment professionals; and educational and awareness programs for residents. Stakeholder involvement in policy, awareness campaigns for professionals, landowners, and the public, and clear municipal communication between regulators and planners are recommended (Hostetler *et al.* 2011). These institutional requirements are often not in the hand of designers, yet can be encouraged and articulated by them.

Ikin, Beaty, Lindenmayer, Knight, Fischer and Manning (2013) investigated the effect of increased density on the role of pocket parks[10] as habitats for birds in a residential neighbourhood. The study indicated that the total green space area was more important than the number, average size or connectivity of green space patches. The findings reiterate the Functional Value of managing green networks in their entirety and suggest that bird diversity can be affected by increased residential density. For increased bird diversity in urban areas, Ikin *et al.* (2013) recommend increasing urban green space cover in residential neighbourhoods, increasing vegetation structure in green spaces and encouraging home owners to plant trees and shrubs.

The green infrastructure principles and design decisions discussed in this section are not exhaustive or new to landscape designers. Yet psychological and institutional barriers have thus far made the

[10] "Pocket parks" refer to mall urban parks, usually in residential neighbourhoods.

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application of these concepts in South Africa rather the exception than the rule. An important concept here is the difference between unintentional and deliberate actions. Designers often hope that additional services will spontaneously be addressed by focusing only on the client's brief. Terms are used in project discussions to explain the benefit of the project without explicit attention given to address that aspect creatively in design.

5.5 Criteria for plant selection in urban landscape design

Vegetation provides the basic building block for other biota in cities (Cilliers & Siebert 2011). Plants play an important role in all ecosystems since they often provide food, nesting and shelter for animals (Farinha-Marques *et al.* 2011:257). Public and private green spaces allow designers and owners to create urban habitats, as well as provide and improve urban ecosystem structure, function and services. Planting design plays an important part in storm-water management, biodiversity conservation and human health (Horwitz, Lindsay & O'Connor 2001). The benefits of planting design for green space at any scale include human well-being, reduction of the heat island effect, wildlife refuge and spatial habitat linkage required for the viability of plants, animals, and beneficial microbes (Pickett & Cadenasso 2008). Of great importance for plant habitat are urban soils (Sauerwein 2011), especially soil pH and soil organic matter (Dobbs *et al.* 2011). Inopportunely, landscape architects are not well known for their soil knowledge or plant selection ability (Quigley 20110) but other members of the landscape design industry are.

Hunter (2011) developed a strategy for planting design in the face of climate change. Climate change affects individual species, but the main concern is the disruption of community interaction networks among organisms, including interruption of predation and pollination—critical components of ecosystem health (Gilman, Urban, Tewksbury, Gilchrist & Holt 2010). The approach does not aim to match specific species to climate change predictions but rather focuses on adding resilience to plantings. Hunter's strategy rates locally appropriate plant species on four ecological criteria: plasticity, functional redundancy, response diversity and structural diversity. The concepts of plasticity and resilience are crucial in terms of adaptation strategies, while structural diversity is considered a cornerstone of good ecological design (Hunter 2011:174).

5.5.1 Planting design for urban resilience

5.5.1.1 Plasticity, response diversity and functional redundancy

Ecological resilience is defined as the capacity of an ecosystem to continue functioning despite environmental disturbance (Elmqvist *et al.* 2003). Resilience in ecosystems depends on the

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relationship between biodiversity and ecosystem function. It is linked to functional redundancy and response diversity. Functional redundancy refers to the quantity of species that supports an ecosystem function (Naeem 1998). For example, many species providing pollinator resources and overlapping bloom times contribute to high functional redundancy. Response diversity refers to the range of reaction to environmental change among species that support the same ecosystem function (Elmqvist *et al.* 2003). For example, species blooming should respond diversely to elements—like drought, frost, and soil fertility—to enable food for pollinators despite environmental conditions.

Plasticity on the other hand is the result of "interactions between genetic variation within species and the phenotypic plasticity of individuals" (Hunter 2011:174; Rossiter 1996). Plasticity is considered in terms of various fluctuating variables, such as temperature, soil moisture, and tolerance of urban pollution, flood and drought (Hunter 2011). The increased use of highly plastic species can, however, decrease the number of species able to maintain ecosystem function across a greater range of environmental fluctuation (Hunter 2011:181). In terms of best serving biodiversity, highly plastic species should be combined with those that have response diversity in terms of climate extremes (Hunter 2011:181).

When planting in urban areas, in order to provide resistance and resilience against climate change, Hunter (2011:187,189) recommends plants with season-long diversity in pollinator resources and high phenotypic plasticity, which can resist fluctuations in temperature and moisture. Additional considerations include plant selection for carbon sequestration, where herbaceous perennials are more advantageous than flowering trees and shrubs, while substituting lawns with low maintenance native plantings will reduce greenhouse gas emissions (Hunter 2011:189). Smetana and Crittenden (2014) argue for the professional selection of native species by designers for hydro-seeding[11]. These recommendations are practical, as they require no policy changes, while favouring biodiversity in the long run.

5.5.1.2 Vegetation structure

Structural diversity refers to the spatial complexity offered by plant form. It is measured as the diversity of physical forms produced by a group of plants (Hunter 2011:175). Vegetation structure is important for species richness and abundance, and for the structural complexity of a habitat

[11] Hydro-seeding refers to large scale planting of veld grass areas by means of spraying the seed mix onto the site, with the help of a pressure pump and hose. To make this technique more effective, the seed is mixed with slurry that gives it weight and aids germination.

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(Livingston, Shaw & Harris 2003). Particular structural features are important for most species to fulfil habitat and resource necessities, rather than specific plant species or composition (Garden, Mcalpine, Possingham & Jones 2007). Structural complexity supports biodiversity (Hansen, Spies, Swanson & Ohmann 1991). Plant biodiversity can be defined as "the composition, number, and relative abundance of plant species, as well as structural (for example, woody, herbacious) and spatial (for example, zonation, patchiness, isolation) dimensions of variability in plant communities across individual" landscapes (Baldwin 2011:78). Higher plant biodiversity within a habitat has a higher potential for delivering a greater amount of ecological functions for more animal species. Consequently, it can support a richer fauna community (Garden *et al.* 2007).

The following structural elements of vegetation have been considered in urban biodiversity studies: cover of trees, shrubs and herbs; tree or shrub height (Fernández-Juricic 2000); tree density (Donnelly & Marzluff 2004); vertical density or volume of vegetation (Strauss & Robert Biedermann); and decaying and dead trees (Deichsel 2006 in Farinha-Marques *et al.* 2011:257). Dead or fallen trees may increase the abundance or diversity of specific fauna groups such as birds, reptiles and beetles (Garden *et al.* 2007). The following elements have also shown a positive influence on urban biodiversity: water elements (Brown & Freitas 2002), linear elements (Smith, Thompson, Hodgson, Warren & Gaston 2006) and watercourses or ditches (Cornelis & Hermy 2004). Pickett and Cadenasso (2008) summarise a few strategies in terms of elements to include that reflect some of these findings, namely: improve the complexity of vegetation volume (shrubs, trees, herbs) and variations in their spatial arrangement; favour the presence of water elements and of linear elements such as ditches or hedges; allow the presence of decaying or dead wood; and select diverse floral composition and native species.

Birds are generally regarded as an indication of diversity in cities as a response to vegetation. Specific criteria for bird habitat consideration have regional variances but can be included through vegetation selection. For example, a study of 25 public gardens in Tel-Aviv, Paker *et al.* (2014) found that most bird species were encountered where species richness on trees and shrubs was high, and tree and lawn cover was medium or low. In addition, native trees attracted native birds. The study further recommends including zoologists in urban design projects. According to the study's recommendations, designers should avoid large lawns, use diverse and dense shrubberies, plant native trees, and create areas that are inaccessible to dogs and people.

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5.5.1.3 Social criteria

Designers need to develop plant palettes based on ecological value and aesthetic goals, as well as socio-cultural and budgetary opportunities and constraints (Hunter 2011). Place identity is linked to human well-being (Hull *et al.* 1994; refer to 3.4.1). Hunter (2008) therefore recommends the "aesthetic matching of signature species" to maintain a sense of place and meaning among changing circumstances (Stedman 2003), as an important social consideration for climate change. She further recommends adding more species to the pallet, including those with matching aesthetic appearance and ecological tolerance.

Regionally indigenous species, in general, match local environmental conditions best. Despite climate change, soil type and soil pH are likely to remain the same; thus, regionally indigenous species can retain their habitat. Kümmerling and Müller (2012:116) therefore recommend maintaining the existing relief and integrating soil conditions and habitats on brownfield[12] sites. Furthermore, the interdependencies of "co-evolved community members" assure healthy ecosystem function (Haines-Young & Potschin 2010; Tallamy 2009 in Hunter 2011:175). Kümmerling and Müller (2012:116) also suggest introducing mainly regionally indigenous plants to support not only regional biodiversity but local identity. The cultural value of plant identity and human desire for increased embellishment and novelty are held up as reasons for the inclusion of exotic species in plant pallets. Kümmerling and Müller (2012:116) recommend the avoidance of invasive alien plants and only using non-native species in small numbers as accents where required. Hunter (2011:175) concurs that popular non-invasive, non-native or non-regional species can be included to acknowledge cultural sensibilities since cultural acceptance and support is important in terms of sustainability. Other socio-cultural considerations include the use of low maintenance plants or the exclusion of plants that decrease visibility and compromise safety (Hunter 2011:175). Kümmerling and Müller (2012:116) add low intensity management of areas with native plants to create habitats that can support biodiversity.

The designer needs to understand the importance of plant choice for ecological criteria and be prepared to invest the necessary effort and time. Furthermore, long-term management must include the replacement of species that fare poorly, the management of plants that compete too severely and the addition of plants over time (Hunter 2011:182).

[12] Brownfields refer to previously built-up sites that have been redeveloped.

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5.6 Summary of main criteria for landscape design

Table 12 summarises the criteria discussed in this section, divided into separate themes. The aim of the table is to demonstrate the availability of information on green infrastructure planning and design, which is currently not a perceived concern of designers in South Africa. It is possible that the simplicity of the criteria compared to complex and costly technical solutions such as green walls and roofs makes them appear less glamorous or less worthy of promotion with clients.

Table 12: Summary of main criteria for landscape design in terms of green infrastructure and ecosystem services

Area of green space and connectivity
1) Land cover: total green space area (Ikin *et al.* 2013) more important than number, average size of connectivity of green space patches
2) Discourage habitat fragmentation (Di Giulio *et al.* 2009) through land use decisions and effective corridors for all taxonomic groups (as far as possible)
3) Consider vegetated streets (Barthel, Parker & Ernstson 2013) and hydrological corridors (Aminzadeh & Khansefid 2010)
4) Physical and functional connections between green spaces at different scales (Hansen & Pauleit 2014)
5) Connect and relate to other initiatives (Hansen & Pauleit 2014)
6) Reduce distances between patches (Farinha-Marques *et al.* 2011)
7) Influence adjacent land use where possible (2011; Hostetler *et al.* 2011)
8) Maintain a high quantity and diversity of habitats and improve their quality (Di Giulio *et al.* 2009)
Existing conditions
1) Maintain existing relief, soil conditions and habitats where possible (Kümmerling & Müller 2012)
2) Consider patch age for biodiversity (Honnay *et al.* 1999)
3) Review soil pH and soil organic matter (Dobbs *et al.* 2011) in high urban conditions (also pollution)
Plant selection
1) Increase tree cover (Dobbs *et al.* 2011)
2) Improve vegetation volume complexity (trees, shrubs and understory) and variations in the spatial arrangement (Pickett & Cadenasso 2008)
3) Increased vegetation structure (trees and shrubs) (Ikin *et al.* 2013)
4) Select diverse floral composition (but mainly native species) (Pickett & Cadenasso 2008)
5) Consider vegetation plasticity in terms of temperature, soil moisture, pollution tolerance, flooding, drought, etc. (Hunter 2011)
6) Consider vegetation functional redundancy: quantity of species that support and ecosystem function: for example, pollinator resources: overlapping bloom times (Naeem 1998)
7) Consider vegetation response diversity: range of reaction in terms of environmental change among species that support the same ecosystem function (Elmqvist *et al.* 2003)
8) Consider vegetation for climate change and resilience: diversity in pollinator resources and high in phenotypic plasticity and can resist moisture and temperature fluctuations (Hunter 2011)
9) Consider carbon sequestration: Herbaceous perennials more advantageous than flowering trees and shrubs (Hunter 2011)
10) Consider greenhouse gas-emissions: Low maintenance native plantings better than lawns (Hunter 2011)
11) Avoid large lawns also for biodiversity (Paker *et al.* 2014)
12) Create also areas that are not accessible to people and dogs (Paker *et al.* 2014)
13) Vegetation structure: improve habitat diversity, complexity, species richness and abundance (Hunter 2011)
14) Consider aesthetic, matching of signature species (Hunter 2011)
15) Add species that match both aesthetics and ecological tolerance (Hunter 2011)
16) Indigenous fauna species respond to indigenous vegetation (Pickett & Cadenasso 2008)
17) Use regionally indigenous species that grow together in communities (Hunter 2011) to match soil (check) and regional identity
18) Landscape heterogeneity: conserve remnant patches of regional vegetation and broad landscape elements or different vegetation types across an area (Pryke *et al.* 2013)
19) Popular non-invasive, non-native or non-regional species can be included for social acceptance (Hunter 2011)
20) Avoid alien invasive species (Kümmerling & Müller 2012)
Elements
1) Favour the presence of water (Pickett & Cadenasso 2008)
2) Favour linear elements (ditches and hedges) (Pickett & Cadenasso 2008)
3) Allow presence of dead or decaying wood (Pickett & Cadenasso 2008)
Multifunctionality
1) Promote heterogeneity of land use (Farinha-Marques *et al.* 2011)
2) Combine ecological, social and economic, abiotic/biotic and cultural functions in green spaces (Hansen & Pauleit 2014)
3) Include different kinds of green spaces in governance (Hansen & Pauleit 2014)

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Human considerations	
1)	Distribution and access for human use (Nielsen & Hansen)
2)	Aim at long-term benefits but remain flexible over time (Hansen & Pauleit 2014)
3)	Allow for social communication and inclusion in process (Hansen & Pauleit 2014)
4)	Allow for different stakeholders and disciplines to be involved (Hansen & Pauleit 2014)
5)	Accommodate human values (Hansen & Pauleit 2014)
6)	Consider safety (Hunter 2011; Özgüner & Kendle 2006)
7)	Low maintenance (Hunter 2011), cultural preference and also support biodiversity (Kümmerling & Müller 2012)
8)	Long-term management in terms of economic and environmental (greenhouse gas emissions) consequences (Kümmerling & Müller 2012); also embodied energy
9)	Encourage civic involvement and unofficial cultures of greening (Barthel *et al.* 2010; Ikin *et al.* 2013; Schäffler & Swilling 2013)
10)	Promote awareness among developers, the public and local authority
Importance of ecosystem services	
1)	Insurance value: human threshold: urban cooling, water supply, run-off mitigation, food production (Gómez-Baggethun & Barton 2013)
2)	Insurance value: ecological threshold: complexity, diversity and rarity (Gómez-Baggethun & Barton 2013)
3)	Assess trade-offs between different ecosystem services: spatial scale, temporal scale, and reversibility (Hansen & Pauleit 2014)
4)	Consider economic, cultural and insurance value (Gómez-Baggethun & Barton 2013)
5)	Service providing versus, service connecting and service benefitting areas (Hansen & Pauleit 2014; Syrbe & Walz 2012)
6)	Ecosystem functions versus human needs: tangible and intangible (Gómez-Baggethun & Barton 2013)
7)	Replacement cost, non-use, direct and indirect value (Gómez-Baggethun & Barton 2013)
8)	Acknowledge ecosystem disservices (Gómez-Baggethun & Barton 2013)

Source: compiled by author (2014)

5.7 Discussion and conclusion

Landscape design has a very particular role to play in the process of change due to the role of the profession to engage and recreate social forms of nature. A lot of information is already available, offering meaningful insight into better practice in terms of landscape design. However, some data is not readily accessible and calls for interim procedures to deal effectively with the status quo. This section provides a summary of main points.

For resilience in social-ecological systems, professionals must respect both ecological and social criteria when prioritising ecosystem services for urban areas. Hansen and Pauleit (2014) and Ahern *et al.* (2014) present models for operationalisation. The complexities around indicators and measurements make them difficult to implement in professional practice. Practical advice that can be taken from the models is to engage with methods and analysis according to data accessibility and the capacity to collect data (Hansen & Pauleit 2014). As acknowledged by Kato and Ahern (2008), professional activities rely on readily available knowledge and established best practice, which inhibits innovation. Ahern *et al.* (2014) address this weakness by favouring learning by doing, civic involvement, education and knowledge sharing, as well as developing workable examples for learning from.

With a practical focus on multifunctionality, Hansen and Pauleit (2014) emphasise green infrastructure integrity. Green infrastructure should: (1) include ecological functions; (2) increase specific ecosystem services and broaden the spectrum of services for multifunctionality; (3) consider

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synergies and trade-offs in terms of the spatiality, temporality and reversibility of decisions; (4) acknowledge values; and (5) aid knowledge transfer.

SITES is an existing rating system for ecosystem services that has great potential in terms of having simplified indicators as a useful checklist. In terms of the selection of ecosystem services for urban areas, scientists recommend designers to consider: (1) a balance between different ecosystem functions and ecosystem services groups; (2) a balance between economic, social-cultural and insurance value; (3) replacement cost; (4) use and non-use value; and (5) direct and indirect value (Gómez-Baggethun & Barton 2013; Hermann *et al.* 2011). Some services highlighted by the authors specifically for urban areas include biodiversity value (ecological threshold), food production, urban cooling, water supply, and run-off mitigation (Gómez-Baggethun & Barton 2013; Hermann *et al.* 2011). Based on the review and the recommendations of the authors, this study proposes that the inclusion of ecosystem services from all four categories provides a sound point of departure for design purposes. Reference to these groups as a barometer can address the various functions and services required in the urban context.

For the provision of these services, vegetation is especially important. Table 12 summarises considerations regarding green infrastructure and vegetation selection. The main criteria for planting design are: (1) selecting plants with qualities of plasticity, response diversity and functional redundancy, (2) providing diverse vegetation structure, and (3) social considerations (Hunter 2011). Social aspects can be summarised to include: (1) proving place identity through signature species or non-native plants where required; (2) strengthening place identity through regionally indigenous species that also have the ecological merit of interdependencies; (3) avoiding alien invasive plants for ecological and cultural reasons; (4) using low maintenance plants for human preferences and because they create good habitats; (5) meeting safety requirements; and (6) considering long-term management (Hunter 2011; Kümmerling & Müller 2012). The considerations summarised here are practical and can aid landscape designers to make an immediate difference.

The next section comprises of a focused review of the South African subject literature for a local perspective on urban ecology and social production.

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Chapter 6



food

ESS image by Jan Sasse (TEEB 2011)

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CHAPTER 6: Urban Ecological Studies in South Africa

6.1 Introduction

Recent studies related to urban ecology and green infrastructure in South Africa can be categorised in different ways. Some studies only deal with urban areas, while others apply similar concepts to towns and rural areas. The theoretical approach taken, keywords used, methodologies and methods differ. Due to past and present socio-economic realities[13], urban nature conservation issues in South Africa are mostly focused on improving human well-being and also include aspects such as poverty, equity, redistribution of wealth and wealth creation (Cilliers, Müller & Drewes 2004).

This chapter reviews South African studies related to urban ecology and urban green space, including sustainability science, infrastructure transition for urban resilience and ecosystem services research. The majority of the studies use the concept of ecosystem services. Furthermore, the review favours studies that connect social aspects and influences to urban ecology and green space. Although not all studies use the term, they allow a social-ecological focus that emphasises cities as human dominated systems and considers the ecology of cities. Lastly, the review sought out stakeholder perceptions, values and participatory methods towards improved sustainability.

This chapter commences with a technical study review, namely, ecological studies focused on vegetation and biodiversity measurement in different types of green spaces. It then looks at studies preoccupied with the economic valuation of ecosystems and their services in specific municipalities and areas. The following section of studies has an explicit social focus. It is divided in two: studies regarding human perception and management, and different approaches to social-ecological integration. Figure 24 graphically illustrates the layout.

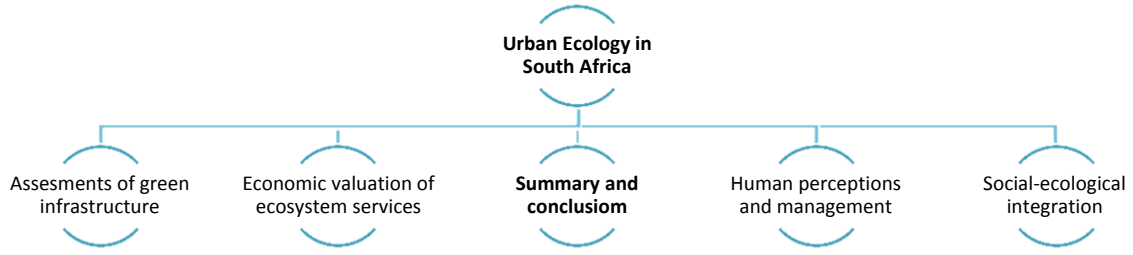


Figure 24: Graphic illustration of the chapter layout

[13] See statistics on poverty and inequality in sections 6.3 and 6.4.

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6.2 Vegetation and biodiversity assessments of green infrastructure

Local studies have been produced on a variety of different types of green spaces. Although relatively rare, these studies cover almost the full spectrum of urban green infrastructure and show the potential these areas hold for improved urban biodiversity and ecosystem services provision, through green infrastructure (Hansen & Pauleit 2014). The studies cover the following subject groups: natural areas in and around the city (Rebelo *et al*. 2011; Roberts, Boon, Croucamp & Mander 2005); vacant lots (S. S. Cilliers & Bredenkamp 1999b); linear landscapes such as railways (Cilliers & Bredenkamp 1998) and roadside verges (Cilliers & Bredenkamp 2000); public green spaces (Cilliers & Bredenkamp 1999a; McConnachie & Shackleton 2010); private gardens (Lubbe 2011; Lubbe, Siebert & Cilliers 2011a); and roof gardens (Roberts *et al*. 2012). Most of these studies are linked to specific municipalities or regions. However, such studies have not necessarily become part of public or professional awareness in the form of results being taken into account in decision-making. These studies are valuable in terms of landscape process knowledge and provide localised examples in terms of climate and vegetation, and cultural relevance regarding socio-political and historic factors.

A few studies are focused on more rural environments that indicate potentially significant implications for urban habitats, but need to be tested in such environments. One such study considers the importance of landscape elements in remnant patch vegetation for biodiversity in productive landscapes in the KwaZulu-Natal midlands (Pryke *et al.* 2013). Another rural study looks at the consequences of land cover change for biodiversity in the Klein Karoo region (Reyers, O'Farrell, Cowling, Egoh, Le Maitre & Vlok 2009), since it has been recognised as a very important driver of change in ecosystems and their services (Alberti *et al.* 2008). The study by Reyers *et al.* (2009) highlights the need for social processes of engagement in order to transfer knowledge to local behavioural change, decision and action. Various strategies for making desired change possible are proposed, from science-stakeholder partnerships to funding mechanisms and future economic activity. Reyers *et al.* (2009) confirm the need for operationalisation of human values towards action though social mechanisms and propose possible incentives. It confirms the validity of the enquiry of this study.

6.3 Economic valuation of ecosystem services

The economic valuation of ecosystem services is aimed to provide a rationale for decision-makers to invest in green infrastructure (E. J. Cilliers 2010; Mertz *et al.* 2007). Payne & Holt (1999 in Russell-Bennett *et al.* 2009:212) explain, "[t]raditionally, marketing has adopted an economic approach

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whereby value is the outcome of a cost-benefit analysis focused on the utility gained". Greening efforts are a potential economic driver for property values and investments. Studies show that social networks and business value are positively influenced by well-developed and maintained green areas (Ernstson *et al.* 2010), but are negatively affected by neglected and isolated spaces (E. J. Cilliers 2010). Recent valuation studies in South Africa have looked at specific municipalities. In Tshwane, Stoffberg (2006) and Stoffberg *et al.* (2010) investigate carbon sequestration by urban trees. In Potchefstroom, E. J. Cilliers (2010) determines the economic value of green spaces. In Cape Town, De Wit *et al.* (2012) explore the value of a functioning ecosystem in municipal decision-making. In Durban, Roberts *et al.* (2005) use resource economics to determine the monetary value of ecosystem services. More recently Cartwright, Blignaut, De Wit, Goldberg, Mander, O'Donoghue and Roberts (2013) developed a cost-benefit model for climate change adaptation. The study found that the most efficient interventions tend to be socio-institutional. Two examples of valuation studies in rural settings include a comparative study that quantifies the dependency and income of residents from wetlands in Lesotho and peri-urban Cape Town (Lannas & Turpie 2009) and the valuation of key services in the Succulent-Karoo biome for management purposes (O'Farrell, De Lange, Le Maitre, Reyers, Blignaut, Milton, Atkinson, Egoh, Maherry, Colvin & Cowling 2011; O'Farrell, Reyers, Le Maitre, Milton, Egoh, Maherry, Colvin, Atkinson, De Lange, Blignaut & Cowling 2010).

Such studies are valuable because they explicitly demonstrate the functions of nature to decision-makers, and they indicate the limitations of monetary measures of the non-material advantages, intrinsic and non-exploitive value of nature (Chiesura & Martinez-Alier 2011:94). Kallis *et al*. (2013) caution against refusing to engage with money in terms of the environment. However, the act of quantifying the value of such services alone is not enough to act as an incentive to make accountable choices that affect their use or misuse (McMichael & Scholes 2005:55). It is also difficult to calculate trade-offs or make comparisons between quality of life and economic concerns (Ernstson & Sörlin 2012:276). The state may want to link development to livelihood and biodiversity protection, even though national and local policies do not always reflect this objective (Dominelli 2012:151). Conversely, market-driven actions favour the lowest overall cost as the primary deciding factor, irrespective of the needs of people or the environment (Dominelli 2012:135). What may seem to be a lack of an outcome on behalf of the state may be the result of decisions taken on the basis of short-term political or economic trade-offs. For example, public green space maintenance budgets may need to be cut back to make room for public housing expenditure.

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The interaction of humans with ecosystems and their services has value for human well-being in more ways than mere functional utility. Chapter 4 introduced the view of Kosoy and Corbera (2010:1234) towards environmental ethics as an alternative attempt to not price the environment, while Chapter 3 revealed Nature Values according to environmental ethics to include Eudaimonistic, Altruistic, Fundamental and Intrinsic Values (Jax *et al.* 2013). According to Holbrook (2006 in Russell-Bennett *et al.* 2009:212), "a more contemporary experiential approach defines value as being more than just economic and proposes additional types of value, including value from the interaction itself and not just the outcome".

However, the above economic valuation studies reveal the need for contextually relevant and appropriate means of environmental value articulation in South Africa. With 29,8% of the population unemployed (StatsSA 2011), socio-economic conditions and levels of inequality continue to place required emphasis on financial need as an important consideration for national and urban priorities. As a result, the state has rolled out programmes emphasising skills development, transformation and infrastructure. Although commendable, these initiatives fail to meet the needs of the poor for physical and psychological well-being that could be provided through green infrastructure deployment. Long-term resilience is neglected due to a lack of emphasis on ecosystem services such as food production and the insurance values provided by ecosystem functions.

Internationally, socio-political factors and human perceptions are increasingly considered in studies that seek improved social-ecological outcomes (Ives & Kendal 2014:67). A number of studies consider human perception and management practices to understand the localised social dimensions that influence human behaviour with regards to the environment in South Africa.

6.4 Social factors, human perception and management practices

Swan *et al*. (2011:182) identify three important social dimensions as drivers of biodiversity patterns: control over land; access to positions, wealth and information; and education, cultural and lifestyle that influence social expectation (refer to 2.3.5).

Due to a long history of political inequality that resulted in a disparity of access to land, wealth, information and education, South Africa has a great divergence in lifestyle and socio-economic opportunities. For example, only 8,3% of black South Africans had completed levels in higher education in 2011, in comparison with 36,5% of white South Africans; while 8,6% of the total population had received no schooling by the age of 20. In the same year, white-headed household

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income was averaged at R365,134 ZAR per annum—six times high than income levels for black African-headed households, who earned on average R60,613 ZAR per annum. In terms of demographics, the South African population in 2011 was comprised of 79,2% black/African, 8,9% Indian/Asian, 8,9% white, 2,5% coloured and 0,5% other (StatsSA 2012).

Social expectation refers to social group identity, entails cultural beliefs and affects consumption choices. Findings on domestic gardens often differ between developing and developed countries with disparities attributed to aspects of climate, culture and socio-economic factors (Lubbe, Siebert & Cilliers 2010). Historic and existing influences of social factors in South Africa have been an important focus of social-ecological studies. The content of house gardens in rural (Molebatsi, Siebert & Cilliers 2013) and urban (Lubbe *et al.* 2010) settings have been investigated. These studies confirm the diversity of rural and urban home gardens. Lubbe *et al.* (2010) also assessed the effects of apartheid legacy and consequential spatially specific socio-economic differences on plant choice. Their study finds that although species richness was higher in affluent neighbourhoods, home gardens in these areas included a lot of exotic species. Low-income neighbourhoods were less rich in species diversity but housed more indigenous plants (Lubbe *et al.* 2010). Molebatsi *et al.* (2013) found that gardens in rural settings in Potchefstroom had the highest species richness compared to other land uses, pointing to the importance of homeowners' decisions on biodiversity in residential settlements. The study is one of few in Africa to consider rural home gardens; it found that, similar to urban settlements, rural settlements are floristically diverse. These studies highlight the potential of garden spaces as "facilitated assemblies" (Swan *et al.* 2011) for biodiversity and ecosystem services as part of green infrastructure. The socio-economic realities faced by residents do not negate the preference for indigenous species, showing again the importance and opportunity within local values. Although dealing with social aspects, these studies made use of ecological quantitative measurements through grid determined sampling points.

Also related to socio-economic factors is the tendency for green space inequality, as measured in nine South African towns by McConnachie and Shackleton (2010). The sustainability of the government-led Reconstruction and Development Programme (RDP) of the 1990s is questionable since beneficiaries were poorly provided with green space, when compared to housing in areas formerly reserved for black and coloured South Africans under apartheid, as well as when compared to neighbourhoods formerly limited to white South Africans under apartheid (McConnachie & Shackleton 2010). The value of public green infrastructure, along with grey infrastructure priorities, is not recognised in South Africa (Schäffler & Swilling 2013). The required rectification in terms of

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public green space provision highlighted here is an important consideration for this study, since landscape designers are employed by local authorities, permanently and as consultants, and can therefore have a significant influence on how values of green spaces are articulated for human well-being. The perception created by current infrastructure versus green space development in poor areas, is that poor people are not in dire need of green space or biodiversity, while in fact, they are the ones that can gain most benefit from these areas.

Due to the acknowledgement of the effects of human perceptions on their decisions and actions that affect biodiversity in cities, many studies have investigated management practices. These studies either assess the influence of current action or evaluate it in terms of required future change. Invasive alien species pose a direct threat to biodiversity (Haines-Young & Potschin 2010), consequently their removal is a topic undertaken by several studies. Urgenson *et al.* (2013) look at the perception of different stakeholders involved in alien invasive plant removal in the Western Cape and test their views on responsibility, policy and incentives. The study made use of interview data with landowners from three sites and web-survey data from managers and professionals. The study compared perceptions with responsibilities and proposed policy tools, which is a similar approach to the one employed by this study. The study found divergence in the willingness to participate from landowners and in stakeholders' perceptions on financial incentives. These normative (Steg *et al.* 2014), legislative (Box 2011) and incentivised (Gobster *et al.* 2007) appeals to values correlate with the review on values undertaken in 4.3 of this study. Important for this study are two recommendations by the authors: to consider a broader spectrum of ecosystem services important to landowners and to effectively communicate with landowners on maintenance requirements (Urgenson *et al.* 2013). Similar to the previous study De Lange, Stafford, Forsyth and Le Maitre (2012) investigate the preferences of stakeholders in the selection of technologies on the examined potential of using invasive alien plants as bio-energy in the Agulhas Plain region, by means of a multi-stakeholder engagement process. These studies do not pertinently focus on values or operationalisation.

A study more closely related to this study is that of McConnachie and Cowling (2013), which considers the concept of evidence-based knowledge and the accuracy of conservation managers' beliefs regarding success and challenges in alien invasive clearance projects in the Eastern Cape. The study makes use of two methodologies: ecological indicators to measure the state of invasive clearance and interviews with managers that commence with broad questions and zoom into very specific structured questions. The study tests whether managers would change their beliefs after

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being exposed to reasoned facts or evidence-based knowledge. The study also estimates the cost of obtaining this knowledge. With the exception of one scientific manager, none of the nine managers changed their beliefs based on the presented scientific evidence. The study therefore contrasts the effects of experience-based versus evidence-based knowledge, of which the study found the latter was not an expensive exercise to undertake, but proved ineffective. This finding corresponds with the findings of Bolderdijk *et al.* (2013) that knowledge is value dependent. The study recommends a focus on behaviour change rather than on beliefs change. The study by McConnachie and Cowling (2013) is a significant reference for this study that also focuses on value change and operationalisation, by bridging the gap between value and behaviour. Interestingly the study focused on beliefs but did not compare their findings with those of other value-focused studies.

Other studies further consider different methods and software for improved municipal management and protection of urban biodiversity. In the case of Cape Town, which is a special phenomenon in terms of abundant and threatened urban biodiversity, this review considered two examples of means to balance conservation imperatives and development needs. Firstly, a study by Holmes *et al*. (2012) looks at BioNET, which refers to a systematic biodiversity plan for the city aligned to national legislation and policy and tools for implementing it. The authors conclude that "[t]he importance of retaining natural open space within the urban matrix for the provision of various essential ecosystem services and socioeconomic well-being is currently undervalued…" (Holmes *et al.* 2012). Secondly, a study by O'Farrell *et al.* (2012) argues for a rapid ecosystem services assessment to determine the contribution to ecosystem service provision through natural vegetation remnants through a weighted approach and a distance analysis completed in merely two days. Though Provisioning Services were most affected, the study emphasises the value of Cultural and Regulating Services for justifying conservation actions for remnant vegetation. These studies are more concerned with the conservation of remaining natural vegetation within the city boundaries, i.e., "ecology in cities" (Cilliers & Du Toit 2014), but demonstrate the importance of human value considerations for social-ecological integration.

More studies consider municipal actions and management. Roberts and O'Donoghue (2013) look at the social progress in climate change adaptation in Durban. Their study considers locally rooted adaptation and resilience. It shows progress in this regard by engaging with key sectors in local government and understanding the potential and constraints of community-based adaptation strategies; these constraints include the opposition of landowners to measures favouring ecosystem services (Roberts & O'Donoghue 2013). A more hands-on study (Avlonitis 2011) considers how

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different direct management interventions may shape ecological outcomes in small-scale greening interventions in Cape Town (see also 3.7). The study focuses on remnant patches, which are only partially facilitated assemblies. Civic involvement was employed to improve the biodiversity of these patches and creates ownership. The study compares the ecological effects of municipal management of these areas by means of biophysical measurement of key attributes and the help of structured interviews. The study poses that ecosystem functionality and integrity can be increased significantly through social interventions. It specifically points out positive, species-specific management practices that increase plant functional diversity, benefit pollinators and improve soil quality. The study adds to the debate for the inclusion of remnant patches as part of urban green infrastructure and suggests ways to integrate them into social-ecological systems to increase their resilience. The study elaborates on the valuable social dimension of the more civic-led interventions. Both studies argue for the importance of municipal action in terms of management strategies and physical management and maintenance actions undertaken. They also show the importance of local government in making ecology accessible to the greater public. Designers can learn from these examples as they are often engaged in municipal open space projects. Designers could have a meaningful effect on articulating the values of ecosystem services in urban areas through civic engagement and understanding the ecological effects of management practices.

Rebelo *et al.* (2011) illustrate the impacts of urbanisation in a biodiversity hotspot such as Cape Town. Urban development is mostly in opposition with conservation of biodiversity, which poses specific challenges to municipalities in terms of management priorities. Since the advent of democracy in 1994 in South Africa, environmental issues have been increasingly informed by socio-economic priorities and political expectations, in contrast with how they were considered under colonialism and apartheid (McEwan *et al.* 2014:207). Despite inequities in power and rights, conserving biodiversity and realising the rights of all citizens are said to be “mutually reinforcing” (Crane *et al.* 2009 in McEwan *et al.* 2014:207). On the other hand, the democratic government is tied to market-led and policy initiatives towards improved sustainability (McEwan *et al.* 2014), while it is also bound by a neoliberal paradigm that enforces economic rationalism in terms of national policy (Bek *et al.* 2010 in McEwan *et al.* 2014). Thus, in South Africa, policies for conservation initiatives with economic benefit are more likely to receive backing (McEwan *et al.* 2014). As a result, there is a tendency towards the commodification of that which requires protection. This can be paradoxical since commodification not only requires “improvement” of nature but also creates market demand, which may lead to exploitation (McEwan *et al.* 2014:213). These studies paint the socio-political reality, which is one of the main indirect drivers of ecosystems change (MEA 2005). Cilliers *et al.*

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(2004) emphasise the need to incorporate socio-economic factors in environmental legislation and highlight the lack of detailed, convincing and user-friendly ecological data for decision-makers. There is a need to operationalise existing scientific knowledge, yet it is doubtful whether information alone would be the deciding factor that fosters the required future resilience.

The removal of species such as alien invasives is considered a direct driver of change to ecosystems and their services (MEA 2005) and is a popular research theme in South Africa. McConnachie, Cowling, Shackleton and Knight (2013) investigated a South African government public works programme, Working for Water, which combines ecological restoration and poverty alleviation. The aim of the program is to create employment by means of restoring landscapes invaded with alien plants through manual removal. The objective of the study was to measure the successfulness of both its environmental and social goal. The 23 programme managers identified a number of challenges including the need for improved capacity and competence of managers and teams, as well as challenges related to planning and coordination with a desire for flexible and adaptive behaviour (McConnachie *et al.* 2013). McConnachie *et al.* (2013) propose ways to improve the programme, such as better conditions and longer periods of employment, as short-term employment counteracts poverty alleviation. Furthermore they suggest an adaptive management approach to overcome the current challenges. Similar to the studies in alien invasive management discussed before, most managerial improvements require social understanding and appropriate incentives. A specific focus on values and their operationalisation is not considered by these studies.

6.5 South African approaches to the integration of humans in urban ecology

Different approaches are taken towards urban improvement with different degrees of ecological and social focus, yet ultimately these methods must be integrated for greater sustainability and resilience (MEA 2005). Many studies are influenced by disciplinary-specific focuses, commonly found between environmental management and spatial planning approaches (Cilliers 2009 in Cilliers *et al.* 2012). The studies presented in the previous section indicate a slow but sure progress towards transdisciplinary work, which enables the inclusion of different viewpoints, knowledge and methods in solutions. Le Maitre *et al*. (2007) argue for the concept of “ecosystem services” to be considered by research in sustainability science due to its ability to incorporate environmental, economic and social scientists in the discussion. Today the majority of studies in South Africa take this approach, most likely due to the multifunctional nature of ecosystem services and its ability to influence policy-makers, planners and the public regarding the importance of biodiversity. Cilliers *et al.* (2012) argue for the ecosystem services approach in a recent study on the perspectives and challenges concerning

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ecosystem services of urban green spaces in African countries. However, Cilliers *et al.* (2012) note that the ecosystem services approach is more often focused on studies in natural areas and less so in urban contexts. In African cities, different methods are used to find direct and indirect use values for ecosystem services (Cilliers *et al.* 2012). The authors favour the Ecosystem-Based Adaptation (EBA) approach in Durban, as the most appropriate approach for applying knowledge about ecosystem services and their value in Africa (Cilliers *et al.* 2012). The EBA approach has focused the application of sustainable management, conservation and restoration of ecosystems and ecosystem services.

The Durban municipality is one of the leading action takers against climate change in Africa (Cilliers *et al.* 2012). Their EBA approach consists of municipal adaptation, improved community adaptation capacity and urban management interventions against climate change. It addresses issues such as urban heat islands, storm-water run-off, and water conservation (Roberts *et al.* 2012 in Cilliers *et al.* 2012). Roberts *et al.* (2012) point out the resource intensiveness and technical challenges the approach has as side effects. Adaptive urban planning and management processes are not cheap but are "more cost-effective, more adaptable and have multiple co-benefits across a range of scenarios and time lines" (Roberts *et al.* 2011:190). This is an important message that needs to be stated boldly to change perceptions of green infrastructure as providing benefit as a short-term cost-saving method. Regardless of expected side effects Durban is a praised example:

> *The EBA approach followed in Durban presents a good example of applying knowledge of ES, not by focusing on specific ecosystem series per se, but emphasising the multifunctional nature of the urban green infrastructure which should be managed by a combination of mitigation and adaptation of the effects of climate change* (Cilliers *et al.* 2012).

A study by Schäffler & Swilling (2013) investigates urban green infrastructure in Johannesburg Significantly, the authors link green infrastructure to various other theoretical themes—including ecosystem services, resilience and infrastructure transitions—which are required for a proper understanding of green infrastructure. The study positively incorporates a variety of disciplinary focuses and theories, which makes it accessible to a wider audience. A first in terms of studies in Johannesburg on this topic, it also offers a rough economic valuation of green infrastructure, including street trees. The study stresses the need for ecosystem services to be valued publicly; it emphasises the importance of a planning process that includes resilient ecosystems with a citizen network to sustain it. The authors argue that service delivery protests in many South African cities currently prevent citizen participation from happening (Schäffler & Swilling 2013). Schäffler and

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Swilling (2013) argue that the ecosystem services provided by green spaces should be exploited, while infrastructure transition is required for increased urban resilience (Schäffler & Swilling 2013). As this case study reveals, when there is little incentive in local government frameworks for the inclusion of green infrastructure, it will most likely not happen. In this case, perceptions and comparisons of green assets are based on the idea of city beautification since there is no way of formally valuing ecological assets (Schäffler & Swilling 2013:9). The authors recommend undertaking financial valuations of green assets in order to raise awareness about the importance of green infrastructure. Furthermore, unofficial cultures of greening in private gardens need to be acknowledged and incentivised (Schäffler & Swilling 2013). This study acknowledges the importance of civic support and an expanded concept of governance that recognises the need for the inclusion of diverse stakeholders. The study, however, remains limited in its considerations of value articulation as it only proposes economic valuation and incentives.

Within the research field of urban ecology, there are also a number of different approaches in South Africa (Cilliers and Siebert 2012). Local approaches to urban biodiversity preservation are also discussed (S. S. Cilliers 2010). This chapter has up to now revealed a number of these broad place-based differences, which are summarised here. According to the authors, approaches in Cape Town focus more on urban nature conservation—ecology in cities—which includes protection of biodiversity and ecosystem services, management of control measures, and mitigating conflicts between humans and nature. The management of these conflicts entails community participation and efforts towards poverty alleviation (Cilliers & Siebert 2012; Davis 2005 in S. S. Cilliers 2010:89). In Durban, open space planning and environmental management receives more attention with greater social integration (Cilliers & Siebert 2012). The approach in Durban is one of resource economics, which focuses on the provision of ecosystem services with monetary valuations thereof to persuade urban stakeholders (S. S. Cilliers 2010). A third city, Potchefstroom, uses an urban agriculture approach to improve low levels of quality of life through community involvement with minimum environmental impact (S. S. Cilliers 2010). According to Cilliers and Siebert (2012), the applied nature of studies does not allow for the growth of urban ecological theory in South Africa. There remains a need to better understand the linkages between social and ecological systems by means of models and monitoring.

Ethicality is a different approach that has so far only been applied on the consumer market in South Africa (Hughes, McEwan & Bek 2013), in the context of wildflower harvesting in the Western Cape. The study considers ethical trade in the case of sustainably harvested wildflowers bouquets supplied

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to the UK from South Africa. Environmental ethics tend to acknowledge the Intrinsic Value of biodiversity. According to the authors of the study, the ethicality approach has been more successfully applied in countries with fewer socio-economic challenges (Hughes *et al.* 2013). Hughes *et al.* (2013) identify an emergent role for institutions in the global South in influencing ethical standards and practice in what they label as "strategizing, embedding and practicing ethicality". This also pertains to the concept of biodiversity protection and management, which requires greater acknowledgement in contemporary social-ecological considerations.

Du Plessis (2008) formulates an approach to sustainability from an ecological world view. The study builds on the foundation of social-ecological systems and engages with theories of values, action and knowledge, which includes ethical considerations. The study begins with the premise that efforts to improve sustainability are failing since they depart from our current paradigm of thought that threatens sustainability. The study then formulates an ecological paradigm by using a transdisciplinary philosophy and building on the idea of partial validities of knowledge (Du Plessis 2008). The study highlights the flaws of sustainable development approaches and finds that understanding of sustainability is evolving in response to system drivers and social world views (Du Plessis 2008). Urban sustainability is based on concepts of resilience, systems integrity and adaptive responses to constant change (Du Plessis 2008). Du Plessis (2008) finds that often value studies deal with values drawn from a current socio-political discourse, and therefore she formulates new values for an ecological world view.

Du Plessis' (2008) study is similar to this study in the following aspects: it enquiries from the literature to find a set of desirable values, which this study does in the form of the conceptual tool of ecosystem services; it then considers what is ethical, effective and efficient in terms of practical application, which this study does in the form of ways of operationalising values; and it also enquires as to true knowledge, which this study does in the form of recent landscape process knowledge and application to landscape design. However, the study by Du Plessis (2008) is largely philosophical and although it proposes a framework for application for studying, understanding and proposing methodologies. Du Plessis' (2008) study does not venture into an actual proposal that empirically engages with aspects of place—i.e., an application to a specific scenario—that this study does undertake.

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6.6 Summary and conclusion

Current South African studies addressing aspects of urban ecology and biodiversity are rare, geographically scattered and often theoretically unrelated. Many authors note a strong socio-economic concern in terms of the country being a developing economy with high levels of social and economic inequality. Studies also acknowledge South Africa's past socio-political inequality under the apartheid system and the unique challenges of a young democracy. Significant drivers of change in ecosystems include demographic, economic and socio-political aspects, which are necessary to achieve greater ecological sustainability and resilience (MEA 2005) in South Africa. In addition, the country's regional climatic and cultural distinctiveness both directly and indirectly drives change in ecosystems (MEA 2005).

The studies of Schäffler and Swilling (2013) and Avlonitis (2011) are most similar to this study from the urban studies reviewed as they both engage with public green infrastructure and the co-involvement of stakeholders in their planning and management. Both studies acknowledge the important role of specific actors such as local authorities and citizens, and the importance of social-ecological integration. Avlonitis (2011) focuses on management practices as direct drivers of ecosystems, while Schäffler and Swilling (2013) focus on value articulation. The study by Du Plessis (2008) is also useful in terms of its acknowledgement of the importance of values in social-ecological systems and how these concepts, including knowledge and practice, need to be ethically considered in terms of operationalisation.

Several studies based in rural areas deal more qualitatively with beliefs and perceptions of those in management positions with an aim of finding more effective ways to incentivise human action and behaviour. These studies often venture into the realm of values without pertinently aiming in on the concept. The study by McConnachie and Cowling (2013) on beliefs, knowledge and behaviour of managers is possibly most closely related to the objectives of this study, yet does it not engage with the concepts of value or operationalisation specifically.

Although many studies have considered different stakeholders in terms of perceptions, decision-making processes and management practices, the role of built environment design professionals and specifically landscape design practitioners has not been acknowledged pertinently. No local study could be traced that considers the role of design or landscape designers with regard to ecosystem services or green infrastructure. Landscape designers have not academically engaged in actively investigating design criteria and appropriate green infrastructure approaches for the South African

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context, nor have they undertaken studies with regard to human preferences of urban spaces and the reasons for this as an attempt to integrate social and ecological aspects through design. This apparent lack of interest with regard to these themes for landscape design in South Africa alludes to the concept of preferences and held values and the important role of value articulation within the industry for operationalisation.

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Conclusions on the Literature Review



bio control

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Conclusions on the Literature Review

A vast amount of literature can be found on social-ecological systems and aspects of social production. In Chapter 2, the study divided these between urban ecology and social production to focus the review, but many studies overlap. Most discussions on social-ecological systems include a reference to biodiversity. While researchers use the word, it appears as a cultural concept rather than a well-understood term. The researcher consulted specific biodiversity studies to find concrete indications of the value and requirements of biodiversity. The study subsequently summarised works that define biodiversity and include required aspects of scale and process. Several aspects of biodiversity remain yet to be thoroughly explained and confirmed. There is currently insufficient knowledge on how to measure ecosystem functions or replace them (Lindenmayer & Fischer 2006) and a lack of understanding on which components are required for ecosystem functions and services provision (MEA 2005). Biodiversity not only has Functional Value for humans but also includes all aspects of stability, functioning and sustainability of ecosystems (Redman 2011), which is also a security value for humans. All values rest on a combination of three factors: diversity of species (Levin 1998 in Alberti *et al.* 2008); keystone species and groups (Haines-Young & Potschin 2010); and co-existence and interaction at community level as functional units (Balvanera *et al.* 2006). The Fundamental Value of biodiversity is thus undisputed.

Many current ecological studies focus on values of components of green infrastructure. Chapter 2 summarises the general approaches to green infrastructure, and Chapter 5 recaptures the specific considerations for landscape design. Green infrastructure depends on habitat, scale and connectivity. A very important aspect of green infrastructure is that it acknowledges both green structure and social governance that embraces inclusionary processes of knowledge (Hansen & Pauleit 2014).

Although research on ecosystem services seems to be growing fast, it is also critiqued. The most significant critique considered for this study is that the concept may lead to homogenisation of values (Ernstson & Sörlin 2012). Yet, as Costanza and Folke (1997) point out, the media and cultural institutions constantly influence and manipulate human values, while researchers have a responsibility towards pursuing better ways to make decisions and achieve goals in spite of uncertainties. It is important here to distinguish in these arguments between Functional Values, which exist regardless of human preferences, and human preferences (Lockwood 1999). With regard to long-term resilience, democratic processes must be used to obtain consensus on public best

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practice, which is often determined by the decisions of a minority, causing ecosystem service erosion (Costanza & Folke 1997; Pauleit *et al*. 2011). Many scientists (for example, Costanza & Folke 1997; Dailey 1997; Ernstson 2013; Pinceti 2012) share the perspective of this study that considers the conceptual tool of ecosystem services as a means for greater objectivity and inclusivity of Functional Values. This study contributes to this debate through its findings.

Social and ecological systems both depend on aspects of time and scale, yet the influence of discourse through metaphors is becoming more acknowledged in research (Ernstson & Sörlin 2009; Ernstson 2013; Gandy 2013b; Harvey 1996; Zipperer *et al.* 2011) similar to the extent that values, beliefs and perceptions are indicated in systems models (De Groot 2006; MEA 2005; Van Oudenhoven *et al.* 2012), underlining the relevance of this inquiry. System models identify drivers of change and role players, that both confirm the importance of landscape designers in their central network position (Ernstson & Sörlin 2012) and the direct drivers they influence in practice that affect land use (MEA 2005), land cover and sense of place (Zipperer *et al.* 2011). Landscape designers further exercise control over the introduction and removal of species (MEA 2005). Several studies directly mention the important role of landscape designers in social ecological systems (Gobster *et al.* 2007; Steiner 2012; Swaffield 2013; Waldheim 2006). The existing ecological landscape design approach of Landscape Urbanism remains unconvincing in its neglect of social concerns and over emphasis on aesthetics (Talen 2013). Few landscape designers theoretically engage with the concept of social-ecological systems, which is a specific contribution of this study and the reason why the majority of the work reviewed is particularly based in a variety of disciplinary fields.

Chapter 3 in this study further reviewed a large amount of work on human values. The different types of values were distinguished and defined from recent studies that summarise work from several fields, shedding much clarity on how values, knowledge and environmental qualities together affect preferences and behaviour. For management goals, preferences and actions both held and assigned values are important (Ives & Kendal 2014). Knowledge does affect Functional Values through cognition, which in return can construct other types of values (Lockwood 1999). Functional Values are important since they provide objective ground for professional actions, but for environmental decision-making processes, Intrinsic Values must be acknowledged since they are normative (Lockwood 1999). In stakeholder processes individuals should have the maximum opportunity to express assigned values consistent with their held values (Lockwood 1999). The value orientations identified by environmental ethics (Jax *et al*. 2013) seem most useful for this study

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because the address aspects of axiology and deontology which both apply to professional practice and ethics.

Although not discussed in depth, the chapter confirmed the importance of nature and green spaces for overall human well-being. Therapeutic values and psychological health aspects of humans affected by nature include: attention restoration, stress reduction, physical activity, social interactions, and reduction of incivilities (Matsuoka & Sullivan 2011), mood regulation, children's cognitive, physical and emotional development and psychological health (Tzoulas & Greening 2011). Physical human health can be improved through green spaces by providing preventative and curative effects of: obesity, cardiovascular disease and type II diabetes (Tzoulas & Greening 2011). Though these facts cannot be considered general public knowledge, some researchers argue that these benefits revealed through research have been influencing people's appreciation of nature in the last half a century due to their increased awareness.

Much research has been done on how people assign values to place; it confirms that environmental qualities, symbols, human experience and social interactions determine human satisfaction, attachment and response to place (Barthel *et al.* 2010; Hull *et al.* 1994; Stedman 2003). These attachments are further hypothesised through biological theories, which are found less convincing. Social and cultural factors influence values attached to landscape through land patterns, landscape contexts and situational contexts (Gobster *et al*. 2007). Through these concepts the cultural landscape is defined by structure, function and change (Tengberg *et al.* 2012). Stedman (2003) explains how the symbolic base for attachment can be changed without affecting overall attachment. Gobster *et al.* (2007) describe how aesthetics can affect human action towards landscape, which emphasises the importance of visual amenity since it is subject to influence from both knowledge and values. This is a very important confirmation for this study, since aesthetic perception and consideration play a key role in the landscape design process and an ecosystem service (Gobster *et al.* 2007; MEA 2005). The potential of Cultural Services to align cultural heritage and environmental studies (Plieninger *et al.* 2013; Tengberg *et al.* 2012) is central to this enquiry. Chapter 3 explains how aspects of natural and human history, tangible and intangible, strongly influence the values people assign to places, which shapes identity and can foster stewardship through attachment (Stedman 2003) or visual affect (Gobster *et al.* 2007).

Several studies were considered with different approaches to capture and measure environmental preferences and values. Place-based mapping (Alessa *et al.* 2008; refer to 3.5) uses a set of

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predetermined Landscape Values, which serve as a good reference for a spectrum of different human values to consider. Landscape values can be tangible, intermediate or intangible in nature (Alessa *et al.* 2008). Other value studies reviewed made use of a diversity of mixed and novel research instruments. The qualitative studies were found to engage more profoundly and directly with values and preferences, which affected the selection of research instruments for this study. The importance of shared rituals in civic involvement in green space that include aspects of knowledge sharing and can provide social-ecological resilience (Barthel *et al*. 2010) has implications for this study. Barthel *et al.* (2010) emphasize how different ways of learning through social engagement, shapes memories that contain essential information for future generations to know and experience in a similar way. Although not specifically elaborated these examples also stress the often unexploited opportunity of green space for subsistence in cities and demonstrate their ability to contribute to aspects of biodiversity conservation.

Chapter 4 subsequently reviewed a body of work on value change and operationalisation. Knowledge and cognition do play an important role in professional decisions and actions; they can change Functional Values which can construct other kinds of values. Values also change through experiential learning which can become transformative if emotions are at stake. Yet, knowledge can also be value dependent (Bolderdijk *et al.* 2013). Steg *et al*. (2014) recommend norm activation through value cues and situational factors for operationalising pro-environmental behaviour among adults. Most other studies reviewed rely on value cues and situational factors to affect values and make use of moral motivation (James 2011; Mansbridge 1994), descriptive norms of frequent contacts (Aaron *et al*. 1994; Goddard *et al.* 2012; James 2011), public figures, official guidance, and targets of tangible achievement (Aaron *et al*. 1994; Box 2011). Two slightly distinct methods proposed the consumption process and means of co-creation (Russell-Bennett *et al.* 2009), and the reframing of messages to tie in with identified held values (Schultz & Zelezny 2003). Value articulation is an essential part of norm activation, and in the built environment many artefacts and arenas lend themselves towards this practice that can wield knowledge and power (Ernstson 2013). Economics valuation, social discourse, ideology, and ethics all influence how professional values are assigned (Ernstson 2013; Gandy 2013b), but situational factors can activate norms, the self and status or increase competition for and costliness of actions (Steg *et al.* 2014). Landscape designers are subject to professional and business ethics, but also affected by environmental, social and aesthetical values (Thompson 1999) bringing together possible competing effects of held values and moral obligations for social and environmental justice. In South Africa, Western art philosophy and

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market-driven influences affect the cultural perceptions of designers through their training and the media.

Recent scientific discourses such as urban ecology also influence design and cause designers and the public to rethink concepts of wastelands and wilderness, in terms of political, aesthetic or scientific questions (Gandy 2013b). The concept of wilderness is argued to have social potential for inclusion of otherness and required critical self-consciousness (Cronon 1996b). These are open opportunities for designers to engage with but thus far they have mainly resulted in visual spectacularisation (Gandy 2013b; Steiner 2014; Talen 2013). The importance of design as a cultural project has caused criticism on uncreative use of ecological processes by landscape architects (Treib 1995/2002), thus indicating myriad debates on questions of aesthetics in the profession of landscape design. The positive side is that these questions are considered more openly and allowing more stakeholders to consider their own values on what urban nature should embody (Gandy 2013). This study contributes to the work investigating the interface of science and cultural discourse with a specific focus on landscape design.

There are further ethical concerns related to equity, justice, knowledge and uncertainty (Ernstson 2013; Swaffield 2013). Landscape design frameworks proposed by designers (Nassauer & Opdam 2008; Swaffield 2013) deal with knowledge and values in a procedural fashion, trusting the designer to remain objective in these undertakings, and do not take into account the influence of held values on designers. These models also do not acknowledge the process of value articulation where value cues and situational factors influence decisions taken by designers (Steg *et al.* 2014). Thompson (1999) and Özgüner *et al.* (2007) consider values of landscape designers within the domain of changing ecological thinking and environmental expectations, yet there are no proposals in these studies to engage with these values. This study argues that there is potential and importance in the values of landscape designers, which need to be operationalised in order to have a greater effect. This study aims to expand the current research by making proposals for value operationalisation for professional practice.

Since knowledge has been reiterated as important for Functional Value and value construction, Chapter 5 undertook a focused review where the study considered models and principles for landscape design. In terms of green infrastructure design in cities, the first challenge is to obtain a balance between ecosystem functions and ecosystem service groups (Hermann *et al.* 2011). The economic, socio-cultural and insurance value of green space should be considered (Gómez-

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Baggethun & Barton 2013), not only in terms of actual demand (Hansen & Pauleit 2014) but also in light of replacement cost, direct and indirect value, and insurance value (Gómez-Baggethun & Barton 2013). Food production and maintenance of functional diversity through ecosystem functions are specifically underlined (Gómez-Baggethun & Barton 2013). There are also service benefitting, connecting and providing areas that reiterate important aspects of scale in green infrastructure (Hermann *et al.* 2011). These considerations also entail attention to the normative values of those involved in the process (Redman 2011).

A second challenge for green infrastructure involves the assessment and quantification of the supply of ecosystem services and spatial data available. Seemingly useful tools that relate essential ecosystem services back to landscape design practices (Ahern *et al*. 2014; Hansen & Pauleit 2014) are problematic in terms of time and levels of difficulty. Ahern *et al.* (2014) offer several practical and useful strategies for designers: favouring learning by doing, civic involvement, education and knowledge sharing, and developing workable examples to learn from. These workable examples relate well to the views of studies that advocate the didactic role of green spaces in cities (Colding 2011). The connection of experiential learning practices to physical project examples reiterates the potential of landscape design practice pursued by this study.

The literature reiterates the importance of ecological functions—a broad spectrum of services, justice and equity with regard to access and use—along with synergies and trade-offs in terms of spatiality, temporality and reversibility (Hansen & Pauleit 2014). Based on the review and the applications at hand, this study proposes that the inclusion of ecosystem services from all four categories and the widening of the scope should serve as an important consideration due to the various functions and services required in the urban context. The study summarises important services for urban areas presented in the literature as well as important considerations for planting design that include social aspects. An important synergy between ecological and cultural aesthetics is the use of regionally indigenous species that have ecological merit of interdependencies for the creation of local place identity (Hunter 2011; Kümmerling & Müller 2012). It is further important to provide cues of care (Özgüner *et al.* 2007), maintenance and access (Hoffman *et al.* 2012) to wilder-looking landscape to increase social acceptance. For greater resilience in plant choice, designers should select plants with qualities of plasticity, response diversity, functional redundancy, and those which provide diverse vegetation structure (Hunter 2011). These are all clear decisions gathered by the study from recent literature on important social-ecological decisions for landscape design.

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The review of South African subject literature in Chapter 6 indicates the importance of past and current political and socio-economic inequalities that must be acknowledged as drivers of ecosystems and their services (MEA 2005). Furthermore, the country has noteworthy regional climatic and cultural distinctiveness with high levels of biodiversity. These factors along with knowledge and practice pose ethical considerations regarding operationalisation of values. Most similar to this study are the studies of Schäffler and Swilling (2013) and Avlonitis (2011), which are urban based and focused on public green infrastructure, planning and management. The studies acknowledge the important role of local authorities and citizens but do not specifically include landscape designers or the concept of values. A few rural based studies do include greater qualitative exploration on concepts of values and management (McConnachie & Cowling 2013; McConnachie *et al.* 2010; McEwan *et al.* 2014), but they also do not deal with aspects of design or landscape designers. This study can thus play an important role in amplifying the position of landscape designers in South Africa, as well as contributing to the body of work on values. With regard to operationalisation, few value studies move beyond behavioural concerns into actual operation, while operational considerations are often not engaged with theoretical concepts of values. This study aims to strengthen the connection between these fields.

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Chapter 7



climate control

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CHAPTER 7: Research Design

7.1 Introduction

While the societal tendency to put findings from natural sciences and technology above those in humanities and social sciences remains, researchers are increasingly required to venture into disciplinary divides (Lele & Kurien 2011). According to Lele and Kurien (2011), environmental researchers must cross the division between the natural and social sciences while at the same time trying to integrate multiple perspectives within the social sciences. In this way, researchers are challenged to overcome traditional disciplinary boundaries while examining individual understandings of the other discipline. The objective is to work towards integration in terms of different values, models and epistemology (Lele & Kurien 2011:213).

The research topic of this study is situated in this interdisciplinary field. For the same reason, framing the research problem and accompanying research design posed challenges as it implied an integration of models and epistemology. Internally, logical connections between theory, hypothesis and evidence were pursued. However, the main challenges were external: identifying the most pressing problems and defining them in "socially relevant and normatively transparent ways" (Lele & Kurien 2011:229).

Figure 25 illustrates the layout of the chapter. This chapter gives a brief overview of possible methodologies available to this study and provides the rationale for the research design. It describes the research instruments used in the study, the study area, sample population and sample size. The chapter then briefly describes the data and analysis thereof, highlighting limitations. It considers ethical implications and concludes with a reflection on the strengths and weaknesses of the research design.

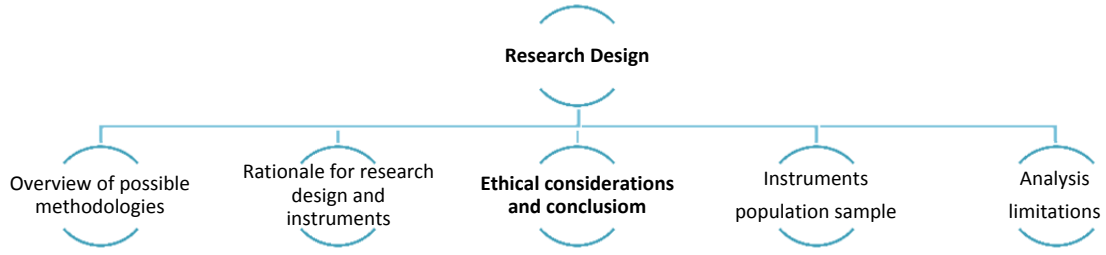


Figure 25: Graphic illustration of the chapter layout

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7.2 Overview of possible research designs

Many disciplines engage in environmental research with diverse attempts to relate environmental and social data. This study investigates the effects of the values held by landscape designers on the social production of ecosystem services. Studies of quantification and performance measurement are traditionally associated with the natural sciences, including ecology. In the South African context, work integrating social and environmental research includes the measured quantification of carbon sequestration by trees (Stoffberg 2006) and the measured effects of management practices on biodiversity in semi-natural areas (Avlonitis 2011). Cilliers and Bredenkamp (1999) considered the spontaneous invasion of plants in intensively managed urban areas. There has yet to be a study measuring biodiversity or ecosystem services as a variable of design in facilitated urban green spaces in South Africa.

In order to consider the production of ecosystem services in landscape design, this study considered the possibility to look at design projects, select projects of note and quantify their success in terms of biodiversity support and ecosystem services. The biodiversity and ecosystem service results could then be related back to the values of designers through interviews, similar to a study by Avlonitis (2011). This study drew inspiration from the work of Yapp *et al.* (2010) in linking vegetation type and condition to ecosystem goods and services for Australian ecosystems. The authors suggest structural classification of vegetation based on height and cover of all vegetation layers as a functional vegetation classification. Vegetation condition is defined as the degree of modification to pre-existing vegetation. In Australia, databases contain readily accessible information on the structural classification of vegetation and the spatial distribution of each class; thus, the researchers used this information along with the information available on vegetation condition classes to inform their two variables (Yapp *et al.* 2010). However, since this data is not readily available in South Africa, the Australian study could not be easily replicated. Further, since the researcher is not a trained ecologist, the task of selecting or formulating structural or vegetation condition classes, selecting indicators and applying quantitative measurements in terms of vegetation, soil, pollinator and seed disperser identification was beyond the scope of this study. Improving measurement of ecosystem services could be a meaningful objective for research, but as demonstrated by the local and international studies reviewed, evidence or information is often not enough to change beliefs and held values.

Another research avenue within the natural sciences involves developing a local rating system for landscape and ecosystem services attributes. Although rating systems need further development,

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the recent expansion of SITES (2014) to include all ecosystem services is a promising start. The system could be locally adapted, but the current incentives for their use and application involve questions of policy and politics. In the industry, large corporations presently use rating systems as marketing devices or for tax incentives. These short-term financial incentives have been proven not to change social norms or values in the long run (Pretty 2003) and have the possibility to errode intrinsic motivations (Mansbridge 1994). The literature review in Chapter 5 identified simplified criteria for advancing green infrastructure and ecosystem services useful to landscape designers in practice, but as in the previous research focus considered, it did not appear a significant means to change practice in itself.

Due to the researcher's background in urban studies and various different qualitative fieldwork methods, this study focused on "social production" and values influencing design. The research built on findings in ecological fieldwork and search applications in design practice in the form of earlier models and frameworks (Ahern 2011; Alberti *et al.* 2008; Grimm *et al.* 2000). Alberti *et al.* (2008) and Grimm *et al.* (2000) provide valuable insight into identifying system drivers that influence ecosystems, including human values. Ahern's work (2011) aims to implement adaptable design practically through learning-by-doing "design experiments" to produce good workable examples. However, despite existing models (Ahern *et al.* 2014), as well as the availability of landscape process knowledge (discussed in Chapter 5), prevailing value systems seem to hinder applications in South African green spaces (Schäffler & Swilling 2013). As acknowledged by recent research, the role of values is undeniable (Ives & Kendal 2014) and arguably equal or greater than that of knowledge (Ernstson & Sörlin 2012) in social-eclogical resilience. Ernstson (2013) identifies specific actors and processes of social production. The state and other landowners are usually considered for their power to influence decision-making, the public is deemed important due to consumer preferences, but the held values of built environment professionals and landscape designers as a concern and opportunity have not received attention in the South African context.

Ives and Kendal (2014:71) raise valuable questions about whose values are relevant, what kinds of values are relevant and how these values can be measured. As pointed out by Swaffield (2013:1194), values frame not only science and management but also the processes of design. Ives and Kendal (2014:71) thus rightfully state a fourth question: "which values do management goals reflect?" This thesis argues that management goals in landscape design and the choices involved are significantly steered by the values of landscape designers, and as stated by Swaffield (2013:1194) "embodied in design outcomes". Furthermore, assigned values are the topic of environmental management, yet

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held values influence assigned values and management decisions (Ives & Kendal 2014). This thesis maintains the importance of held values of designers and the consequential assigned values in terms of management goals and design outcomes.

7.3 Rationale for the research design

The critical perspective of social production views the policy agenda of managing urban ecosystems as entailing a social construction of reality, power and ideology that cumulates into a discourse of values, objectives and resources (Hajer 2003 in Douglas & Ravetz 2011:247-8). The framing of the main problem in terms of social values and social production places it primarily within social sciences research. The secondary focus on operationalisation additionally bears reference to landscape process knowledge, environmental requirements and consequences, but ultimately operationalisation is bound to the triggering of human action and behaviour. Social science research has three main challenges: (1) the need to allow for multicausality; (2) the need to see facts as socially constructed, not as something to be discovered; and (3) the emphasis of context specificity and historical contingency (Lele & Kurien 2011:214). For this reason, this study adopts a constructivist perspective and aims to investigate this process of social construction or "production" (Berger & Luckmann 1966; Ernstson 2013; Latour 2005; Lefebvre 1974/1991). This research makes use of a qualitative research to unravel core themes as embedded in context. This approach is deemed most valuable for value studies since it seeks to preserve the internal narrative of data (Terreblanche, Durrheim & Painter 2006:563). Due to the commited contextual approach, the research also employs aspects of phenomenological and contextualist thinking.

Those sharing a profession hold diverse kinds of values. Bengston (1994) explains how forest service employees staged an internal uprising due to professional dissatisfaction with traditional forest management. However, a study conducted by Brown and Harris (1992 in Bengston 1994:519) indicates that those who join ethical associations have very different values than most forestry employees. Similarly Özgüner *et al.* (2007) summarised contemporary debates between landscape design professionals with regard to naturalistic landscapes (refer to 4.7.4). This reiterates the question of Ives and Kendal (2014) regarding methods of measuring predominant values. Kellert (1985) faces a similar predicament when aiming to analyse historical trends in perceptions and uses of animals in 20th century America. The research challenge is twofold: there is a need to identify a source of data that can adequately reflect the values in questions and a need for a way to measure this data in an empirical and standardised fashion (Kellert 1985).

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Kellert (1985) considers newspaper articles (following the work of Bos *et al.* 1977)[14] as a reasonably good indicator of public perception, since textual analysis allows for the consideration of socially constructed versions of reality (Terre Blanche, Durrheim & Kelly 1999). Kellert's study (1985) on values over a 76-year period highlights how general assumptions about value change are often not confirmed by empirical research. As Kellert indicates, pragmatic and commodity-oriented attitudes towards animals and nature have remained dominant in the US despite shifting values and assumptions that 'American' values towards animals had changed. The nuances of how values and attitudes manifest as changed behaviour allow for a greater understanding of the complexities that influence value and behavioural change.

This study thus considers textual or content analysis and a constructivist approach as the most suitable methodologies for the research. However, Terre Blanche *et al.* (1999:7) warn that constructions of reality favour certain social actions while discouraging others. For this reason, this study also applies an interpretivist approach. As revealed by the various studies reviewed in Chapter 3, the interpretivist approach to values can be dealt with quantitatively—through questionnaires and surveys—to assemble models and make large-scale predictions; or qualitatively—through interviews or participant observation—to gain in depth understanding (Ives & Kendal 2014:68). Based on the demonstrated in depth understanding gained through interviews by Barthel *et al.* (2010) among many others, this study also chose to use qualitative interviews to explain subjective reasons and meanings behind social actions (Terre Blanche *et al.* 1999:7). The qualitative research thus made use of triangulation–improving understanding through using approaches from different instruments and sources (Kelly in Terre Blanche *et al*. 2006; Lockwood 1999).

The research approach specifically follows contextualist theories that view humans as social beings whose actions mirror socially imitative meanings, values and knowledge (Harrison & Burgess 2003/2008:476). In this approach many factors are acknowledged as circumstantial to behaviour—for example, the past, place and the role of structures and norms (Harrison & Burgess 2003/2008:476). The contextualist approach seeks to understand human behaviour in context and therefore favours qualitative methods that engage people in discussions rather than questionnaires or experiments (Harrison & Burgess 2003/2008:477). Important for this study, qualitative methods interpret feelings and experiences in human terms and allow for inductive exploration where all variables are not clear from the onset. Potential variables can in this way be identified and possible relationships between them (Terre Blanche *et al.* 1999). "Thus, the interpretive approach does not

[14] W. Bos, L. Brisson and P. Eagles, A Study of Attitudinal Orientations Central Canadian Cultures towards Wildlife (University of Waterloo, Office of Research Administration Project No. 702-717, Waterloo Canada, 1977).

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focus on isolating and controlling variables, but on harnessing and extending the power or ordinary language and expression to help us understand the social world we live in" (Terre Blanche *et al.* 1999:274).

This research design aligns with social-ecological systems thinking. Thus, it is not focused on discrete elements per se, but rather aims to understand these concepts and the processes that connect to form a whole (Hostetler *et al.* 2011:370). This study considers the urban realm to consist of: the physical world (matter); social institutions and abstractions of space (power); and symbolic ideas, perceptions and values (mind) (Lefebvre 1974/1991)[15]. The research relates strongly to the critical perspective of social construction and aims at a broad narrative to capture the dialogue regarding biodiversity, urban ecology and ecosystem services inside landscape design practice in urban centres as a social response to the global urban and environmental crisis. This can be viewed as a manifestation of the global scientific rationale filtered by societal and, in particular, professional needs and values to manifests as a local discourse on urban ecology particular to landscape design practice. More specifically the research aims to capture the current held and assigned values in landscape design practice and understand how these may play a role in the social production of ecosystem services through this particularly influential actor group.

Social discourses as manifested in physical design matter can be captured as artefacts (Ernstson 2013). If we accept that words are also artefacts (Fisher 1993), then the words used to explain and describe designs and ideas around them are manifestations of the values and ideas that inspire and support these types of designs. Thus, it is possible for expressions of symbolic ideas and values—expressions of the mind—to be identified and quantified; this analysis could also potentially reveal social abstractions and institutional structures of power that are central to social production processes (Lefebvre 1974/1991). The thesis posits that these findings on the social production of ecosystem services through landscape design practice could be unravelled along with the social practices that articulate these values and operationalise them (see Figure 26).

[15] The idea of the city as a human dominated system ties in with the post-structuralist, humanist view of 'the social construction of urban space' as coined by Lefebvre (1974/91) and reinterpreted by others for urban studies.

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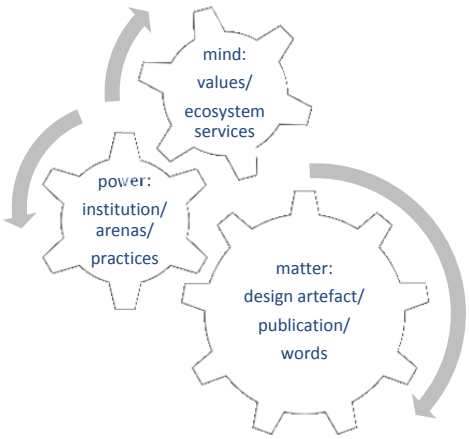


Figure 26: The social-ecological system and social production of ecosystem services through landscape design

Source: by author, based on Ernstson (2013) and Lefebvre (1974/1991)

Figure 26 illustrates the interconnected production process and the hypothesised components based on the theories of urban space construction and social production that are central to the research design.

7.4 Study area and research instruments

This section introduces the study area and general statistical information as a background on socio-economic conditions in South Africa. It follows with a discussion of the research instruments, the logic for their selection and the rationale behind the population size and sampling unit.

7.4.1 Study area and population

Due to the relatively small nature of the industry, the study area is the whole of South Africa. Since, by definition, landscape designers do not encompass one single profession, it was difficult to estimate the amount of designers in South Africa. As a reference to an approximate figure, current member numbers were requested from three existing bodies for landscape designers. There are currently 211 members at the Institute for Landscape Architecture (ILASA) in South Africa of which 120 are registered professional landscape architects with the professional body the South African Council for the Landscape Architectural Profession (SACLAP). SACLAP has 170 professional members of which 97,6% are white and 53% are male. There are 68 candidate members not yet registered of which 78% are white and 51,4% are female. Between ILASA and SACLAP there are approximately 329 landscape architecturally related professionals, most are white and gender numbers are almost equal.

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This study also considered the South African Landscape Institute (SALI), which mainly consists of landscape contractors and managers, some of which are also designers. Members of SALI are not likely to be members of ILASA or registered with SACLAP. At SALI principals of companies register as members and represent an unknown number of designers. There is currently a record of a total national principal membership of 146 landscape contractors and suppliers. Of these 40% are based in the Western Cape, 18,5% in KwaZulu-Natal and 41,5% in Gauteng. In terms of race 84% are white and 26% are female. Though these figures are broad, they suggest that a very high majority of landscape designers in South Africa are white, and approximately two thirds are male.

The development process in South Africa allows for substantial professional input and initiative from landscape designers in private or municipal projects. Each project comes with a brief from the client, and the main land uses would be pre-determined by municipal regulations based on the work of town planners. In general, the landscape design component will form part of a larger development project which also includes other professionals and built environment designers. Private projects are mostly at a site scale, but open space frameworks and projects that look at various green spaces at once also occur at municipal level. Unfortunately, landscape designers are often appointed once major design decisions of the development have already been taken. Furthermore, the landscape design is often left with the tail end of the project budget. Much private development and government work rely on 'design-and-build' projects where the construction company is requested to generate a design proposal. The largest landscaping company in South Africa is the international *Servest Group* and they employ few landscape architects, mainly making use of landscape managers as designers.

There are, at municipal level in general, a number of main requirements or criteria for private and public development projects that contain significant landscape components. Some municipal processes may request the appointment of a registered landscape *architect*, but this is not always regulated or enforced by all municipalities. Design proposals for developments are often circulated to several government departments for approval, including some with government-employed landscape designers. Municipalities employ landscape *architects* in the main urban centres, but designers sometimes have a less technical background and horticultural training. According to correspondence with council officials at the Tshwane, Johannesburg, Cape Town, and eThekwini municipalities (2014), their requirements for development approval entail, inter alia, the use of mainly indigenous species, the priority of public safety, inclusive design, low maintenance

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requirements, and specific quantitative aspects such as plant densities per area. The nature of public development may further require community and stakeholder engagement, the employment of local labour, and skills-development initiatives. The perceived main concern of the various councils is currently to compel professional landscape design input in new development projects, while monitoring ecosystem disservices (Lyytimäki & Sipilä 2009), such as social nuisances and financial and environmental costs. Once landscape designers are included in a project, municipal and client requirements are unlikely to hamper their creative pursuit of structural diversity, habitat creation, community involvement, and multifunctionality. This is, in the authors' opinion, the crux of the power that landscape designers hold in terms of their professional decisions.

The study focuses on core urban centres located in three of the nine provinces—Gauteng, KwaZulu-Natal (KZN) and Western Cape. Gauteng province only occupies 1,4% of the surface area of the country, but houses 23,7% of the South African population or 12,3 million of the 51,8 million people measured in 2011 (StatsSA 2012). The Western Cape and KwaZulu-Natal each has a population of 5,2 million and 10,3 million respectively. South Africa is divided into nine different vegetation biomes (refer to Table 16 in 7.5.1). These prominent urban zones are each situated in a different vegetation biome. Gauteng is in the grassland biome, KwaZulu-Natal urban centres, are mainly in the Savannah and Indian Ocean Coastal Belt biomes, while the Western Cape is in the Fynbos biome (Mucina & Rutherford 2006). As mentioned in the introduction of this thesis, South Africa comprises only two per cent of the earth's surface, but contains ten per cent of global plant species and seven per cent of all vertebrates (Le Maitre *et al.* 2007). South Africa also houses three of the world's 34 global biodiversity hotspots (Myers *et al.* 2000).

Some core general statistics are provided here to give a general impression of the status of the country with regard to the state, users and clients of urban green spaces. In terms education, in 2011 of South Africans 20 years and older, only 28,9% had completed high school and only 11,8% had completed higher education, while 8,6% had no formal education (StatsSA 2012). The remainder had completed either some primary or some secondary education. In terms of income, the average household income was around R103 thousand ZAR[16] per annum in 2011, with female-headed household income averaging close to half the amount earned by male-headed households (StatsSA 2012). Gauteng and Western Cape province both have similar average household incomes at R78,5 and R78,1 thousand ZAR per annum, respectively, which is nearly double that of most of the other provinces that range between R39,7 and R22,9 thousand ZAR per annum. KwaZulu-Natal is in fourth

[16] In 2014, the exchange rate of South African Rand (ZAR) to United States Dollar (USD) stood at R11.30 ZAR for one USD.

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places with an average household income of R38,9 thousand ZAR per annum. Of the total population, 29,8% are unemployed in terms of the official definition[17] and 40% in the expanded definition of unemployed[18]. Of the total population, 77,6% of people live in formal dwellings with 13,6% in informal dwellings[19] and 7,9% in traditional dwellings[20] (StatsSA 2012). The high levels of inequality in South Africa result from historic factors (see further statistics and context in 2.3.5; 6.3 and 6.4).

7.4.2 Research instruments, population and sample size

Values affect deeply embedded standards of what is desirable, which governs future decisions and validates past actions (Braithwaite & Scott 1991 in Lockwood 1999:381). According to Lockwood (1999:396), these constructs are best measured with different methods "that converge on the theoretical meaning of the construct, while diverging on the irrelevant aspects" of which both are assessed in the process. Lockwood (1999:397) recommends a coordinated and multifaceted methodology that could involve methods like content analysis of verbal protocols, semi-structured interviews, psychometric value scales, stated preference assessment and behavioural analysis. This study selected the first two research instruments to capture data for analysis and quantification, content analysis and semi-structured interviews.

Content analysis allows for a constructivist interpretation, while interviews favour subjective interpretive analysis (Terre Blanche *et al.* 1999). The selected instruments have potential to reveal the social and cultural relations within which the relevant data are embedded, as well as the existing ideas and opinions of people aligned with these social systems (Harrison & Burgess 2003/2008:477). These two distinct methods are hence related to different theoretical perspectives, which provide for triangulation at two levels. Further, two distinct data sources were used to achieve triangulation.

The content analysis and semi-structured interviews were applied to primary sources of data. Each instrument is discussed in brief and the rationale behind the data source in terms of sampling population and size.

[17] "*Unemployed (official definition):* Persons who did not work, but who looked for work and were available to work in the reference period" (StatsSA 2012:48).
[18] "*Unemployed (expanded definition):* Persons who did not work, but were available to work in the reference period" (StatsSA 2012:48).
[19] "*Informal dwelling:* Makeshift structure not approved by a local authority and not intended as a permanent dwelling. Typically built with found materials (corrugated iron, cardboard, plastic, etc.). Contrasted with formal dwelling and traditional dwelling." (StatsSA 2012:80).
[20] "*Traditional dwelling:* A dwelling made primarily of clay, mud, reeds or other locally available natural materials. This is a general term that includes huts, *rondavels*, etc. Such dwellings can be found as single units or in clusters." (StatsSA 2012:81).

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7.4.2.1 Content analysis

When engaging only with scientific writing and experts, research risks becoming isolated from the everyday life of ordinary people—the quotidian discussions and activities that help maintain the world we live in. Research conducted in isolation from the public realm may result in it becoming difficult to apply its findings. This has been the tendency in ecological studies, which often occur in natural areas away from people. Urban ecologists who focus on social-ecological systems have a goal to integrate findings into design practice and therefore cannot work in isolation from social systems. Publications are a useful means to obtain insight into the complex social-ecological system of the city (refer to 7.3). They reflect views, held perceptions and values in the form of social discourse.

According to Aguilar Díaz (1998), the act of writing about a city entails a twofold process. Firstly, collective practices are captured and exhibited in the form of value, themes and hierarchies given to the urban context. At the same time, the media may discuss shortcomings or forthcoming events. These values are captured in a convenient form—which can be an informative note, a report or advice given—that orientates, models and gives representation of social recognition to a previous or existing social discourse. Signs and images employed by the media have the power to create particular representations that influence popular experiences of people, objects and places. Research in social constructionism analyses these representations as part of a system of meanings and practices existing at a social rather than individual level (Terre Blanche *et al.* 1999).

Periodical publications, flyers, websites and blogs—which have been identified as important means of interaction between the media and the specific study area or community of practice—can be collected and studied over time. Some basic general criteria for information selection include selecting publications that discuss broadly defined urban themes of importance, in this case landscape design practice, and how this is related to life and other day-to-day realities in the city. As Aguilar Díaz (1998) advises, when performing content analysis, it may be meaningful to take into account the following: formal structure of the publication, its orientation or political representation, coverage given to different topics, use of photography and images, type of publicity or propaganda and target audience. Other aspects to consider include the stakeholders, editor in chief, director and owner, cost, language and means of distribution. Since this study investigated landscape design projects in South Africa, the research identified three prominent profession-focused magazines.

Magazines for landscape design professionals were selected on the basis of being well known in the industry and having been previously identified as influential in terms of environmental planning and

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design (G. Garner in Stoffberg, Hindes & Müller 2012). No other profession-focused magazines dealing with landscape design practices were available, and therefore the whole spectrum of the sample population was considered. The selected magazines were: *Urban Green File*, which targets custodians, planners, designers and managers of the urban environment; *Landscape SA*, which focuses on all green industry-related concerns; and *Environmental Management*, which concentrates on sustainable development. Table 13 provides a summary of each magazine's focus and distribution, while the rating cards in Appendix C give more information on quantities and percentages.

Table 13: Distribution and focus of the three industry magazines

Magazine	Main focus and readership	Total circulation	Copies per year	Cost	Distribution
Urban Green File	**For custodians, planners, designers and managers of the urban environment; people who specify all the products and technologies used in the development of infrastructure in South African cities; professionals who are advising municipalities and private developers on urban development and infrastructure delivery,** for example: • Town planners, landscape architects, consulting engineers, architects and environmental consultants (61%) • Municipal managers and managers of municipal departments (18%) • Property developers and owners of large facilities or land (8%) • Companies responsible for the construction of urban development/infrastructure projects (8%) • Technology and product companies (5%)	3,365	6	20% paid 80% free	SA urban population: distribution to researched audience
Environmental Management	**The principles of sustainable development: Biodiversity and Ecosystems Management; Water and Energy Conservation; and Waste Management** • National and provincial government departments and municipalities • Property owners and developers • NGOs • Managers of protected areas and golf courses • Environmental officers, consultants and lawyers • Architects, engineers and town planners • Landscape architects and contractors • Wholesale nurseries and growers • Irrigation contractors	3,120	6	R30 ZAR	SA
Landscape SA	**South African green industry: new landscaping projects (both from the design and installation aspects), interior plantscaping, horticulture, cut flowers, nurseries, turf management, irrigation, machinery, golf courses, and environmental issues** • Horticultural societies, associations and the cut flower sector (18%) • Nurseries (wholesale, retail and growers) (18%) • Landscape architects, contractors and professional consultants (17%) • Golf courses and other sports/turf/recreational clubs (14%)	4,000	6	R30 ZAR	Gauteng (40%) Western Cape (20%) KwaZulu-Natal (14%) North West Province (6%) Mpumalanga (5%)
Summary	Green industry professionals and contractors, built environment professionals, municipal managers, developers, nursery owners, etc.	10,485	18	Low cost/free	SA

Source: compiled by author (2014)

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In addition to landscape architects and contractors, the magazines are distributed to government departments and property developers, as well as other built environment professionals: architects, urban designers, engineers and environmental practitioners. Collectively, more than 10,000 copies of the three magazines are distributed every two months to the main urban centres throughout South Africa. They are mostly mailed through the post to a select audience free of charge or offered at a low cost[21]. Two of the magazines also make some issues available electronically.

The magazines were examined over the period from January 2004 to January 2013.[22] The period of time was selected for its economic variance and political constancy, while being long enough to potentially indicate tendencies of change. Importantly, full sets of these magazines could be sourced for this period of time. In total, the study reviewed 144 magazines, 658 main articles and 355 design projects (see Table 14).

Table 14: Breakdown of the three industry magazines by number of issues, main articles and design projects

Environmental Management (EM)	Landscape SA	Urban Green File (UGF)	Totals
44 issues reviewed	48 issues reviewed	52 issues reviewed	144 issues
143 main articles	348 main articles	167 main articles	658 main articles
74 design projects	192 design projects	89 design projects	355 design projects

Source: author (2014)

As part of the analysis, the researcher verified the representativeness of the magazines in terms of geographic region of distribution and projects featured, including to what degree they represented landscape design practice. These findings are discussed in the Chapter 8. The categories for and method of analysis are discussed in 7.5.

7.4.2.2 Semi-structured interviews

The researcher used content analysis as a first enquiry to the research questions, seeking systems of meaning at a social level. As a second round of investigation, the researcher conducted interviews with experts, which were more interpretive and added individual meaning and experience to gain a more subjective understanding in terms of the research questions. These interviews further contributed to the contextual grounding of the data. The researcher considered it important to combine constructivist and interpretive research in order to find a balance between abstract ideas and social frameworks of constraint versus individual agency, experience and meaning (Terre Blanche *et al.* 1999).

[21] R33 ZAR or $3 USD in 2014
[22] Note: *Landscape SA* only began publishing in September 2004 and *Environmental Management* first began publishing in October 2005.

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Two critical identified risks supported the use of diverse methods, namely, the influence of the held values of the researcher and the potentially undefined nature of values of interviewees. As pointed out by Lele and Kurien (2011:213), researchers engaging with interdisciplinary environmental research feel the need to contribute to the urgent environmental crises facing humankind. The reason for engaging with these challenges often comes from an aspiration to diminish environmental problems. "This urge is a double-edged sword, as it also comes with an a priori framing of what the problem is, based on what values underpin the researcher's perspective" (Lele & Kurien 2011:229). Research further suggests that interviewees may not be aware of their true motivations, or provide socially desirable answers (Steg *et al*. 2014). It is therefore important to not only rely on self-reports of individuals on the prominence of diverse motivations.

These considerations also led the researcher to interview long-standing figures in the industry rather than a random selection of professionals. Experts are regarded as people who hold defined values regarding their profession, in this case landscape design practice. It is thus argued that selecting experts that hold clearly defined values for the interviews diminished the risk of the researcher influencing the voiced opinions of interviewees. The merit of interviewing long standing figures is confirmed by Fischhoff (1991 in Lockwood 1999:390) who states that clearly defined values may be held for "items and in contexts with which the person has had previous valuation experience, and has had an opportunity to clarify his or her beliefs through trial and error".

In terms of sampling criteria, the researcher made an effort to achieve geographical representation and diverse institutional make up. Leading figures in the industry and professional institutions were asked to identify experts in the main urban centres; the researcher generally preferred to interview experts that coincided among recommendations. The researcher conducted interviews in four major urban centres in South Africa, namely, Durban, Cape Town, Pretoria, and Johannesburg. Of the selected 12 experts (see Table 15), three had previously interacted with the researcher but only on professional terms. The qualitative selection considered the length of professional experience in the field, geographic area of concern, availability, interest to participate and openness. The researcher sought a minimum of three people per major geographic region. Several experts had worked in more than one geographic region, including provinces other than those listed. The study thus included lecturers and tertiary institutions, practitioners and contractors in the sampling. Among the original ten experts, the researcher added two editors[23] of two of the professional magazines, to have a

[23] The editor of the third magazine did not respond to various requests for an interview.

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common reference that links the two instruments, i.e., the editor that was in charge of selecting the magazine design projects used in instrument one, was also questioned about the content of the magazines and the state of the industry in instrument two.

Table 15: Twelve expert interviewees by geographic location and area of work in South Africa

South Africa (nationwide)		
1 Magazine editor (SA)		
2 Magazine editor (SA)		
3 Landscape architect/landscape designer and contractor (SA)		
4 Landscape architect/landscape designer and contractor, lecturer		
KwaZulu-Natal (KZN)	Gauteng	Western Cape
	5 Landscape architect, lecturer and practitioner (plus northern provinces)	
	6 Landscape architect	
	7 Landscape designer and contractor	
	8 Landscape contractor and designer	
9 Landscape contractor and designer		10 Landscape Architect, external examiner
11 Landscape architect, lecturer		
12 Landscape contractor and designer		

Source: author (2014)

7.5 Analysis

This section gives an explanation of the basic criteria and process of analysis for each research instrument.

7.5.1 Content analysis

The analysis had two components, each of the three profession-focused magazines were first analysed separately to reveal their individual language; thereafter the results were considered together to deduce findings for the three as a whole. The first step of the context analysis used the general categories that would be considered in ecological field studies (MacGregor-Fors 2011), these are listed in Table 16. The categories were specifically important to establish the nature and representativeness of the featured projects in the magazines. The magazines were available in hard copy and the data were fed into Excel spreadsheets, from where it could be quantified (see Appendix D).

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Table 16: Categories and criteria used for analysis of the design projects and main articles

Category	Subcategories	Criteria
1. **Geographic location**	Province and name of settlement area	Google Earth was used to verify locations in South Africa
2. **Urban location**	City (peri-centre, peri-urban); Town; Village; Rural.	City = > 1 million inhabitants; peri-centre = close to city centre; peri-urban = suburban or township areas (periphery) Town = < 1 million > 20 000; Village = < 20 000 people; Rural = isolated settlements (10-20 km away from the above)
3. **Biomes**	Savannah; Grassland; Nama Karroo; Succulent Karroo; Albany Thicket; Indian Ocean Coastal Belt; Dessert; Fynbos	Vegetation type based on biomes (Mucina & Rutherford 2006)
4. **Design type**	Engineering; Architecture; Landscape; Urban Design	Type of design intervention
5. **Human use**	Residential; Retail: office; Retail: accommodation; Recreation; Mixed use; Infrastructure; Commercial; Industrial; Institutional; Conservation	Type of economic development (Farinha-Marques *et al.* 2011)
6. **Owner**	Private developer or state-owned	
7. **Access**	Private; Public; or Restricted access	Open; Fenced; Boom gate; Guarded or the like
8. **Site character**	High; Medium; or Sparse level of development (MacGregor-Fors 2011)	% of built-up area: 100-67%; 66-34%; 33-0% (MacGregor-Fors 2011)
9. **Land cover**	Physical surface characteristics (Werner & Zahner 2010	% of disturbed vegetation (MacGregor-Fors 2011)
10. **Ecological scale**	Patch; matrix; landscape (Werner & Zahner 2010)	One land use type; citywide; into urbanised surrounds (Werner & Zahner 2010)
11. **Infrastructure character**	Grey; Green; Blue; Brown (Farinha-Marques *et al.* 2011)	Sealed surface; Green; Water; Reused land (Farinha-Marques *et al.* 2011)

Source: compiled by author (2014)

This part of the analysis for each article provided contextual background for the thematic interpretation that followed. All the main articles were analysed; although they did not all feature design projects, they did feature topics of value in the industry. When possible the geographic location and urban location were noted. Not all main articles featured design projects. In addition for design projects, the dominant biome, design type, human use, owner and access were also recorded. The site character, land cover, ecological scale and infrastructure character could not be established in all cases in the article or photographs. For this reason the n-values of many of the graphs are slightly different as they account for the magazine articles and projects that did reveal the relevant information for that category.

This study based the primary classification on the theme(s) or topic(s) of value featured in each main article. The researcher performed a combination of content and thematic analysis (Namey, Guest,

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Thairu & Johnson 2007) to quantify the relative frequency of topics or themes in the data set and to identify trends over time. The analysis assessed theme frequency rather than word frequency to incorporate context into the analysis, as recommended by Namey *et al.* (2007:143). The analysis focused on observing and identifying words that expressed the main themes of the articles. The researcher interpreted the title, subtitles, images and text of the articles to deduce the primary subject matter(s) or value projection(s). The study took a phenomenological data-driven approach—themes were noted as they occurred and were not predetermined or based on "Landscape Value orientations" (Rolston & Coufal 1991) identified in the literature review. Each time a theme occurred, it was assigned a full value. These topics were then later grouped through their association with the four main categories of ecosystem services—namely, Cultural, Provisioning, Regulating and Supporting Services—based on the description of the MEA (2005), and the division of the categories according to the example provided by TEEB (2011) (see Table 17). In this way, the category of ecosystem services represented by the nature and function of the design project were identified for each main article. Themes were allowed to arise naturally from the data and then brought into bearing regarding the research question (Terre Blanche *et al.* 1999).

Table 17: Four categories of ecosystem services as grouped by TEEB (2011)

Cultural Services	Provisioning Services	Regulating services	Supporting Services
· Recreation and mental and physical health · Tourism · Aesthetic appreciation and inspiration for culture, art and design · Spiritual experience and sense of place	· Food · Raw materials · Medicinal resources · Fresh water	· Local climate and air quality regulation · Carbon sequestration and storage · Moderation of extreme events · Waste water treatment · Erosion prevention and maintenance of soil fertility · Pollination · Biological control	· Habitats for species · Maintenance of genetic diversity

Source: by author, based on TEEB(2011)

The analysis aims to reveal the construction of values vis-à-vis urban nature as related to cultural material and text in the landscape industry (Terre Blanche *et al.* 1999). The researcher sought to discover broader patterns of social meanings and practices, as well as the social assumptions these entail, as encoded in the text or language (Terre Blanche *et al.* 1999). This could open up hidden effects of concepts and practices dominant in the industry for reflection. The analysis enquired as to how claims are made in the industry based on what is of value in terms of landscape design and urban nature. The researcher then related these articulated values to the concept of ecosystem services to see how these are inherently locally constructed. The analysis explored the context created by each magazine as an enquiry into the types of articulated values, meaning if the values could resonate through a particular narrative or not. In order to elaborate on this aspect, the researcher also visually analysed the front covers of the magazines in terms of the images employed

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to capture attention and express identity. The researcher then identified the ecosystem services associated with the visual images. Thereafter the analysis explored the combined context created by the three magazines together, the findings of which are detailed in Chapter 8.

7.5.1.1 Preliminary challenges of the analysis

It is worth mentioning four specific reflections that surfaced as part of the analysis:

The content analysis considered a few main articles, including discussions on design by other professionals in the built environment, such as architects, engineers and urban design practitioners. The analysis gave discussions on design equal attention because they similarly reveal values held towards practices of urban ecology. Since they appear in magazines mainly focusing on the green industry, they are worthy of consideration.

Although the kind of design projects reviewed are at different scales dependent on each project, in general the majority of landscape design practices occur at the individual property scale. Individual scale is the most common method of current practice in terms of administrating the appointment of professionals and implementation of projects. This is a practical reality opposed to the wider matrix scale recommended in most ecological work.

The researcher preferred landscape design practices accessible to the public, as this study acknowledges the effect of exposure to urban nature on societal values. Examples reviewed in the content analysis, however, included private properties with regulated entry as well.

The analysis revealed the difficulty of distinguishing between the articulations of cultural ecosystem services produced by green spaces and those articulated by both green spaces and infrastructural projects. Other authors have raised this issue as a weak point of ecosystem service analysis. Voigt *et al.* (2014) caution that infrastructural facilities and amenities strongly influence the recreational value of urban parks.

7.5.1.2 Limitations

The method employed is limited by the possibility of a strong bias among the editors with regard to their criteria for the selection of material—as well as the kinds of values articulated—which may differ from those of landscape designers at large. During the period of fieldwork and interviews, the editor of Environmental Management magazine (EM) confirmed a nationwide multidisciplinary focus for the publication. Project selection was based on innovation and good or best practice. Although

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advertising did play some role, projects featured also needed to be "meaningful" (as stated by the editor). During our interview, the editor of Landscape SA proclaimed a similar nationwide focus. Project selection was guided by what readers would find interesting but also influenced by personal interest and social connections to an extent. Featured projects were identified based on events and "happenings" within the industry. Awards bestowed are seen as a lead to what can be good potential, while visual appeal also matters. The discussions of the projects in the articles by the editor are mainly guided by the interview held with the landscape designer of such project. From the perspective of this study, it may be argued that editors and marketing agents strive to achieve buy-in from their readers—most of whom are practitioners in this industry—hence, this study assumes that the magazines provide a representative perspective of the generally pertinent concerns and related values in landscape design.

The research instrument is argued to be transparent and indicative of the raw data. The data are stable and can be studied in detail; however, the thematic coding does imply interpretation by the analyst. This can raise questions of reliability (Namey *et al.* 2007). Normative aspects are featured both in the conceptualisation of ecosystem services and in their measurement and evaluation. As explained by Jax *et al.* (2013:262), "[u]nderlying values already play a major role in how ecosystems are perceived and what is considered an ecosystem service". In this case, the researcher attempted to maintain consistency by first identifying the themes in a phenomenological way and once they were determined they were compared to the set categories of ecosystem services (TEEB 2011). The researcher interpreted all data personally over a short, one-month period. A challenge during the thematic coding of some projects was to consciously distinguish between the grey and the green infrastructure value projections as part of the same project. This is taken up in a later discussion.

The concept of ecosystem services formed part of the research questions from the onset, and in this study served to relate the findings to current scientific discourse (Ernstson 2013). Since the conclusion of the literature review recommended the inclusion of ecosystem services of all four categories but not all ecosystem services per se, the researcher only used the four main categories to compare the findings. Since the original value topics or themes were identified in a phenomenological way, it was not possible to match all these with individual ecosystem services at a later stage. In retrospect it could have been a value adding exercise but is considered beyond the scope of this study. Furthermore, ecosystem disservices (Lyytimäki & Sipilä 2009) were not ignored in the study, but they were not overtly articulated in any of the articles. The influence of disservices (such as trees interfering with CCTV cameras' views) on norms and values is undeniable.

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7.5.2 Semi-structured interviews

The researcher used the interviews as a form of triangulation and to gain a depth of understanding on matters raised by the content analysis of the magazines. The interviews allowed findings obtained from the content analysis to be tested and include experts' insights regarding tendencies and reasons for these findings. The researcher made effort to pursue contradictions, conflicts of opinion and negations, as these would uncover subjective reasoning behind opinions held that relate to values and normative positions held.

Six of the interviews were conducted in person, and the remaining six were conducted telephonically due to geographical divides. All interviews were recorded and notes were taken during the interview. A brief explanation of the purpose of the study and the nature of enquiry was emailed to the experts or explained verbally prior to the commencement of the interview. The explanation was kept broad, describing the project as an enquiry into trends and tendencies in the landscape industry over the past decade.

Initial questions were open ended and requested justifications for opinions offered to avoid respondents' answers being influenced by the researcher's bias. Lockwood (1999:394) cautions that it is important to give participants an opportunity to explore different ways of expressing their values. Any a priori framing poses limitations on constructed values (Lockwood 1999:396). The method should provide an opportunity for testing the hypotheses that people are likely to express, in the case of experts this may be prospective "cognitions regarding the essential nature of functional values" (Lockwood 1999:397) of urban nature.

In the second half of the interview, the researcher discussed research findings from the content analysis with the interviewees, with the aim of expanding the hypotheses on the relationship between variables. Here experts were directly consulted regarding their knowledge of industry, asking whether they agreed with the finding of the content analysis and whether they could identify institutional or social processes that articulate environmental importance and influence the industry. The emphasis was on gaining an improved understanding of the South African context based on experiences over time, as well as the strategic role and position of the experts. Appendix B contains the questions used in the semi-structured interviews.

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Once all the interviews had been recorded, they were analysed over a period of one month. The different questions were considered one at a time for all interviewees and the main themes that surfaced from the respondents' answers were identified and grouped in tables. Reoccurrences of themes and topics were considered in terms of weight and importance, without ignoring isolated encounters. From this analysis and interpretation of the experts' opinions, the researcher constructed a narrative for each question posed as a contextual framework of social constraints and possibilities. Chapter 9 contains these narratives. Based on the interview analysis these narratives stated the identified variables in terms of professional social practices and meanings and posed hypothetical relationships between these variables. The variables and discourses identified are discussed in Chapter 9.

7.5.2.1 Preliminary challenges of the analysis

The concept of ecosystem services is not an active part of landscape design practice currently. It is not widely employed and the researcher had to explain the different categories to experts. Consequently value articulations had to be interpreted by the researcher in terms of their significance for ecosystem services. These interpretations inevitably involve personal value judgements as in all qualitative studies. The challenge of the research was to not fall back on predetermined categories, but preserve the integrity of the data narrative through the use of contextually derived terms as is the goal of qualitative work (Terre Blanche *et al.* 2006). Only afterwards the researcher related these themes to the concept of ecosystem services.

7.5.2.2 Limitations

The small number of experts interviewed might be considered by some as a limitation to this study. There exists the temptation to judge qualitative research as less scientifically rigorous by applying quantitative research sampling principles. This depends on whether a positivist or an interpretivist/constructivist perspective is employed. As a guideline, six to 20 sampling units are recommended for a homogenous sample, depending on the duration of the interview. In terms of exploratory research, the idea is to identify the pertinent issues for a larger study which calls for fewer samples (Kelly in Terre Blanche *et al.* 2006:288). Due to the current relative homogeneity of the industry and the explorative nature of the study, the sample taken was considered representative of the population. Additionally, the duration of time experts have spent in the industry, their diverse locations and backgrounds, and testing them on the findings of the content analysis, were all efforts to get a wide representation of possible values. Furthermore, the study employed triangulation through the use of mixed methods and data sources, and in quantitative terms the large sample size and several year reviews through the content analysis balanced the smaller number of experts that were interviewed.

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This method is limited by a possible bias in the selection of the experts, which was constrained by various recommendations, as well as time and willingness of experts to participate. A second limitation is the possible effect of the researcher on the expression of values by interviewees through the questions posed and discussion thereof. According to Lockwood (1999:390):

> *When people do not have clearly defined assigned values and have difficulty in appraising a situation, then a value elicitation procedure is likely to influence the values which are expressed. […] Surveyors can therefore have a significant effect on the expression of values by the way the problem is defined and the information that is presented. One approach to addressing these problems is simply to present the person with as little information as possible. However, this increases the likelihood that the responses are not answers to the same question the surveyor has in mind. The best approach is an explicit recognition of the researcher's role in the creation and expression of values.*

In order to avoid influencing the expression of values by interviewees, the researcher made an effort not to reveal too much information about the study prior to the interview and instead opened up the interviews with personal questions that were easy to answer followed by broad general questions. The researcher refrained from using the word "value", rather referring to "issues" or "topics of concern" in the industry, which was thought to be more value neutral and non-normative. Experts were not questioned directly about their own personal practice or values, but rather consulted with regard to South African tendencies in general. These tendencies were discussed in terms of drivers and social practices that may be producing specific outcomes in landscape design practice. This may have influenced the types of answers received. Experts that have been involved in industry for at least a decade were assumed to have clearly defined assigned values and no difficulty in appraising landscape professional practice. These statements inevitably contain conscious and unconscious value projections. When dealing with the narrative the study aimed to maintain its integrity and considered context-derived themes as representative of values. Regardless, the potential role of the researcher and the specific questions posed in influencing the expression of values from experts needs to be acknowledged.

7.6 Ethical considerations

The ethical procedures stipulated by the Faculty of Engineering Built Environment and Information Technology Ethics Committee were followed and all instruments handed in for approval prior to

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commencement of the fieldwork. All interviewees signed informed consent forms on whether they desired to remain anonymous and gave consent to the recording of the interview. One interviewee requested anonymity. All interviewees permitted recording. There was no need to reveal the identities of any interviewee for the purposes of this study. The names of individuals remain anonymous for ethical reasons and due to the small size of the industry.

Permission was requested and gained in writing from the three magazine editors and publishers to use their magazines for the purpose of the content analysis. As the magazines are part of the public domain the information is not considered sensitive; however, the researcher exercised care not to imply any specific person, company or group. Appendix A contains the letter of approval from the ethics committee, a declaration and cover letter by the researcher, informed consent form signed by all interviewees and answers from the three editors on the permission request.

7.7 Summary and conclusion

The selected research design is appropriate considering the focus of the study and expertise of the researcher. Although this study falls in an interdisciplinary research field, the fieldwork focused on social values, which made it an exclusively social study. Research instruments were selected from both the constructivist and interpretivist approaches to provide a balance in terms of social structures and individual agency and experience. The fieldwork was qualitative in nature but made use of quantification in terms of the data analysis and findings. In this regard, the analysis achieved triangulation at three levels, in terms of the variety of primary data sources, theoretical perspectives used during data analysis and multiple research instruments used to study the problem. The research also followed approved ethical procedures.

Limitations to be acknowledged include possible biases imbedded in the content of the magazines, value judgements made by the researcher in the content analysis and the researcher's potential role in influencing the expression of values by experts during interviews. These are typical concerns for qualitative fieldwork studies.

Nonetheless, there are strengths behind the selected research instruments and data sources. Magazine content analysis allowed for a detailed study of data. The magazine articles, photographs and words reviewed were overt and easy to quantify. Secondly, a large quantity of design projects could be covered by the method in a short period of time. Thirdly, of the three selected magazines, each focuses on a specific market inside the diverse landscape design practice. The combination of

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the three provided a more diverse perspective of the status of design and values in the industry. Lastly, the engagement with real world issues in terms of publications filled with everyday matters and issues is a way to ascertain the appropriateness and applicability of the findings towards implementation in practice, which is the pursuit of urban ecological research.

Regarding the interviews, the experts were identified by a variety of sources and came from different backgrounds and geographic locations in general but from the main urban centres. Experts were willing and eager to share their individual experiences and open in their responses. The findings of the content analysis could be discussed with the experts, while meanings and social practices could be identified and relationships between variables questioned. These strengths, combined with prior experience of the researcher with these methods, hold promise for the findings that are discussed in the next two chapters.

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Chapter 8



aesthetics

ESS image by Jan Sasse (TEEB 2011)

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CHAPTER 8: Research Findings and Discussion of the Content Analysis

8.1 Introduction

As explained by Terre Blanche *et al.* (1999) interpretive research is centred around experiences, feelings and meanings that informants talk about, while social constructionist research looks at the way people use talk to manufacture experiences, feelings and meanings. Both these approaches were employed by this study.

Qualitative research entails asking and refining questions but is also about finding answers (Terre Blanche & Durrheim 1999). This study designed a content analysis research instrument to answer the research questions set out in Chapter 1, namely:

i) What concerns has landscape design practice in South Africa addressed in the last decade?
ii) What do these concerns disclose about contemporary values related to urban ecosystem services, for example, which ecosystem services are valued and which are neglected by landscape design practice in South Africa?
iii) Which contemporary professional social practices are articulating the value of certain ecosystem services in the landscape design community of practice?
iv) How can professional social practices operationalise values to socially produce essential ecosystem services?

The review of design projects as displayed and discussed in profession-focused magazines arguably can disclose concerns and trends regarding value systems related to reconstructed nature in the industry. The way the designs are represented, as well as the discussion in the articles, form part of a system of practices and meanings, which occurs at a collective level (Terre Blanche *et al.* 1999). During the interview process, the researcher gathered more insight into subjective experiences and understanding of contextual matters related to these questions, which is discussed in Chapter 9.

This chapter discusses the findings of the content analysis. The discussion is grouped in the following subsections (see Figure 27): (1) representativeness of the results; (2) context and narrative of the three publications; (3) articulated themes and how they relate to the concept of ecosystem services; (4) a discussion of the ecosystem services findings and tendencies over time; and (5) a preliminary discussion on the professional social practices revealed regarding the operationalisation of values.

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The chapter concludes with a note on preliminary conclusions, which are then further discussed in the next chapter once the second round of data is taken into account.

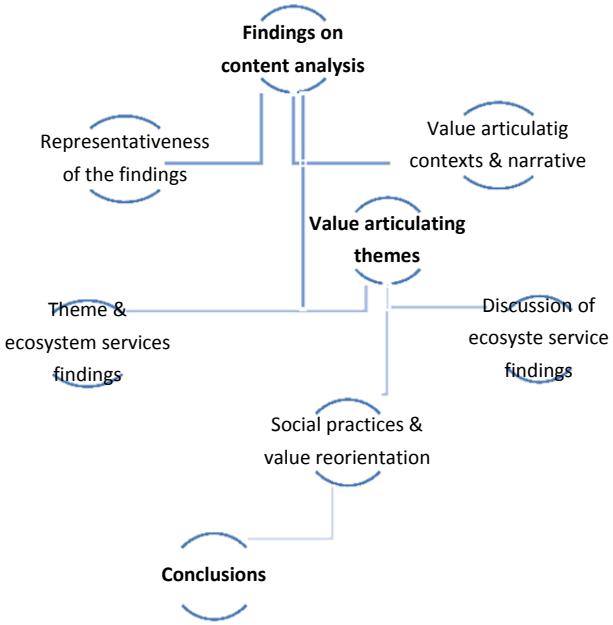


Figure 27: Graphic illustration of the chapter layout

8.2 Representativeness of the results

To capture findings on a nationwide scale is challenging, more so since it implies making generalisations. As discussed by Kellert (1985) and Aguilar Díaz (1998), content analysis is a useful instrument to reveal generally held views and interests, but publications need to be judiciously selected. The first estimation of the analysis was specifically designed to confirm whether the design projects, covered by the three magazines conjointly, contextually matched the criteria of the study. Eight different categories were mapped for each design project and featured article, most importantly in terms of the project location, access, developer, type of design and land use (see section 7.5.1 on analysis process and criteria).

As the combined findings of the magazines indicate, the featured design projects are geographically representative of the whole of South Africa (see Figure 28). The three main urban centres represented are situated in the provinces of Gauteng (55%), the Western Cape (27%) and KwaZulu-Natal (8%) (n=422)[24]. This geographic dominance was similar for the magazines individually as much as for the joint findings. The regions correspond with those identified by a UN-Habitat report on the

[24] The n-value here reflects the feature articles that were specific to and revealed their geographic location. Note that the n-value on subsequent pages varies, as not all the featured articles revealed information on all eight categories recorded.

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state of African cities (UN-Habitat 2010). Notably, the majority of all projects were either located in Gauteng or the Western Cape, which should be kept in mind when considering the findings.

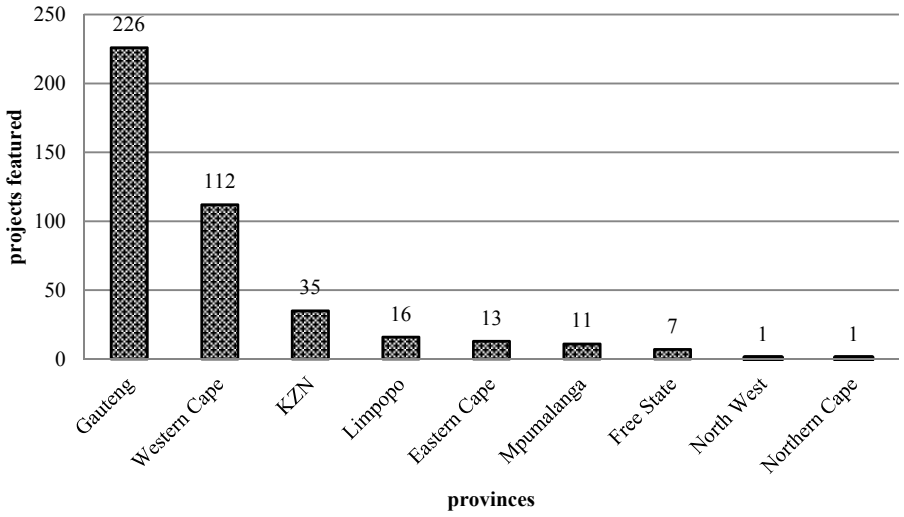


Figure 28: Location of the featured projects across the nine provinces in South Africa (n=422)

The location of the different projects is also tied to vegetation biomes, which gain reader exposure as part of the project visuals in the article or may influence the plant choice. Figure 29 shows the dominant biomes where projects have been featured. The biomes correspond to the locations of the provinces cited in Figure 28. The grassland and savannah areas correspond with Gauteng province, the Fynbos and Succulent Karoo correspond with the Western Cape, and the Indian Ocean coastal belt and Albany thicket correspond with KwaZulu-Natal (KZN).

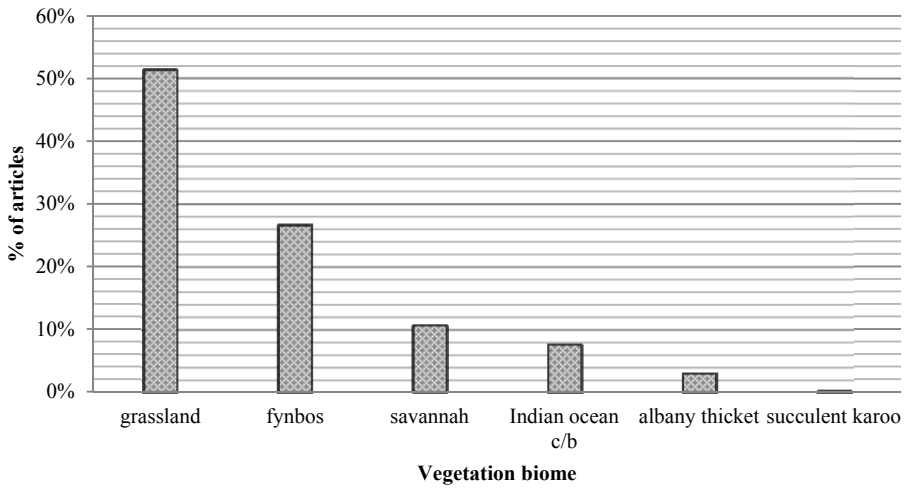


Figure 29: Vegetation biomes featured in the main articles and projects of the magazines

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As shown in Figure 30, 68% (242/352) of the featured projects were located in cities, either in peri-centre or peri-urban areas (see 7.5.1 for the analysis categories and definition of terms), which was positive as the investigation focused mainly on urban issues. Yet, all articles were considered—even those pertaining to rural areas (14%)—because urban ecosystems also include adjoining sparsely populated areas (Pickett *et al.* 2011) and rural areas have direct reference to urban areas during urbanisation. Furthermore, this study aimed to include a greater geographic spread and representation, since firms located in urban areas do the majority of landscape design in rural areas. In terms of project location, villages with a population of less than 20,000 featured least at 6%.

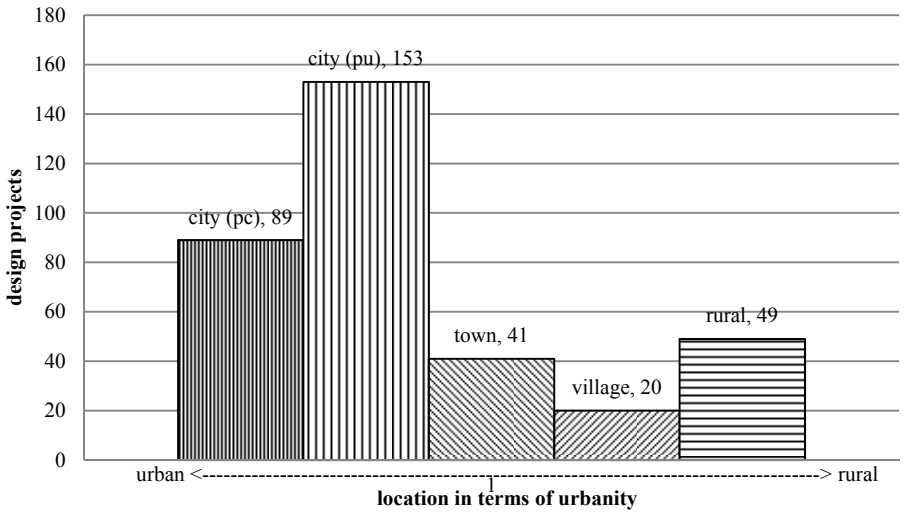


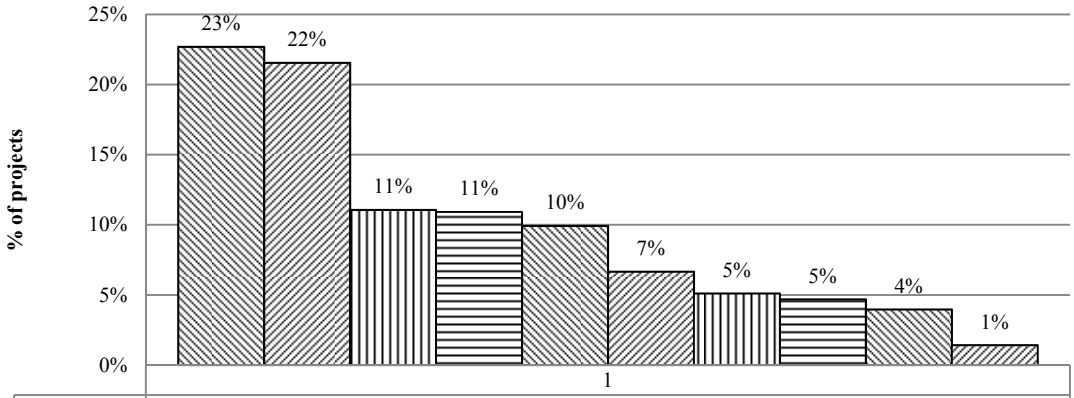
Figure 30: Location of the design projects featured in terms of urbanity (n=352)

This research focused primarily on landscape design (57% of the projects). However, the content analysis also included designs by related professions—architecture (22%), engineering (15%) and urban design (6%)—because they reveal values held towards green infrastructure practices. Landscape design projects accessible to the public amounted to 45% (n=355). The remainder of the projects were private properties with gated entry. Sixty per cent of the projects were private developments, as opposed to state-funded projects. The research included the last two criteria to consider how many of the designed projects were accessible to the general public.

A total of ten different land uses were distinguished, most projects being either recreational or large-scale residential projects, followed by infrastructure, office retail and commercial projects, respectively (see Figure 31). The amount of residential projects is significant but equal to

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recreational, public green space projects. This is a positive result since it implies that the results are representative of private and public decision-making agencies and user groups concerning green space preferences. Infrastructure projects, which are largely associated with more rural settings, are also noteworthy since while the infrastructure function is always culturally functional, the ecosystem services associated with the project may not be. This was important to reflect on during the analysis of the infrastructure projects, in terms of ecosystem service identification.



	1
residential	23%
recreational	22%
infrastructure	11%
retail: office	11%
commercial	10%
institute	7%
industrial	5%
retail: hotel	5%
mix	4%
conservantion	1%

type of project land use

Figure 31: Land uses of featured projects by percentage

It was not clear from the outset whether the projects covered by the magazines could be regarded as representative of landscape design practice nationwide. Due to cultural and historical diversity in South Africa, findings with different nuances will likely be obtained if smaller geographic regions are studied within the country. However, the data discussed here demonstrates that the reviewed projects provided a balanced representation regarding landscape design practice, considering location, access, developer and land use. Crucially, 68% of the projects were located in urban areas, and 56% were specifically landscape design projects.

The findings revealed by the content analysis are discussed first for each of the three magazines individually to reveal how each magazine employs specific contexts and languages.

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8.3 Value articulation contexts and narrative

This subsection discusses the specific context and narrative created by each magazine and the types of values articulated. Besides the topics of concern, the location and types of design projects featured also revealed specific contexts or narratives within each magazine. The front covers of the magazines—crucial in terms of identity and intended audience—were analysed visually in terms of the types of images used. The context of each magazine is discussed with reference to similarities and contrasts among them.

All three magazines situated most of their projects in urban areas (see Figure 32), including both peri-urban city (pu) and peri-centre city (pc) categories. Strikingly, of the three magazines, EM magazine had most featured projects in rural settings, while Urban Green File (UGF) had most projects in peri-centre city (pc) areas and Landscape SA had most projects in peri-urban city (pu) areas (see Figure 32).

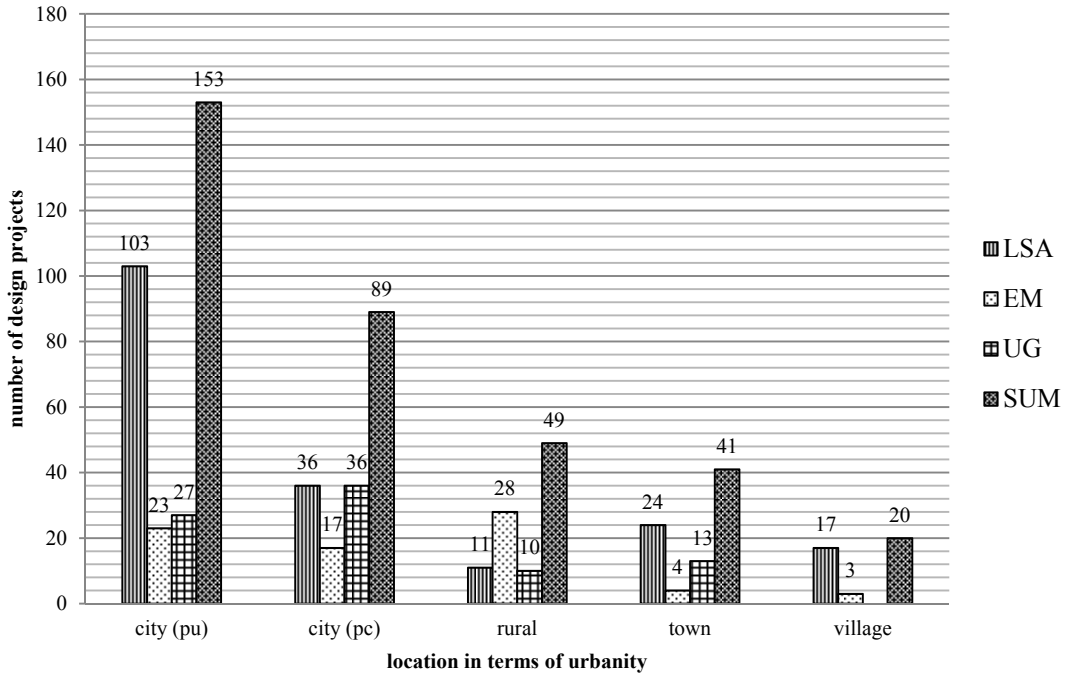


Figure 32: Location in terms of urbanity of design projects featured by each magazine

These distinctions are related to and reflected in the different project land uses (see Figure 33). All three magazines featured a majority of projects for either recreation or residential land use. In terms of distinctions, EM had far more infrastructure and industrial land uses, which is characteristic of rural settings. UGF had more mixed-use projects than the other magazines, which is typical of peri-

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centre city districts. Meanwhile, Landscape SA had the most residential projects, which is common for peri-urban areas in South Africa.

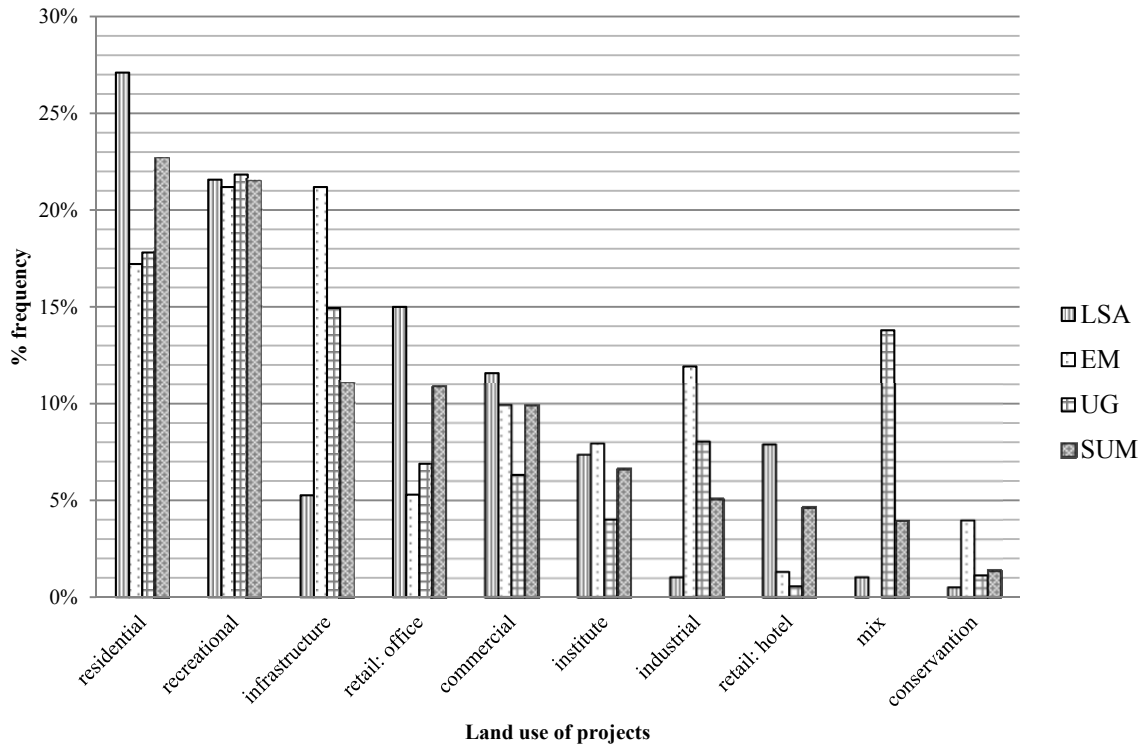


Figure 33: Land uses of the projects featured in the magazines

These locations and project land uses are also in accordance with the nature of the project design type. EM distinctly featured more engineering design projects than any of its peers, which relates to the infrastructure and industrial nature of the projects; UGF had more urban design projects, typically employed in mixed-use urban-centred projects; Landscape SA featured mainly landscape design projects, large-scale residential, situated in suburban areas (see Figure 34).

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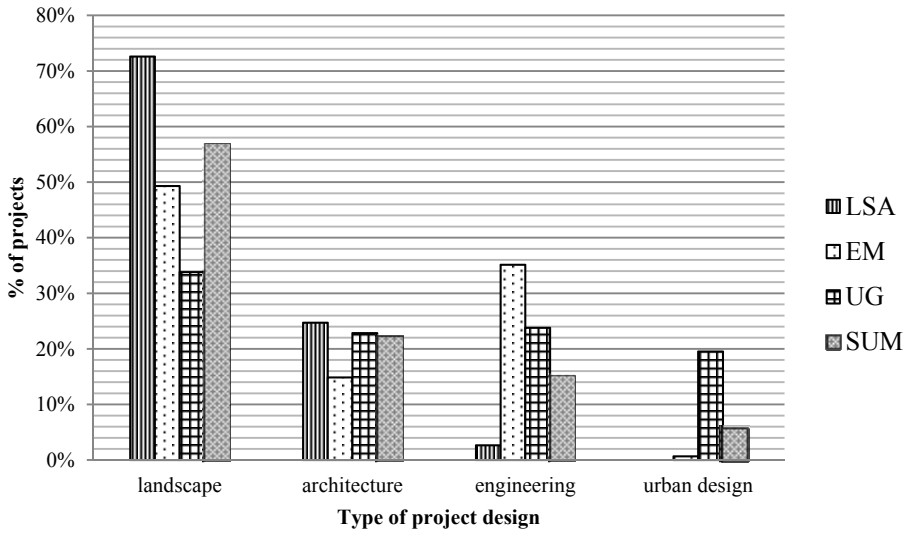


Figure 34: Type of project design featured in the magazines (by percentage)

In terms of the front cover images of the magazines, the analysis identified several trends. The majority of EM covers featured images of nature without factory-made elements or with at least some natural features in the background (see Figure 35). Landscape SA covers often featured manicured gardens and horticultural images, while UGF covers mainly made use of illustrations of the design process, mainly containing references to urban development and recreation facilities (see Figure 36).

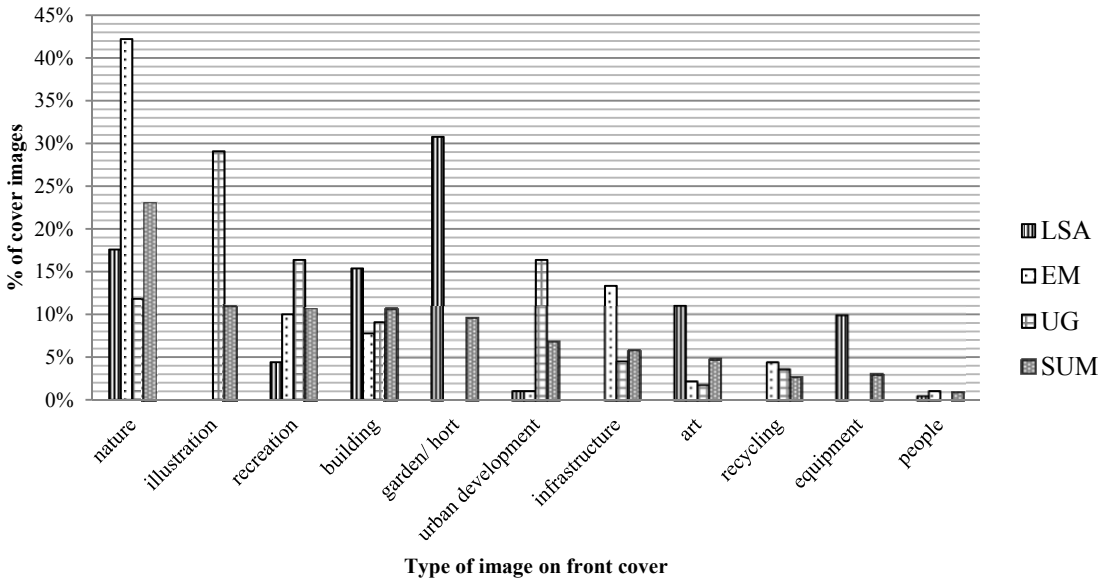


Figure 35: Front cover images of the magazines (by category)

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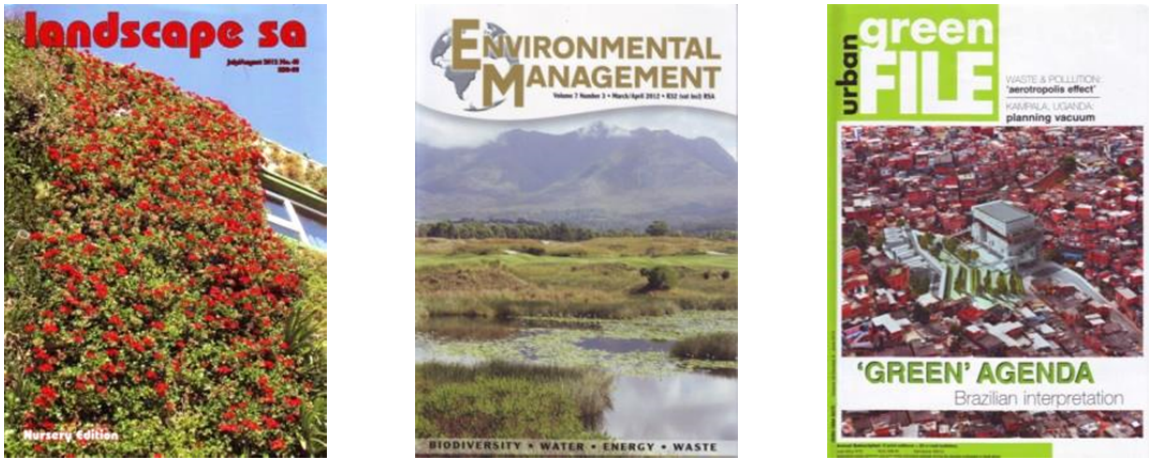


Figure 36: Front cover images of the magazines (2012): Left to right: Landscape SA, Environmental Management and Urban Green File

Source: Landscape SA (2012, June/Aug 48: cover); Environmental Management (2012, March/April, 7(3): cover); Urban Green File (2012, June, 16(8): cover).

By matching the front cover images with the ecosystem service groups they purport to articulate, the following patterns are observed. Firstly, the cover of EM magazine articulates Regulating and Supporting Services, while Landscape SA articulates Cultural Services and UGF articulates an equal amount of Cultural and Regulating Services (see Figure 37).

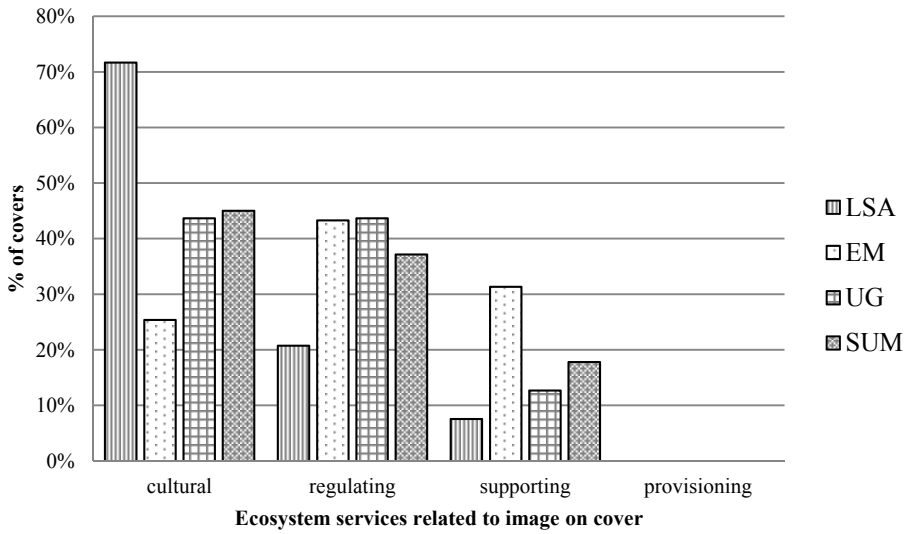


Figure 37: Ecosystem services as related to the front cover images of the magazines

Lastly, the study considered the topics of concern articulated inside the feature articles and associated design projects. EM magazine, as per its slogan on the front cover, is mainly concerned

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with sustainability, recycling and biodiversity. The dominant themes of UGF are sustainability, community matters and recycling. Landscape SA focuses more on design, aesthetics and horticultural plant choice, along with social and community matters (Figure 38).

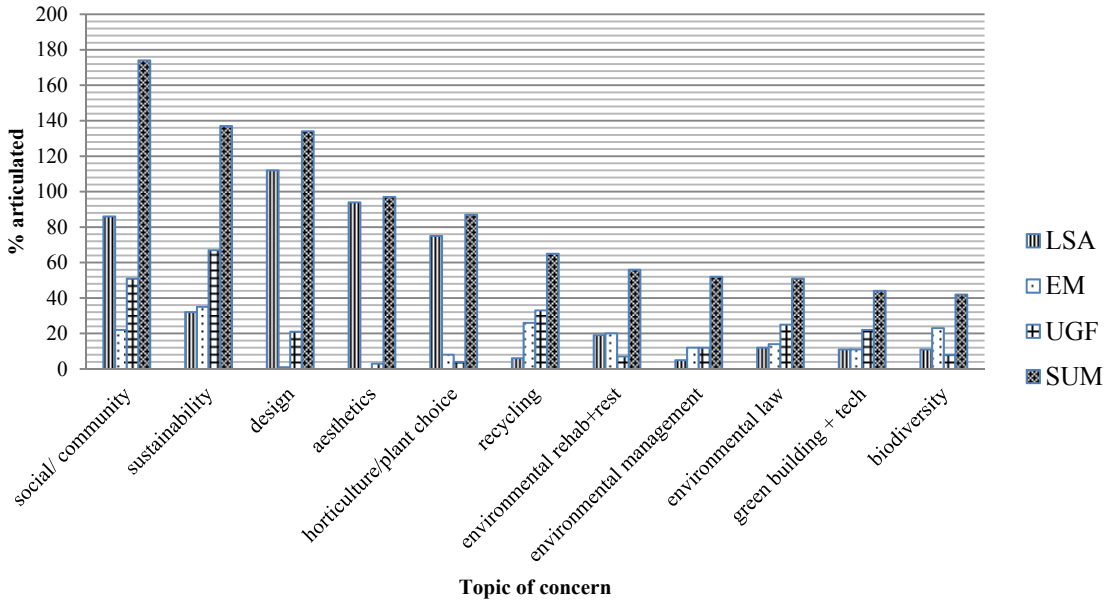


Figure 38: Topics of concern articulated in the feature articles of the magazines

In the content analysis, topics of concern were matched with the articulated ecosystem services. The findings were very similar to what the front covers articulated in terms of ecosystem services. Landscape SA focuses primarily on Cultural Services, while EM and UGF articulate more Regulating Services. EM gives equal attention to Supporting and Cultural Services, and UGF focuses more on Cultural Services (see Figure 39). The articles are more nuanced than the front cover images, but reiterate a similar articulation of values.

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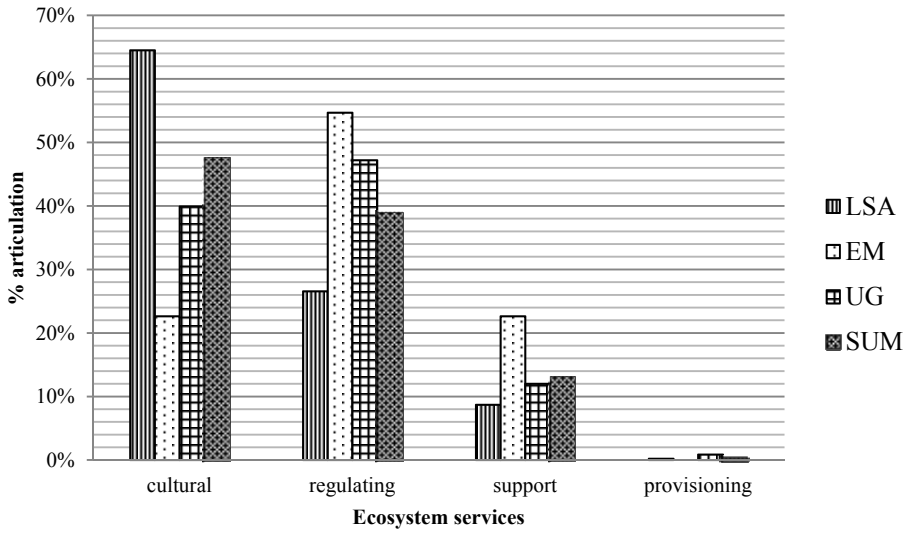


Figure 39: Ecosystem services articulated by feature articles in the magazines

The next section summarises the findings from the analysis into a narrative language for each magazine.

8.3.1 Summary of individual narrative of magazines

Environmental Management (EM) magazine, as the name reveals, is mainly "focused on the principles of sustainable development: biodiversity and ecosystems management, water and energy conservation, and waste management" (rating card, see Appendix C). Each issue carries a subtitle on the front page: "Biodiversity. Water. Energy. Waste." The editor remained the same throughout the period of the analysis. Regular features include "making the indigenous choices"; "controlling invaders" and "environmental law matters". The publication has a prescriptive narrative towards human choice and action and what is right and wrong in terms of the environment. This narrative resonates with that of "ecology in cities" where humans are seen as opposing, separate and harmful to nature and natural areas should be protected by keeping humans away or controlled (see Figure 40). The magazine employs expert opinion and the law to legitimise this narrative and stipulate control measures.



Figure 40: Headline of an article in EM magazine (Nov/Dec 2009, 5(1):13)

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The publication mainly articulates Regulating Services in terms of sustainable resource use and management but also manages to cover more on Supporting Services than its peers, featuring biodiversity and habitat issues pertinently, but mostly outside urban areas. It publishes more projects of conservation nature than any of the other magazines (see Figure 33) and includes many unspoiled natural areas in its articles. This goes along with many images of nature, animals and birds on the front cover with a pro-environmental narrative. In terms of design, this is best related to infrastructure and industrial engineering projects—for example, pipelines, dam walls, and new roads (Figure 34)—that run through non-urbanised areas. In this regard, most professional advertisements are from environmental consultants and products, often connected to rehabilitation work.

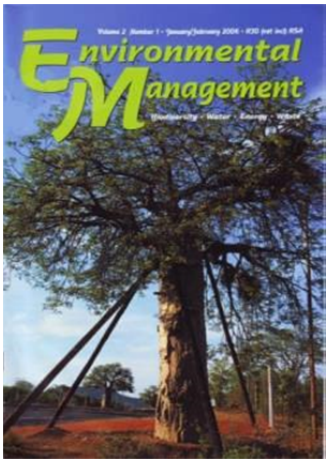


Figure 41: Front cover of Environmental Management magazine (January 2006, 2(1): cover)

Image of Baobab trees, which were relocated to make way for an upgrade of the N1 highway in Limpopo Province, South Africa

EM addresses advanced ecological topics such as renewable energy, carbon sequestration, biodiversity gardens, payment for ecosystem services and general rehabilitation projects related to invaders, wetlands and endangered species. In a seemingly awkward contrast, “golf course management” was a regular feature of the magazine until January 2011. The role of the informed citizen and professional—if somewhat elite—in local environmental and also community matters has prominence.

The Urban Green File magazine is focused on “the custodians, planners, designers and managers of the urban environment…people who specify all the products and technologies used in the development of infrastructure in our cities” (rating card, see Appendix C). The magazine had seven different editors over the nine-year period, which makes it the least consistent in terms of layout and regular features. The first editor who lasted over a year started the Environmental Management

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magazine in October 2005. Thus, initially it had a larger environmental focus with regular features on "identifying invaders" and "words on waste". This focus became more socially urban with features such as "tree of the issue" and "battle of the burbs". The first feature ties in with, yet socially reframes, former angles, while the second entails social comparisons between and preferences for urbanised areas. In later years, the "tree of the issue" also fell away, while features stimulating critical engagement in urban matters prevailed. These features include "inspiration" and "insult" that praised or critiques development trends and "expert viewpoint" features, which voice specific social opinions from the editor. The publication remained throughout this period a highly urban-based magazine, which talks about reconstructing environments through urban development and urban design.

Since 2006, "city visit"—which highlights specific urban centres throughout the country—has been a regular feature. The magazine features an equal spread of design projects between landscape, architecture, urban design and engineering. It thus draws on a broader design audience with a focus on mixed-use and recreational projects. Professionals who advertise their services in UGF are mainly environmental consultants and landscape architects. The Institute for Landscape Architecture in South Africa (ILASA) awards have also been regularly featured by the UGF. Figure 42 shows a headline from an article in June 2009.



Figure 42: Headline of an article in UGF magazine (June 2009, 14(2):8)

Since 2008, "Green Building" became a regular feature, which resonates with the pro-technological and expert narrative employed by the magazine to legitimise its perspective (see Figure 42). In this regard, the publication features sustainable design and social community issues. It articulates Cultural and Regulating Services as provided through expert intervention in terms of design with regular features such as "waste and pollution management" and "environmental planning and design". The many urban development illustrations on the front cover (see Figure 43) emphasise the human centred narrative, which arguably resonates with the "ecology of cities" as being completely urban-based and a product of human intentionality.

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Figure 43: Front cover of Urban Green File magazine (April 2010, 15(1): cover)

Image of proposals from a competition for a new inner-city park in Johannesburg, Gauteng Province, South Africa

Landscape SA is centred on the "green industry: new landscaping projects (both from the design and installation aspects), interior plantscaping, horticulture, cut flowers, nurseries, turf management, irrigation, machinery, golf courses, and environmental issues" (refer to rating cards in Appendix C). This includes the entire green horticultural industry in South Africa, with a focus on residential and recreational projects, with most projects at a suburban level (see Figure 33 and 44). The magazine had a consistent editor in place for the period of the analysis. Regular features include projects along the following themes: turf management, machinery, cut flowers, horticulture, irrigation, landscaping, recreation and environment.

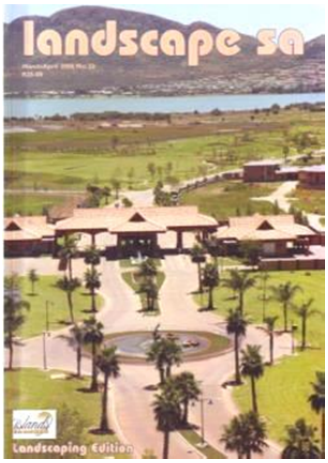


Figure 44: Front cover Landscape SA magazine (April 2008, 22: cover)

Image of a housing estate entrance near Hartbeespoort Dam, Gauteng Province, South Africa

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The publication features far more landscape projects than any other type of design. Professionals who advertise in the magazine are mainly focused on construction and implementation, while many products are also advertised. A far greater amount of articles and therefore also more design projects are featured per issue than in the other magazines. This is because the focus is on showcasing new landscaping projects with a somewhat uncritical stance that informs rather than voices strong opinion (see Figure 45). The publication is primarily focused on social aspects and plays on cultural aspects like design, aesthetics and plant choice in project discussions.


2009 ILASA AWARDS OF EXCELLENCE

The 2009 Awards of Excellence for ILASA (Institute of Landscape Architects of South Africa) took place in September at the Radisson Blu Hotel, Gauteng. The awards are held every second year and this year, 29 entries were received across five categories. The 13 winning projects are given below.

Excellence in Design – Projects Under Construction

- Khayelitsha Harare Precinct 3 by KALA
- Serengeti Golf and Wildlife Estate by Inside Landscape Architects

Excellence in Design – Project Proposals

- Corniche Bay Resort, Mauritius, by Newtown Landscape Architects and Greenlinc Joint Venture

Figure 45: Headline of an article in Landscape SA (Sept 2009, 31:28)

In terms of legitimising its specific context, the main narrative is one of group consensus and things held in common among different aspects of the green industry. Most aspects are not questioned but rather included. Experience in the field and results—in terms of implemented projects—are emphasised rather than expert opinions and technology. The magazine regularly features the South African Landscape Institute (SALI) awards and the South African Green Industries Council (SAGIC) convention, among other group activities.

The three different narratives were important to unpack since they represent the view of three distinct marketable audiences in the South African landscape design industry: The environmentalist; horticulturalist; and built environment designer. Preferences and values can be distinguished by these three narratives which also bear implications for urban nature in terms of design outcomes. The narrative languages reflected and employed by the magazines are indicative of the combined findings, which are discussed in the remainder of the chapter.

8.4 Value articulation themes and discussion

The main objective of the review was theory-driven; it aimed to establish base values held regarding urban nature in the landscape design industry. As Goulder and Kennedy (1997:23) explain, "[s]ociety cannot escape the value issue: whenever societies choose among alternative uses of nature, they indicate (at least implicitly) which alternative is deemed to be worth more". The analysis pursued a balance between consistency and open flexibility (Namey *et al.* 2007). The thematic analysis was

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therefore also data-driven; themes or value orientations identified in the literature review in similar contemporary studies were not considered or used a priori. In total, the review identified 26 different local themes or sentiments towards reconstructed urban nature as articulated by the magazines. The topics identified in the analysis are listed in the left column of Table 18. The theme findings are discussed in more detail in section 8.5.

As a matter of interest, after the analysis was completed, the researcher compared the themes with the Landscape Values (Rolston & Coufal 1991) and social value types identified by former studies and contemporary authors (Alessa *et al.* 2008; Van Riper *et al.* 2012) as discussed in 3.5 (see Table 18). Notably, the studies of the above authors were located in national parks and natural environments as opposed to the design projects reviewed in this study, which were facilitated assemblies mainly in urban environments.

Table 18: Comparison of 26 topics articulated by the magazines with Landscape Values and social value types identified by other authors

Topics of concern in landscape design/reconstructed nature in SA (author 2013)	Landscape Values (Rolston & Coufal 1991)	Social value types (Alessa *et al.* 2008)	Tangibility (Alessa *et al.* 2008)
Environmental management; Environmental restoration/rehabilitation; Biodiversity; *Horticulture/plant choice; Habitat;*	Biotic diversity	Biological	Tangible
Identity; Law/environmental control;		Cultural	
Heritage;	Natural history	Historic	
Social/community (tourism, safety etcetera);	Recreation	Recreation	
Urban renewal;	Economic	Economic	Intermediate
	Habitat;	Wildlife	
Aesthetics; *Design; Horticulture/plant choice*;*	Aesthetic	Aesthetic	
	Intrinsic	Intrinsic	
Urban agriculture/permaculture; Sustainability; Waste; Water wise; Pollution management; Mining rehabilitation; Climate change; Renewable energy; *Recycling; Resource management;*	Life support	Life sustaining	
Green Building/technology; Education; *Design;*	Scientific	Learning	Intangible
Recycling; Resource management;		Future	
Sense of place;	Spiritual	Spiritual	
Medicinal plants; *Sense of place;*		Therapeutic	

**Italics indicate topics that fall into more than one category.*

Source: compiled by author (2014)

Significantly, regarding the comparison that can be observed in Table 19, most landscape design themes identified in this study could be matched to some extent with landscape and social values identified by the other authors. However, some concerns matched more than one value in terms of the specific nuances of the local social discourses. The tangibility of values as identified by Alessa *et al.* (2008), for example, did not reveal any significant inclination. What was, however, significant about the comparison is that no *intrinsic*, *habitat* or *wildlife* value expressions were identified as

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such in the research as articulated by landscape design projects in South Africa. These are both important social and natural aspects of resilience. The importance of vegetation as habitat has been emphasised by (Cilliers & Siebert 2011), which is a fundamental condition for urban biodiversity and the security value (Gómez-Baggethun & Barton 2013) it provides. Secondly, Lockwood (1999) stresses the importance of the articulation of Intrinsic Value for environmental concerns in people.

The themes were consequently arranged according the four value types identified by Jax *et al.* (2013) in terms of values in environmental ethics (see Table 19). This comparison further highlighted the tendency of zero articulation of Intrinsic Value, with most themes identified as residing with Instrumental Value "as a means to something else", which is the direct opposite of Intrinsic Value. Both Eudaimonistic and Fundamental Value groups were well articulated. Notably, the themes of *biodiversity* and *habitat* were expressed as Fundamental Values rather than Intrinsic Values. This coincides with findings by Stern and Dietz (1994), who concluded that there is no clear distinction in public consciousness between valuing nature in itself and valuing nature because of the human benefits it provides. Gardner and Stern (1996 in Lockwood 1999:388) claim that their data indicated that there is no widespread eco-centric orientation in Western cultures, yet there is strong support for environmental protection. This seems to reflect the case of the current findings where Fundamental Values were articulated but no Intrinsic Values.

Table 19: Comparison of value themes with those identified in environmental ethics by Jax *et al.* (2013) and environmental psychology Thompson and Barton (1994)

Intrinsic value in and for itself that implies moral obligation towards it (biospheric);	**Fundamental Value** as a basic condition for life on earth (non-use; biospheric);	**Eudaimonistic Value** as a basic condition for good human life (non-use; altruistic/egotistic);	**Instrumental Value** as a means to something else;
Eco-centric		**Anthropocentric**	
	Environmental management; Environmental restoration/rehabilitation; Biodiversity; *Horticulture/plant choice; Habitat;*	*Sense of place;* Heritage; Identity; Aesthetics; *Design; Horticulture/plant choice;* Social/community (tourism, safety, etc.); Education;	Functional utility (use; altruistic/egotistic). Medicinal plants; Social/community (tourism, safety, etc.); Urban agriculture/permaculture; Sustainability; Waste; Water wise; Pollution management; Mining rehabilitation; Climate change; Renewable energy; *Recycling; Resource management;* Green Building/technology; Education; *Design;* Urban renewal; Law/environmental control

**Italics indicate topics that fall into more than one category.*

Source: compiled by author (2014)

As the data reveals, reconstructed urban nature is professionally regarded as inherently beneficial to humans and not valued intrinsically. Lockwood (1999) posits that limited forms of value articulation by institutions—which exclude Intrinsic Value of nature—will encourage those who interact with these to abide by the same limits. From this perspective, arguably, the lack of acknowledgement of

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Intrinsic Value can be reflective of a cultural specific attitude towards reconstructed nature in South Africa, which is endorsed by designers. Yet, such an allegation would require further research to confirm its veracity.

8.5 Combined theme and ecosystem service findings

8.5.1 Themes

The three data sets were added together to achieve a united narrative for the three magazines conjointly. The aim was to reach a perspective of the collective effect of the magazines in terms of value articulation seen as reflective of landscape design practice. In terms of the combined findings, Figure 46 displays the 11 most frequently articulated topics. The most articulated topic was social concerns related to the community, that is, the everyday socio-economic well-being of people and how landscape design projects address these (14%, n=1228). The second most common topic was the goal of sustainability—ways in which resources and energy are saved through built environment design initiatives. Many articles did not consider it necessary to comment on much other than a design itself and the aesthetic elements of the design. Design as a science and an art form thus came in third place, closely followed by aesthetics. The fifth most mentioned topic was horticulture and plant choice, with different cultural norms used as a rationale for plant selection. The topic of environmental restoration and rehabilitation was of particular interest for the study and came in seventh place (5%). Biodiversity only took eleventh place, with an occurrence of 3%.

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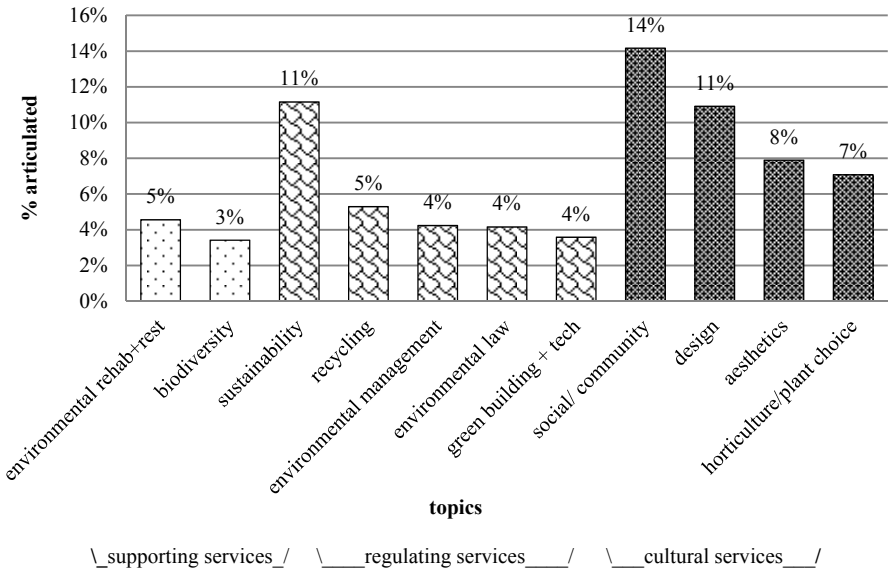


Figure 46: Most recurrent topics of concern, 11 out of 26, by percentage of articulations in feature articles

Note: n=1228; The 658 feature articles containing 355 design projects, often articulated more than one concern/topic. The 'n' value reflects the total number of times a topic was articulated. A full value was assigned every time a topic occurred, irrespective of the number of topics identified per article.

8.5.2 Theme discussion

These results were compared with a study by Van Riper *et al.* (2012) that used onsite surveys in a national park setting in Australia with predetermined value groups (as indicated in Table 5 and 18 and formerly discussed in 3.5). In the study, the values most selected by national park visitors were recreation, with aesthetics and biodiversity in second place, followed by future, therapeutic, and intrinsic, respectively. In terms of comparison, notably, the first few categories in both studies resemble each other with "recreation" corresponding to "social and cultural concerns" and "aesthetic" corresponding to "design" and "aesthetics". Similarly, concerns around the "future", which took fourth place in the national park study, corresponds in a way to issues around "sustainability", which was the second most articulated topic in this study. What differs between the findings of the two studies is the position of "biodiversity" in second place in the national park study, which only came in eleventh place in this study. Horticultural plant choice, which came in fifth for this study, did at times also refer to aspects related to local biodiversity, such as indigenous plant choice. However, aspects of biodiversity, therapeutic value and Intrinsic Value highlighted by Van Riper *et al.* (2012) may be related to natural settings and less to facilitated urban landscapes, or may be telling of cultural attitudes and local social discourses particular to each setting. Such speculation is further verified later in this study.

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8.5.3 Ecosystem services

The themes were grouped according to the main type of ecosystem service categories (MEA 2005; TEEB 2011) with which they were associated. Figure 47 presents a summary of all the topics matched with each of the four ecosystem service categories.

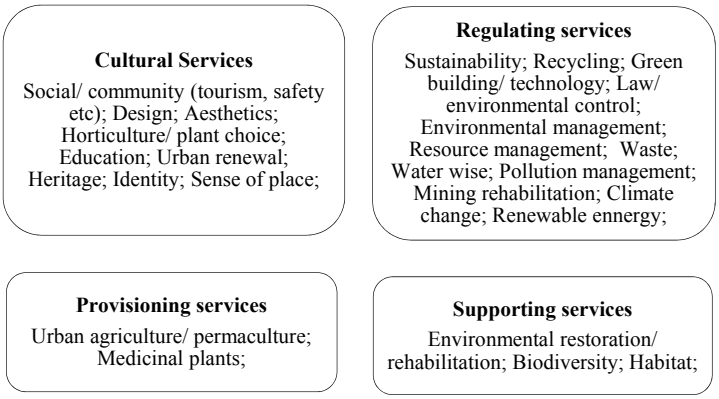


Figure 47: The 26 topics of concern, ranked by frequency, associated with each of the four types of ecosystem services

Source: author (2014)

Figure 48 compares the representativeness of the four types of ecosystem services. Of the 1228 reviewed articles, 47.5% (n=915[25]) primarily articulated the importance of Cultural Services, while 39% mainly articulated Regulating Services. This contrasts dramatically with a lower emphasis on Supporting Services (13.1%) and Provisioning Services (0.3%). These findings are an important part of this research and are discussed in the next section.

[25] Note that although the feature articles articulated 1228 topics, sometimes different topics in one article represented the same ecosystem service type. For this reasons the n-value for total articulation of ecosystem service types are 915 and fewer than the total articulation of topics.

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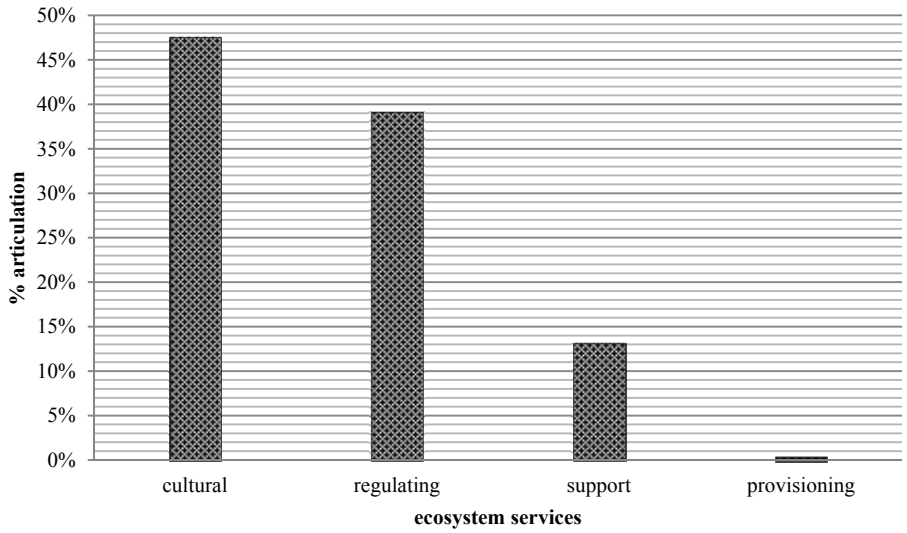


Figure 48: Four types of ecosystem services by percentage of articulation in topics of concern

8.6 Discussion of ecosystem service findings

The findings reveal a clear imbalance between the frequency with which professionals articulate Cultural and Regulating Services values, as opposed to Provisioning and Supporting Services. Provisioning Services are generally appreciated more in developing or rural areas, where people depend directly on nature for food, firewood, water, and construction material. In Africa, these often collectively owned services are also gathered and sold to supplement household income (Egoh *et al.* 2012:72). However, as people move to city environments, these services are often not available to them any longer, and the direct dependence of people on nature is lost. Even the layout of the home gardens of some ethnic groups in South Africa may change radically (with more Cultural and fewer Provisioning Services) as people become more 'Westernised' and move to cities (Molebatsi *et al.* 2010). In large cities, most of the Provisioning Services, such as water and food are outsourced beyond the city boundary (O'Farrell *et al.* 2011). This may partially explain the findings of the study, since the majority of the projects reviewed were urban. A lack of knowledge and the required revision of municipal bylaws to facilitate utility and community gardens are possibly further reasons.

Given that 20% of South African households have inadequate access to food and only 20.7% actually produce food (DAFF [Department of Agriculture, Forestry and Fisheries] 2010), food gardens can supplement household income (Egoh *et al.* 2012) and help to reduce vulnerability. Such practices, as part of multifunctional spaces, also have the power to reconnect urban dwellers with their interdependence on nature, which can improve public support in dealing with global environmental

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challenges (Barthel *et al*. 2010). For example, in urban Stockholm, Barthel *et al.* (2010:263) found that allotment gardens provided fertile soil, flowers and vegetables, but also produced services such as pollination and pest control, which are beneficial to the broader urban landscape. They argue that the "stewards of urban green areas, like those engaged in allotment gardens, and the social memory that they carry may help counteract further decline of critical ecosystem services" (Barthel *et al.* 2010:264). Thus they suggest that urban food gardens are central elements of sustainable urban development and form part of urban governance for resilience (Barthel *et al.* 2013). The analysis reveals that landscape designers in South Africa install some food and medicinal gardens, but the importance of the Provisioning Services of nature receives a disproportionate lack of attention in the social production process.

With regard to Supporting Services, according to the analysis, the need to incorporate diversity and habitat into city environments is not perceived as essential in current design practice. Closer inspection of the data reveals that, comparatively, a higher percentage of projects located in rural areas (51%) are associated with Supporting Services, compared to projects located in towns (22%) and projects in cities (16%). This phenomenon may be due to competition with other social priorities in urban areas, as well as a common misunderstanding that biodiversity has few direct benefits to humans and little relevance to cities (Ahern 2012). However, aspects of stability, functioning and sustainability of ecosystems depend on biodiversity, which reflects the increased functional roles possible in those areas with more species (Tilman 1997). According to Ahern (2012:4), we should also understand urban biodiversity in the context of response diversity that can serve as a key resilience capacity building factor in reaction to the effects of climate change. The spatially explicit function and services of biodiversity need to be assessed in more definite terms to allow greater weight in design decisions (Ahern 2012). Hermann *et al*. (2011) and Steiner (2014) caution that the importance of ecosystem functions should not be neglected in deliberations of green infrastructure and ecosystem services.

In cities, Regulating Services, although they are not all highly visible or cherished, are generally considered most valuable (Costanza *et al.* 1997), as these services need to be supplied on site (Egoh *et al.* 2012). A lack of Regulating Services, such as temperature and storm-water regulation, has an immediate effect on human comfort and urban functioning; they are more evident and easier to quantify. The "engineering" approach to green infrastructure in South Africa has possibly increased the awareness of Regulating Services. Although often substituted by grey infrastructure, design for Regulating Services is growing due to affordability and sustainability. Yet, Roberts *et al.* (2012)

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caution that these services are not necessarily more affordable but are more cost effective, adaptable and have co-benefits.

Cultural Services include recreation and physical health, aesthetics and spiritual benefits (TEEB 2011), as well as heritage values, cultural identity and tourism (MEA 2005). The articulation of Cultural Services in the articles reviewed may be related to the current socio-economic and historic-political reality in South Africa, which is considered an indirect driver of change for ecosystem services (MEA 2005). South Africa is only two decades into democracy, and the overall socio-political thrust is focused on greater social equity. In addition, a large number of design projects in democratic South Africa have related to celebrating a wider heritage and cultural identity since democracy. Hosting the FIFA World Cup event in 2010 also drove the design agenda in South Africa, since the mega event called for large-scale sporting facilities and fan park developments throughout the country. All these projects contributed in some degree to the articulation of social and Cultural Services associated with urban nature. While rarely considered in studies, countries become increasingly dependent on Cultural Services during economic development (Molebatsi *et al.* 2010; Plieninger *et al*. 2013). The direct experience and appreciation of Cultural Services combined with their holistic nature can make multifunctionality in green infrastructure management possible (Plieninger *et al.* 2013). Tengberg *et al.* (2012) also allude to the possibilities of relating cultural heritage and environmental resource management, and the potential this holds. However, currently a relationship has not been established between these concepts in South Africa.

No clear changes in tendencies with regard to ecosystem services articulation could be identified in the articles analysed from the nine-year period. Cultural and Regulating Services were continuously emphasised more strongly than Supporting and Provisioning Services, and all the services remained within a ten per cent range (see Figure 49). The focus on Cultural versus Regulating Services seems to be oppositional—whenever one increased, the other diminished—which indicates a potential trade-off between them. The dominant articulation of Regulating Services in 2006 may be a reflection of a period of positive economic growth—prior to worldwide economic collapse in 2008—on professional values. However, there is a discrepancy between landscape design professionals' perceptions of the importance of ecosystem services and those of researchers, in terms of the relative importance given to ecosystem services.

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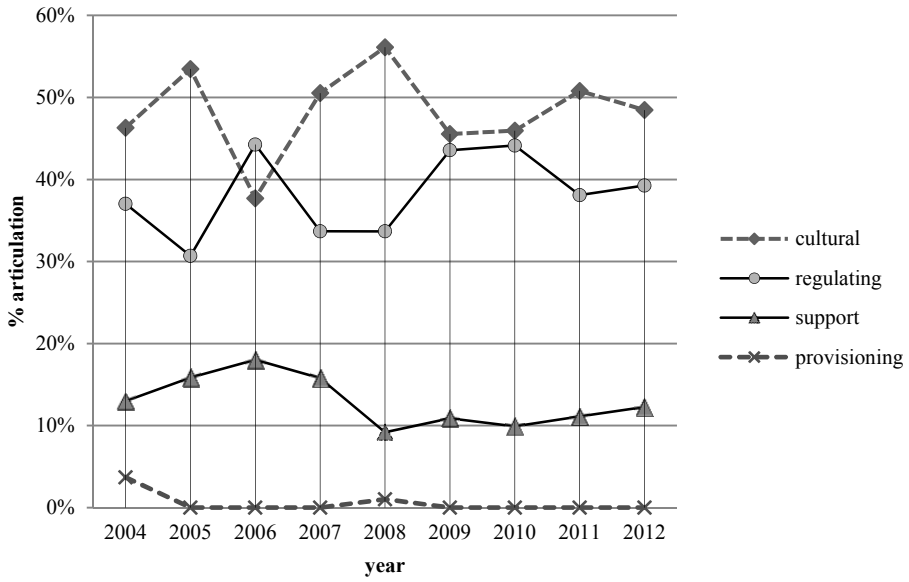


Figure 49: Articulation of the four types of ecosystem services (2004-2013, by percentage)

8.7 Preliminary considerations on operationalisation of values

This study reveals the importance of the existing underlying values regarding urban nature in landscape design practice. Further, held values influence assigned values and ultimately belief and behaviour (Ives & Kendal 2014) even beyond the landscape industry itself. To increase the value that practitioners accord to Provisioning and Supporting Services, the relation of these services to topics that were deemed important by them (such as social and community affairs, sustainability, design, aesthetics, or horticultural plant choice) can be made more explicit, in the framing of messages and communication (Schultz & Zelezny 2003). Chapter 10 considers these possibilities in more detail.

The content analysis of the profession-focused magazines in this study allowed influential professional social practices to be identified as important to the industry. The design practices are speculated to play a role in social norms in terms of assigned values and decision-making among landscape designers (Ives & Kendal 2014). These professional social practices were rating systems with economic incentives; the law, which is related to state authority and prosecution; and award systems by different institutions based on norms inside the profession. Each of these systems produces artefacts, in terms of actor-network theory (Latour 2005), which can be employed to give weight to arguments around land use.

When considering the potential of these professional social practices with regard to the value creation studies considered in Chapter 4, Mansbridge (1994:147-8) explains that moral or altruistic

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motivation is less susceptible to compromise than punishment or material benefit. For this reason, it can be argued that though encouraged by Box (2011) as targets of tangible achievement, rating systems when tied to economic incentives are negotiable as a norm changer (Pretty 2003). Legal incentives, also encouraged by Box (2011), fall into the same category, since motivation is extrinsic in the form of punishment. Swaffield (2013) argues that practitioners regard the law as on par with scientific knowledge and in this way shapes professional values. Although this is to be expected, in South Africa, despite many good frameworks and policies (Du Toit & Cilliers 2014), problems surrounding law enforcement and policing are recognised as a matter of concern, which reduces the perceived power of the law.

Research shows that existing forms of social organisation rely on both moral motivation and material sanctions (Mansbridge 1994). For this reason, award systems appear to be the most immediate and practical value promoter of the three. Award systems not only promote advertising and business but also can be used to correct misperceptions about ecosystem services and biodiversity; to persuade through public figures such as judges and winners; and to influence learning from co-members with improved environmental training or experience, which relates to findings on value by Aaron *et al.* (1994). This approach can also tie in with the proposal of Steg *et al.* (2014) to strengthen normative goals in the industry through value cues, and situational factors that influence the accessibility of these values. It relates affectively with the targets of tangible achievement identified by Box (2011), since the publicity and recognition that awards provide motivate the setting of targets and the winning of awards that of achievement.

Furthermore, the work of passionate landscape design practitioners in South Africa to put into practice different ecosystem services can provide intrinsic normative incentives for others. Various authors have reiterated the importance of good workable examples to influence perceptions and understanding (Ahern *et al*. 2014; Box 2011; Steiner 2014; Swaffield 2013). This can lead to the development of "epistemic communities" that evolve consensual knowledge (Haas 1989) and develop the practice on the basis of their shared interests and values (Mansbridge 1994). Findings by Goddard *et al.* (2012:268) similarly recommend the "harnessing of existing social norms" or social responsibility towards nature to spread ecological practices through a process of social diffusion consisting of mimicry and competition among members. Furthermore, studies show that public spirit can be created by these encounters through emotions related to a sense of justice, participation in small groups and well-designed deliberation processes that produce a commitment to decisions (Mansbridge 1994:156).

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The preliminary findings thus indicate the great potential of award systems as a way of shaping institutional and professional knowledge and values. Awards hold potential to increase recognition of the importance of all ecosystem services and to improve green infrastructure quality. This implies that the criteria used in local award systems currently need to be explored; Chapter 10 investigates these criteria further.

8.8 Conclusion

The content analysis served as a preliminary advance to the first three research questions. This section further discusses conclusions concerning the broader social system indications derived from the content analysis.

i) What have been the concerns addressed by landscape design practice in South Africa in the last decade?

The content analysis identified twenty-six different themes or topics of concern in the industry, which can serve to relate new values to existing ones. The main concerns addressed by landscape design practice are social and community-related matters, quest for sustainability, design as a science, design as an art closely related to aesthetics, and best plant choice based on a variety of criteria. These identified held values in the landscape design industry are significant since they can serve as important entry points for achieving the required future change in values and decision-making (Ives & Kendal 2014; Steg *et al.* 2014).

When compared to Landscape Values in environmental psychology and Nature Values in environmental ethics, notably, none of the themes articulated the Intrinsic Value of nature or that of habitat for wildlife. This indicates the absence of a clear distinction in consciousness between valuing nature in itself and valuing nature because of the human benefits it provides. It also neglects the importance of biodiversity that provides insurance value. Thus, it appears from the data that reconstructed urban nature is professionally regarded as inherently beneficial to humans and not valued intrinsically. From this perspective it could be argued that designers endorse a lack of Intrinsic Value and disregard habitat for biodiversity in urban areas.

These finding are significant, since according to Lockwood (1999:383), Intrinsic Value beliefs have the potential to influence “the mode by which an individual makes environmental decisions”. Furthermore, intuitional limitations regarding value articulation can pose restrictions in terms of

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value articulation of individuals (Lockwood 1999). This is as important for landscape professionals as it is for the institutions and actors influenced by them, for example, government and the general public. Yet, such allegations require further investigation.

The aspects of biodiversity, therapeutic value and Intrinsic Value highlighted in a study by Van Riper *et al.* (2012) received far less articulation in the data of this study. Chapter 9 further investigates whether or not these findings are accurate and significant.

ii) What do these concerns disclose about contemporary values related to urban ecosystem services, for example, which ecosystem services are valued and which are neglected by landscape design practice in South Africa?

The identified themes that articulate values around urban nature largely reflect the value of Cultural and Regulating Ecosystem Services provided by urban nature. In South Africa, the benefits of Supporting and Provisioning Services seem to remain underestimated, while Cultural and Regulating Services are deemed more important. Particularly Provisioning Services are seen to not belong as a matter of course in reconstructed nature projects, while Supporting Services that include biodiversity are only considered in about 13% of the projects and mostly in non-urban areas. The literature reviewed indicates that all ecosystem services are important for resilience in systems but most of all biodiversity, which is considered an ecosystem property and function required for the delivery of other services (MEA 2005). A balance is required when weighing up the inclusion of different ecosystem functions and ecosystem services groups (Hermann *et al.* 2011).

iii) Which contemporary professional social practices are articulating the value of certain ecosystem services in the landscape design community of practice?

The data identified the following professional social practices with potential to shape values inside the landscape design industry: environmental laws, ratings systems and award systems. Each provides certain incentives and plays an active role in terms of value articulation, which has potential for operationalisation.

iv) How can professional social practices operationalise values to socially produce essential ecosystem services?

Of the identified professional social practices, award systems are argued to hold the greatest immediate potential for achieving value change, as they provide intrinsic and extrinsic incentives, and can simultaneously foster public spirit and the evolution of consensual knowledge. They can also

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be targets of physical achievement that strengthen normative goals in the industry through the value cues generated through and by them as good workable examples. This can stimulate mimicry and competition among members. Chapter 10 discusses the great potential for strengthening normative values in the industry through the operationalisation of values.

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Chapter 9



pollination

ESS image by Jan Sasse (TEEB 2011)

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CHAPTER 9: Research Findings and Discussion of the Semi-structured Interviews

9.1 Introduction

As expressed by Terre Blanche *et al.* (1999:321), by aligning real life events to a specific perspective, "qualitative research aims to make the strange familiar and the familiar strange". Society, being socially constructed, places limits on what is seen as possible or legitimate (Terre Blanche *et al.* 1999:282). In this study, semi-structured interviews with experts served to elaborate on the findings of the content analysis, providing more subjective, experiential insight. This research aimed to achieve geographic representation of practice in South Africa. The study area encompassed the four major urban centres in South Africa, in the three provinces of Gauteng, Western Cape and KwaZulu-Natal (KZN). As the questions primarily addressed the last decade of practice, individuals with at least ten years of experience in the industry were interviewed. The twelve selected experts included two magazine editors and three lecturers all from different institutions, with practical experience in the industry (refer to Table 15). The experts had between 18 to 42 years of combined involvement in the industry, with an average of 32 years per practitioner.

The researcher analysed the expert interviews by identifying and categorising the main themes from the dialogue in a data-driven phenomenological fashion. The researcher then formulated a thick description for each question based on the respondents' themes. The first subsection of this chapter uses these descriptions to expand on the findings, guided by the main research questions. The subsequent section discusses the main social discourse that emerged regarding design and context. The data analysis uses both themes and discourses to identify variables and relationships between variables. The third subsection connects landscape design to the scientific discourse of social-ecological systems by considering identified variables such as role players, scales, drivers, resilience and values. This analysis aimed to gain an improved understanding of the local context regarding social practices in landscape design and operationalisation of values. This chapter summarises the main themes or ideas of significance from the findings and compare them to findings from the literature review in a discussion. The section ends with the main conclusions on the research questions (see Figure 50 for chapter layout).

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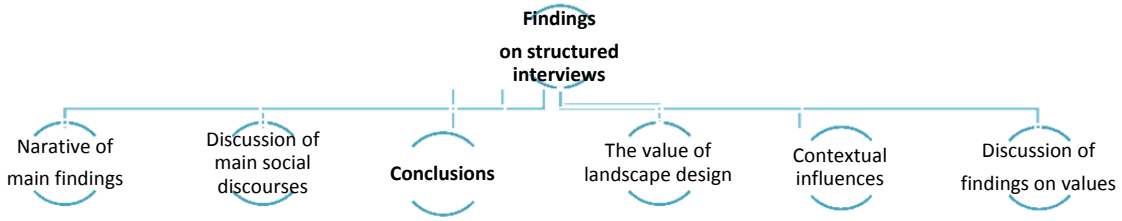


Figure 50: Graphic illustration of the chapter layout

9.2 Narrative of findings

During the semi-structured interviews, the researcher first posed broad questions to the experts to gather spontaneous information. Thereafter, the researcher specifically asked experts for their opinion on the findings of the content analysis. Appendix B lists the 16 questions posed to each interviewee. These questions served as a guide only; the exact sequence and wording was sometimes improvised depending on the flow of the conversation. The researcher regrouped the questions into 14 main enquiries and then worked the combined answers of all interviewees into a thick narrative. Appendix E lists the complete narrative. This section presents and discusses relevant excerpts. Note that the questions used to structure this summary vary sometimes in exact wording from those posed during interviews and found in Appendix B, since some questions were grouped for a focused discussion.

9.2.1 Decisions, motivations and outcomes of landscape design

The first enquiry aimed to establish the nature of the industry at present, as a means to ascertain the findings from the content analysis and gain perspective on the status quo. This enquiry related to the first research question, namely: What have been the concerns addressed by landscape design practice in South Africa in the last decade?

The researcher raised this query in three ways in the interview. Firstly, the researcher enquired about the factors that influence the choices of designers, and secondly, the researcher probed the "topics of concern" in the industry. These questions aimed to discuss design projects as the embodiment of values and prodded after the drivers of influence in that embodiment. These discussions revealed the social discourses that legitimise held and assigned values. Thirdly, the researcher directly asked experts whether they agreed with the findings and to state their rationale. This section discusses the narrative derived from these three enquiries. The subsequent section contains a discussion of revealed discourses and values.

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9.2.1.1 What influences landscape designers most severely in their choices of what to place in a landscape project?

The experts mentioned several factors that influence decisions made by landscape designers and impact project outcomes. The enquiry aimed to go beyond the standard considerations into ideas of what makes a difference. Yet, inevitably the experts also mentioned standard project determinants.

The experts considered the three most influential factors to be, respectively: (1) the budget of the projects or financial considerations; (2) the brief and "attitude" of the client; and (3) the "attitude", creativity and knowledge of the designer. Within these discussions social norms of prestige, taste, trends and also ethics and values surfaced—mostly those of the designer. The experts raised two important related points. Firstly, the experts noted the existence of the "enlightened client", who is not purely profit-driven but has an understanding of systems and a vision. However, this type of client is not the norm. Clients are often not aware of possibilities available or are merely profit-driven. In the case of the state as a client, the experts raised a specific concern about the lack of appointment of landscape architects to assist with decision-making at any government level. Secondly, the experts noted the idea of designers as "opportunists"—who make the most of things and add knowledge and thereby fulfil an educative role—but also the view of designers as "artists"—with a vision and passion for work regardless of public opinion. Several statements by the interviewees confirm these two points:

> *They [designers] have to deliver what the clients ask for, but I do think they can play a huge educative role by adding their own knowledge […] because they are the people who are in the know. The client knows what he or she wants but is not aware what the landscape architect can offer over and above his or her own requirements* (Interviewee 2, November 2013).

> *There are a few of the, if I can call it, the more 'arty' designers who go out of their way to produce fantastic things […] if you are an artists you push yourself […] you do it because you want to test it or you see value in it […] that is the job of a designer, it must not come from the client* (Interviewee 7, December 2013).

> *I stood outside and always looked for the bigger picture, and also the bigger picture in terms of what is possible… Because we tend to be Cinderellas that are second to architects and engineers, we tend to be opportunists… that grab the opportunity and*

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> *make the most of that. So we do go beyond what the different briefs are expecting from us. I assume most architects and landscape architects do that* (Interviewee 11, November 2013).

The experts raised another idea: designers should convince clients of best practice through successful examples of innovative work, which could save clients on costs in the long run. Perceived lack of creativity in design projects may be tied to budget constraints and profit-driven projects—time versus cost concerns—leading to the use of standard designs.

There appears to be a slight tension between designers and contractors; Contractors perceive designers to be arrogant in disregarding their plant knowledge, while designers blame them of designing "out of their own nurseries". Efforts to optimise solutions through combined knowledge are not the norm and contractor input is seen as mostly an afterthought on the spur of the moment as a problem-solving technique.

Although not considered the most significant, the experts consistently mentioned the factors of environmental considerations and sustainability. References to these factors were mostly in the form of "water wise" actions and a recent thrust towards "endemic" or regionally indigenous plant choice. Other important factors include site, context, history, users and functional considerations, which all play a role in decision-making.

In sum, social considerations and interactions featured as the main discussion, while client and designer values remain important, with the skills and knowledge of the designer being emphasised.

9.2.1.2 What were the main topics of concern in the industry over the past ten years?

The experts pointed out two major changes that affected the industry during the past 10-20 years. Firstly, the passage of a new constitution in 1994 had a profound influence on the landscape architecture industry in South Africa. The laws set out by the constitution entailed increased attention to social rights with concern for health and well-being. The municipalities initiated distribution of "municipal wealth" to historically disadvantaged areas and the development of many public open space projects in these areas. In addition, projects related to heritage and commemoration received a new emphasis in the industry.

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> *I don't think it is a change in focus in how landscape architects design […] I think what the post-1994 environment allows us to do is to practice or display landscape architectural skill on a wider and a more visible base* (Interviewee 5, November 2013).

The second change relates to the global economy. The economic boom in South Africa from 2000-2007 had two local consequences. Firstly, the availability of funds resulted in many large-scale projects with large budgets and allowed landscape designers the opportunity to create "world class" projects. Secondly, the housing boom produced many "walled communities", i.e., security estates where people are socially isolated and less exposed to "sustainable living".

Large, mostly public projects with big budgets during the economic boom resulted in a greater awareness of landscape design as a profession in the country. Conversely, the post-2008 economic crisis led to tightened budgets and a drop in the importance of landscape design in South Africa. An additional financial concern for the industry is the recent minimum wage increase (2012/2013). Though long overdue, this policy shift has affected those involved in landscape implementation and resulted in increased prices nationwide.

There is a general concern about the lack of appreciation of the cost of landscaping in comparison with other services and infrastructure. This is partially blamed on the cheapest tender system that rewards the tender to the lowest bidder, which is accepted in South African public and private tender processes. The tender system is seen as a reflection of the typical mentality towards landscape projects as being cost-driven and not quality-driven. A parallel concern among designers calls for more creativity in projects and a need for marketing "good design". These factors, along with the lack of promotion of the profession, influence public perceptions negatively and lead to a shortage of professional landscape architects[26].

In terms of public values, a booming economy is perceived to have eroded values on sustainable living. Meanwhile, during economic crisis, landscape design receives less importance due to financial constraints. Landscape designers are thus challenged to deliver high value, sustainable landscapes at a low price. On the positive side, there is a general increasing concern and consciousness for the environment, which results in greater assigned values to the environment. Many experts felt this shift in consciousness was influenced by worldwide trends and climate change. As a result work is being classified as either ornamental or ecological, with a different "style" and more "wild" elements

[26] Note that although landscape architects are also landscape designers, they are distinguished from the former based on formal qualifications.

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creeping into formal design in general. The ecological emphasis has also led to the commercial availability of more rare indigenous plants.

In brief, from the discussions with experts, political and economic concerns are ostensibly more prominent than environmental concerns in the industry.

9.2.1.3 In your experience, do you agree that community and social concerns, sustainability, and concern for design and aesthetics are prominent concerns in the industry?

After posing general questions, the researcher directly discussed the findings from the content analysis with the experts. In terms of the importance of the three profession-focused magazines chosen for the content analysis, experts regarded them as covering the full scope of landscape design projects within their combined focus and holding a bias towards what readers—professionals—would like to see and read. The content analysis revealed significance given to social and community concerns, sustainability, and concern for design and aesthetics. The majority of the experts agreed that these were the most prominent topics, respectively. Two experts felt that these concerns should be addressed in every project as a minimum requirement. It was mentioned that projects might include far more "hidden" aspects than what the magazines featured. Since research indicates that interviewees tend to agree with statements of the researcher (Steg *et al.* 2014), the researcher probed the experts on four specific design themes further to reveal their sentiments.

Three interviewees argued that the context (i.e., where the project was occurring) influenced the nature of the concerns and distinguished between "smaller" garden and "larger" corporate projects (see also discussion on discourses 9.3). Larger projects were seen as often connected to the social or environmental "image" of a corporation and influenced by the agenda of the client. Some felt that social charity projects were the result of companies having a "guilty conscience" and that social charity projects should be enforced and incentivised by government as a minimum requirement.

Experts agreed that the main goal of design is to satisfy human needs and desires and that this value was a prime consideration in South Africa. However, some experts felt that the "quality" of the environment is neglected, while functional socio-economic aspects, like job creation, receive more attention. Similarly, the experts considered aesthetics as tightly connected to design, and these visual aspects distinguished landscape design from engineering. According to the experts, landscapes should be pleasant, attractive and conducive of productivity.

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The experts mentioned that the public did not yet readily accept the "new aesthetics of biodiverse gardens", and people prefer "neater" manicured and maintained gardens. Yet, the experts noted that the "indigenous aesthetic" is becoming more accepted in municipal work. Although subjective aspects determine people's preferences, there is also commonality.

Further, the experts noted that projects must look good, as well as perform functions, including the promotion of liveability, sustainability and encouragement of ownership. The experts identified social issues and upliftment as more important than aesthetics in the developing world context of South Africa.

The findings of the content analysis steered the discussions, which focused on community matters, sustainability, aesthetics and design. To summarise, from the discourse, the researcher detected two main themes: quality design and context (refer to 9.3 further explores themes and related social discourses).

According to the three enquiries, political and economic influences and their bearing on social dynamics in the design process are significant. Yet the client and designer, as well as the values and skills of the designer are also important for delivering quality design. Furthermore, the context of the project largely influences the embodied outcomes of the project.

9.2.2 Ecosystem services valued by landscape design

A discussion on the value given to different ecosystem services served as a reflection on the second research question: What do these concerns disclose about contemporary values related to urban ecosystem services, for example, which ecosystem services are valued and which are neglected by landscape design practice in South Africa?

Since ecosystem services did not spontaneously form part of the discussion, as the concept is not yet widely used in the industry, the researcher rephrased the question in terms of the reasons people "value urban nature" and provided examples of the services in each specific category, according to TEEB 2011. As in the previous question, the experts were asked whether they agreed with the findings of the content analysis in terms of the outcome of projects being more inclined towards Cultural and Regulating Services and less towards Provisioning and Supporting Services. The answers discussed what is occurring in the industry, as opposed to agreement or disagreement. Specific

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questions regarding the importance of biodiversity followed. This section raises those questions, which are then elaborated on in the section on social discourses regarding design.

In general the interviewees felt that appreciation of nature's services was dependant on area and also on different demands from the client. There was a feeling that, geographically, certain areas—like the Western Cape, due to better education and employment—differ in terms of appreciation of nature. For example, Cape Town has an "aesthetics committee" that deals with social issues in the city. This tendency is further discussed in the discourse section. In addition, the experts argued that in professional magazines, design and aesthetics might receive more attention due to reader appeal; the mainstream media was seen as a way to create needed awareness of neglected matters in the general public.

The experts considered socio-economic factors to be opponents of biodiversity concern, while the question of ownership made utility gardens difficult to manage. There is growing interest and concern for utility gardens, such as food and medicinal gardens, as well as vertical and roof gardens. The rising interest in home food gardens is comparable to trends in the 1970s, and the experts perceive the current surge to be related to health concerns. However, experts feel that people do not always have the knowledge to overcome challenges related to growing vegetables; thus, they often give up due to lack of results.

The interviewees felt that the psychological value of green space did affect people's choices, but not on a conscious or evident economic level. It was further posited that people need public space as an "escape" in the city. Some experts felt that new environments should incorporate vegetation that accommodates processes and biodiversity to shift public perceptions. Although there are links between aesthetics and sustainability, the link between biodiversity and sustainability has not been made.

> *People have not understood the difference between a sustainable biodiverse environment and a biodiverse poor environment but an aesthetic environment—that is aesthetically pleasing […] And in all design, when you are involving habitat modification or creation of new environments… you should be designing in-between corporate things or plantings and elements that will actually bring insects in, bring birds in, or add to processes* (Interviewee 6, December 2013).

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In summary, the experts reiterated that public and profession knowledge of good practice with regard to ecosystem services was not sufficient and that certain aspects were harder to achieve in urban areas, such as biodiversity or utility gardens. Concerns for physical and psychological health, and aesthetics could support a rationale for biodiversity, as these concerns are currently valued reasons for green space provision. The media could play a role in this. The context and client are determining factors.

9.2.2.1 What hinders change towards greater urban biodiversity?

The experts name three major factors as potential hindrances to positive change for biodiverse urban areas. Firstly, the market is self-focused and leads to short-term economic performance measures based on profit, which leads to resource abuse and green issues being valued less than other infrastructure. Secondly, existing cultural perceptions are apathetic towards the environment. People are stuck in unsustainable habits, fear change and lack understanding and knowledge. Thirdly, the government is not only challenged by poverty and infrastructure demands, but also lacks commitment to the environment. There is a failure to employ required experts at all government levels along with a lack of enforcement of law and policy to address the source of the problem.

A fourth factor is a perceived deficiency of professional knowledge and initiative on the subject. People should understand why it is good to follow laws and rules. The profession can play a valuable role in this aspect. However, landscape design institutions[27] do not exercise power in terms of government and the public, which limits the profession in terms of influencing the government and the public through professional advice.

In sum, the market, cultural perceptions, socio-economic challenges, and competing socio-economic goals and a lack of government support currently hinder the development of green infrastructure and a balanced production of ecosystem services in urban areas. Experts see landscape designers as having potential to make a difference in this respect by influencing values of the state and the public and by improving skills.

9.2.3 Social practices and value articulation

Again as a reflection on the findings of the content analysis, the researcher brought professional social practices of value articulation into the discussion. The researcher asked experts whether they

[27] There are two institutions: Institute for Landscape Architects in South Africa (ILASA), specifically focusing on landscape architects, and the South African Landscape Institute (SALI), which includes landscape designers, managers and contractors.

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thought the law, rating systems and awards programmes were important influences on design and whether they could discuss these and other influences. This subject relates to the third research question: Which contemporary professional social practices are articulating the value of certain ecosystem services in the landscape design community of practice? The researcher asked experts which practices could have an influence on South African design practice. This relates to the fourth research question: How can professional social practices operationalise values to socially produce essential ecosystem services?

Through the discussion the sentiment that came to the fore was that people do things for different reasons: the majority of people follow trends set by others or at least talk along even if they do not necessarily know of practice trends. "Followers" tend to reproduce what the professional and commercial magazines highlight, while a small percentage specifically breaks with popular trends. Advertising and financial benefits certainly play a role in market logic, but marketing also needs to be pitched at the right level and to the right audience to be effective. Competition is perceived to be healthy for keeping high standards in the profession, while knowledge and quality have come a long way in landscape design. There is a definite search for credibility from a business point of view, and professionals employ different artefacts to achieve credibility. The award systems are one such artefact.

9.2.3.1 Awards

In terms of awards in the industry, the experts cited the benefits of showing the quality and credibility of projects, which can be used for marketing and advertising. Award systems were reported to not only motivate staff members inside companies but were also seen as a means to teach within the profession.

> *It's important for our profile as an organisation that the kind of services we deliver are good enough to win as many awards as we do. So obviously there is a marketing connotation, but it is also good for our people, for our staff, […] it is very important for our staff the recognition that one gets […] so it's really twofold, so our clients can see we are the best and also for our staff so they can also see we are the best* (Interviewee 3, November 2013).

The interviewees considered the available award systems in South Africa at present as positive influences on innovation, while acknowledging that environmental considerations do not play an important enough role in certain award systems. In terms of applying sustainable initiatives, experts

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felt these initiatives should be instigated in the design phase; otherwise they cannot form part of implementation in the current system. There is thus a perceived need to measure the contribution of the contractor to the quality of projects in a different way since it is largely dependent on the design component. The new professional categories are predicted to largely influence future involvement and rationale of different parties to the profession.

In the opinions of the interviewees, judges play an important role in the criteria of the awards and their application. The experts felt that it should not be too easy to win an award, and different kinds of foci in awards are required. The judging process is often seen as educational, when there is contact between the judges and the participants and issues are discussed on site.

Unfortunately, not everyone belongs to an institute, as the interaction between institutes and landscape designers can be positive. Additionally more incentives are needed to encourage non-member participation in awards. The awards provide a perspective of what is happening in the industry for designers and give them the ability to compare their own practices to these standards. Regrettably, the publications on the awards stay inside the profession and are not used for marketing to the wider public.

In sum, awards serve as a benchmark, promote quality and credibility, are useful for marketing and advertising, motivate staff, and teach landscape designers. Further, the criteria and application for awards is important. Judges play an important role and can spread knowledge during judging. Different focuses are required for awards, and the contribution of the contractor needs to be acknowledged.

The following factors limit the impact of awards: not all designers are members to institutions, incentives are required for participation, the impact of awards largely remains inside the profession and the environment does not play a large enough role in the awards criteria.

9.2.3.2 Rating systems

The experts cited the influence of both legislation and rating systems on larger corporations more than on individual landowners.

> *It's come in and suddenly the corporates are all over it, you'll see the Nedbanks and Absas are trumpeting that their new headquarters are a four star or a five star, or that*

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> *they are green star rated; because obviously it is going for corporate image and that's …not a bad thing* (Interviewee 3, November 2013).

The experts reiterated that short-term profit drives development. Rating systems give importance and credibility but come at a high cost, and if not financially viable, these systems are not employed. There is a perception among experts that corporates do not participate in rating systems for ethical reasons but rather for image and financial benefit. This observation coincides with the findings of Steg *et al.* (2014), who associate high cost public action of individuals with status. Some experts felt that the wealthy should show greater social responsibility. The experts saw rating systems as promoting high technology, which is not always the answer to greater sustainability and feel problems can also be solved using low-tech solutions.

> *I think this whole rating system is of huge importance to the industry, because it is almost free advertising, a person who has won an award, has got something to advertise, it shows a standard, that is the main thing, the standard […] to get a new job […] this is a huge driving force for a lot of people* (Interviewee 7, December 2013).

In brief, the experts view rating systems as mostly corporate with high costs. These systems are often implemented not for ethical reasons but rather for image and financial benefit. High tech is not always the most sustainable or only route to sustainability.

9.2.3.3 Legislation

The law shapes professional values, as professionals consult new legislation and use it to gain authority on decisions. The experts acknowledge that professionals are also restricted to certain practices by the law. "Legislation sometimes forces people to make certain decisions" (Interviewee, 7, December 2013). Swaffield (2013) comments on this reality as equating the law and science. This is different from the punitive association of the public with legislation.

> *A law cannot solve it, the execution and the management of the law becomes important, so they have to work together […] rules and regulations and laws is a forceful way in getting people to change, but it is not a positive way in getting people to change […] education is a much better way in converting people than laws […] if people do it through own will and own understanding it will be a much more positive change and a more wilful change* (Interviewee 4, November 2013).

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Environmental legislation is perceived by experts to influence decisions and having a positive influence, yet the law does not rectify the problem and is often not enforced. The importance of enforcing the law coincides with the limits of legislation as behaviour changer described by Box (2011). Interviewees, however, proposed that government should be seen as supportive of green initiatives. Aaron *et al.* (1994) reiterate the importance of endorsement through public figures.

To sum up, the law is important for government or corporate projects. However, it has limitations. Law is not always enforced, is negative in terms of punishment and is perceived not to address the problem.

9.2.3.4 Knowledge and examples

The experts identified several shortcomings and made proposals with regard to improving knowledge in the profession. These proposals were associated with specific professional social practices. People inside the profession have a need to know more. Educational courses inside the profession arranged by the profession were seen as necessary and a way to enhance practice. Plant knowledge, sustainability and technology were three required areas identified in need of knowledge expansion. A joint conference (which according to an interviewee has occurred previously) that strengthens relations between designers and contractors can lead to required knowledge sharing. The experts proposed two aspects that could make a difference to the profession: encouraging the enrolment of more students to study the profession and having more professionals employed by government to amplify the scope and impact of the profession.

The experts argued that designers are able to use successful projects to convince clients of benefits, while examples also influence other designers in terms of possibilities.

> *If these good designs are exposed in the media and people do see that, and you can highlight the benefits from either an ecological side or from a sculptural side, and the cost implication of these things so people understand the financial part of these work […] but we will have to convince them and show them past experience or past projects that have worked* (Interviewee 7, December 2013).

This rationale coincides with the literature (Box 2011; Colding 2011; Goddard *et al.* 2012). Colding (2011) and Ahern *et al.* (2014) emphasise the importance of exposing urban residents and designers to functioning ecosystems and good project examples in order to gain public support and induce learning. Scientifically enriched public culture allows for changing perceptions and acceptance of

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previously incongruous elements (Gandy 2013b) and visual stimulus plays an important part in this process since (Gobster *et al.* 2007).

Although knowledge has been shown to be value dependant (Bolderdijk *et al.* 2013), knowledge can change aesthetic preferences (Gobster *et al.* 2007). The values people assign to place often relate to physical environmental qualities (Stedman 2003) and aesthetics (Gobster *et al.* 2007), lived experience (Tuan 1977) or symbols (Hull *et al.* 1994). Landscape visual experiences have been shown to affect people's emotions (Gobster *et al.* 2007; Tuan 1997); emotional triggering can lead to transformative learning (Groen & Jacob 2006) and ignite new inspiration (Lazlo 1973). Research hence confirms that working examples could be a powerful way of instigating transformative learning and change.

To recapture this section on social practices, people follow trends, market logic and financial benefit. This behavioural tendency highlights the importance of advertising and marketing via the media, but it needs to be pitched at the right audience. Education inside the profession is required—particularly in the areas of plant knowledge, sustainability and technology. In conclusion, experts recognise the potential and need for knowledge in the industry and that the awards and rating systems are seen as producing potential incentives towards learning. These practices could also consequently lead to knowledge sharing and create much-needed examples required for public and professional conviction and transformation.

Green space values and principles are important for decision-making in urban planning and development, as well as for users (Douglas & Ravetz 2011:261). The experts raised ethical questions about the responsibility of the profession for the environment, as well as the responsibility of each person or the wealthy towards the environment. In Britain, Thompson (1999) suggests that, besides professional and business ethics, the profession should be concerned with ecological, aesthetic and social values. Treib (1995/2002) condemns this perceived moral socio-economic and ecological obligation imposed on designers as a constraint on the cultural and aesthetic role of landscape design. The next section considers specific social discourses around design and context that surfaced through the interviews.

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9.3 Discussion of main social discourses

Discourses are broad "patterns of talk" or "systems of statements" taken up in conversations, which one is able to identify when part of a culture, yet maintaining a critical distance from it (Terre Blanche *et al.* 1999:328). This section highlights the main discourses revealed by the interviews in terms of values held in landscape design industry in South Africa and discusses these discourses in the light of other research findings. These themes reveal the relative worth assigned to things of value in the industry, which is supported by held and assigned values. They also reveal cultural norms and beliefs, all of which influence judgement, decision-making and behaviour (Ives and Kendal 2014).

Landscape design is the main topic of discussion. As design strives to add value (Swaffield 2013), this section considers the different local discourses around specific values delivered by landscape design. The discussion also considers contextual influences on these discourses as revealed by the interviews. The aim of this discussion is to consider the complex task of local operationalisation of values.

9.4 The value of landscape design

During the interviews, the value of landscape design was both defined by what it is and what it is not. The concept of design seems to form part of the core identity of the profession and the value attributed by the profession to itself. This section discusses five specific values of landscape design, which were often set against each other in interviews: design, aesthetics, functionality, economics and biodiversity. These identified values are briefly compared to those value projections found by the similar focused studies of Thompson (1999) and Özgüner *et al.* (2007), respectively, in Britain and the UK. While Thompson (1999) uncovered ecological, social and aesthetic values to be most dominant in Britain, Özgüner *et al.* (2007) identify differences in opinion on aesthetics, safety, performance, cost effectiveness, community involvement and wildlife among landscape architects with regard to preferred design style. Of all these projected values and concerns in both studies, community involvement is perhaps the only one that was not pertinently raised in interviews with experts in South Africa. These common elements shed light on general ideological and perhaps Western-centred or even colonial influences on South African landscape designers despite cultural and climatic differences. Other nuances between value findings are highlighted in the discussion of the individual discourses below.

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9.4.1 Design as professional identity

Design surfaced as a very important theme for landscape design practice in terms of identity. "Good design should drive a project from the start […] if a project is not designed, there is no direction, it has no purpose […] the best way to guide a project is through proper design" (Interviewee 4, November 2013). Thompson (1999:83) also notes this reference to good or proper design in his study as an important reference and concern of landscape architects. As Swaffield (2013) explains, design is regarded to influence shape, configuration and appearance of a project, but it also largely refers to the process followed.

In terms of design as a process, there are different discourses on the importance of design for the landscape industry. A prominent discourse is that the design initiative of a project is more significant than the execution or construction of the project, which forms part of the design process. In South Africa, this leads to some tension between designers that can be landscape architects, horticulturalists or landscape contractors, due to educational formation and historical references.

> *Your larger projects are designed by landscape architects and that is good because they are trained as designers, but my concern is that a lot of them—I am not saying all of them […] are very arrogant [...] I have a huge horticultural experience […] most contractors would work with a wide range of designers […] 50% would say you have some knowledge […] the other 50% think they know it all, and they are here to policeman you. There is a bit of a strange attitude that I find comes from landscape architects, a bit of a superior attitude, which to me is a bit absurd. At the end of the day we are a team and each one has a specialist skill in that team* (Interviewee 9, November 2013).

As the interviews attest, designers set creativity above experiential knowledge, which contractors and horticulturalists perceive as arrogant. Landscape construction work is historically associated with unskilled labour and experiential knowledge. On the other hand, landscape architects—who are specifically educated in design—are renowned for not having good plant knowledge in general, which also indicates the perceived importance of this aspect by this group. According to Quigley (2011:89), this tendency is similar in the US where many landscape architectural programs have little or no emphasis on horticulture, ecology or botany, and landscape architects are almost "proudly ignorant" of this fact. This arrogance or ignorance appears to be a result of the value assigned to creativity and artistic endeavour.

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This discourse on design and the identity of the profession bears traces of influence of Western art philosophy (refer to 4.7.3). There is evidence of a longing for landscape design to redeem its position of a "sister" among the arts that was lost in the 18th century, as well as to the idea of nature as something to be "improved", from post-18th century thinking (Thompson 1999:13,34). These aspirations are most probably not directly related to art theory as explained by Thompson (1999), but rather an effect of artistic aspiration of professionals. The specific pursuit of creativity and innovation is a strong theme related to late 20th century philosophy of "personal ways of seeing" and configuring "meaningful patterns" in the landscape (Thompson 1999:26). This also bears reference to landscape design as a "cultural project" Treib (1995/2002), which gets stifled by functionalism and ecological goals. These artistic pursuits regrettably often result in planting design, which focuses on the use of single ornamental qualities of plants, a similar frustration noted by Quigley (2011) in the UK and US.

The environmental crisis is seen as something that brought more importance to the landscape profession, also in South Africa. Steiner (2014) points out that this could inspire a professional identity, yet, there is a new rivalry with other built environment professionals as people compete for expertise, which is also acknowledged in South Africa.

> *I think we as landscape architects understood it from the beginning […] even before the green aspect in architecture and the concerns of the environment became an issue […] all the other professionals also became very much aware of the larger environmental issues we have to address […] one of the problems that I am beginning see is the identification of our roles […] where do we start drawing the line, is it necessary to a draw a line?* (Interviewee 11, November 2013).

The discourse on the environmental crisis has led to worldwide professional concern with sustainability, yet in South Africa the term still does not seem to hold much weight and is often reduced to being "water wise", using solar energy and making indigenous planting choices. Thompson (1999) points out that sustainability has both ethical and aesthetic implications. According to the experts, there has, been a moving away from mass planting, which is highly non-resilient and involves excessive use of annuals, which is resource intensive and unsustainable (Hunter 2011). Practitioners are reportedly using more organic products for fertilising and pest control, which is environmentally less harmful. Nevertheless, in South Africa, sustainability is mostly regarded in economic terms of viability and not in environmental terms of resilience or biodiversity. According to Özgüner *et al.* (2007) one of the motivations mentioned by interviewees in the UK for

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using “naturalist” planting is indeed sustainability, yet the real cost effectiveness is debated among professionals (refer to 4.7.1).

To conclude, design is an important part of professional identity. It is both inspired by knowledge and creative endeavour, each of which holds challenges in terms of pro-environmental design. The inclusion of different kinds of knowledge and values in the design process need attention.

9.4.2 Design as aesthetics

There is great professional concern with design and aesthetics in South Africa, which relates strongly to professional identity. Landscape design is seen as different from engineering since it is preoccupied with visual aspects and aesthetics. Some experts do argue that social issues are considered more important than aesthetics in South Africa, as revealed by the content analysis findings. “Fancy design” is, however, questioned by some experts as something only appreciated by people with a certain level of education. This relates to findings of Thompson (1999) that although aesthetics were regarded as the heart of landscape architecture in Britain, some designers regarded art as elitists and few saw themselves as artists.

In the literature review, Gandy (2013b) explains that design narratives, which are perceived to relate to the cultural elite, manifest in high-tech versions of sustainability or post-industrial landscapes, which are preoccupied with representing the familiar in unfamiliar ways as a radical cultural praxis. These narratives relate to the cultural role of landscape design, as explained by Treib (1995/2002). Gandy (2013b:1310) asserts that the trend of “spectacularisation of landscape”—or the “technological sublime”—is far removed from direct every day cultural and scientific practices. The inability of visual projects to connect to social purposes is one criticism of Landscape Urbanism (Talen 2013). As a political praxis, others use these representations to highlight dislocations in terms of class, gender and ethnicity (Gandy 2013b:1311). The ability of cognition to change aesthetic appreciation of complexity through greater understanding has been noted by authors (Gandy 2013b; Gobster *et al.* 2007), which may indicate aspects of education influencing these local debates. However, socio-economic infrastructure challenges, like housing and high levels of inequality in South Africa, together with a legacy of past discrimination, places strong condemnation on elitism.

Gandy (2013b:1303) holds that urban ecology offers alternative concepts of synthesising nature and culture in contemporary landscape design. In South Africa, this is evident in the idea that the “new aesthetics” of biodiverse gardens are “untidy” versus “neat” formal gardens. However, this has led

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to landscape designers seeing landscape projects currently as either "ornamental" or "ecological", which is not achieving social-ecological integration. This seem to be similar in the UK, where Özgüner *et al.* (2007) found aesthetics to be a main difference in opinion among designers for selecting "naturalistic" garden styles. The 20th century artistic quest for the "aesthetic experience" references the picturesque movement that broke away from qualities of regularity in the post-18th century (Thompson 1999:25) and has been influenced by ecological concepts in urban ecology to manifest as the "new picturesque", maintains Gandy (2013b). There are evidences of this mainly aesthetic response in South Africa, reducing ecological design to a trend that brings "wild" elements into more "formal design styles" using rare and indigenous plants; and this tendency is perceived to be on the increase in South Africa.

In South Africa, although some experts feel that the "indigenous aesthetic" has become "acceptable" to the public, in general, the public still perceives wildlife and wilderness as a menace, especially in areas where these features are more abundant (for example, Durban). These tendencies show some similarities to the UK where some designers prefer formal gardens based on public demand, appropriateness and a particular experience they offer, while the appropriateness of wildlife in cities is also a topic of debate (Özgüner *et al.* 2007). In the literature, Gobster *et al.* (2007) and Sadler *et al.* (2011:290) point out the importance of aligning ecological sustainability with people's sense of beauty and amenity. Hunter and Hunter (2008) also advise that in order to be truly successful in terms of sustainability, the public must value these interventions. This challenge is hard for professionals, specifically in terms of less popular species groups such as insects or arthropods (Kotze *et al.* 2011), or unattractive and dangerous habitat elements such as wetlands or deadwood (Sadler *et al.* 2011). However, individual or institutional attitudes can also not be the sole arbiters of "good design" (Douglas & Ravetz 2011).

In spite of new aspirations and change, remaining popular inclinations can be found of aesthetically replicable, low maintenance planting schemes in South Africa, which according to Sadler *et al.* (2011) offer low biodiversity value. These tendencies are associated with the fiscal crises of the 1970s and 2008. In South Africa, these reproductions are seen to be produced by "followers" in the industry because they are "cheap and easy" to produce and certainly address some clients' requirements. There is a lack of initiative and creativity associated with these designs, which some experts do not appreciate.

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In short, social issues, an ecological focus and low maintenance requirements challenge aesthetics in design. Aesthetics can be associated with elitism and set against social concerns. The need for public acceptance is a further important criterion for design.

9.4.3 Design as economics

In South Africa, the design phase is understood as the part where all-important decisions regarding the landscape are taken. The creative potential of the designer is linked to both his/her values and the budget. High standard or "world class" projects are associated with innovation and large budgets. Good design is seen as having long-term benefits, being useful, improving life quality and saving the client money in the long run. The "enlightened" client will buy into the vision of good design and not tighten the budget excessively. It is significant to note, that concepts of economics were less prominent in the findings of Özgüner *et al.* (2007) and Thompson (1999) in developing countries; however, cost effectiveness was a concern for sustainable practice in the UK.

Corporate gardens are associated with a company's image and marketing strategies or tax incentives and generally have higher budgets. Research can substantiate this claim, predicting that higher cost and public action will favour pro-environmental behaviour triggered by status (Steg *et al.* 2014). Green spaces in this way become designed fragments of nature that inscribe social and political power in the landscape (Gandy 2013b:1306). These designs adhere to environmental or social concerns mostly for direct or indirect cost saving and not for moral reasons, according to the interviewees. Research has shown that social norms are not affected by economic incentives in the long run, yet these incentives can erode normative values that support environmental action (Mansbridge 1994; Pretty 2003). The literature morally criticises this "green washing", but such practices have benefits in terms of influencing public perceptions and trends, if only in terms of the visual character of locally indigenous vegetation (Gobster *et al.* 2007; Sadler *et al.* 2011:292). The benefit derived from visual examples of green spaces relates to the idea of reframing of environmental messages raised by Schultz and Zelezny (2003), by associating pro-environmental practice with self-enhancing values. In South Africa, experts feel that this approach has widened the public acceptance of "wild" indigenous gardens or permaculture practices and social responsibility.

In South Africa, landscape is perceived to be usually the last consideration of the budget in terms of the client's priorities, with engineering infrastructure being first in line. Schäffler and Swilling (2013) confirm this in their Johannesburg-based study. Box (2011:310) explains that the benefits to society in terms of ecosystem services are not reflected by the market in terms of land use changes, while

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funding and fiscal policy also underestimate the value of green space to society (Douglas & Ravetz 2011). Dominelli (2012) reminds that at the market level, cost dominates decision-making. The expert interviewed confirmed this fact.

> *The capitalist economy is driven by short-term [objectives]. You know a list of companies report quarterly and they are judged quarterly by their results. So very often people make decisions for the short-term, and a short-term result may not be in line with long-term results* (Interviewee 3, November 2013).

This financial reality certainly prevails in South Africa. For example, tenders are awarded to the lowest bidder when it comes to construction, which experts feel reflect endorsement of cost saving above quality outputs. "The purpose of having a real financial value to landscaping is a shortcoming; it has not changed at all in the last 20 years" (Interviewee 4, November 2013). There is thus a concern from experts that design becomes cost-driven and not quality-driven. This is seen as a South African tendency, which is demoralising to the industry and results in less creative design due to budget constraints. Good design is not subject to big budgets, yet those who are financially driven in the industry are perceived to make little effort design wise as a consequence. "You can create very creative work without it being very expensive […] because it is designed properly […] it is not always money, it is the *will* to do it from the side of the designer" (Interviewee 7, December 2013).

The personal values and ethics of the designer are implicit in this economic predicament. Although designers are paid to give "good advice" to their clients, the client may desire a simple low-cost implementation above all, and this "value cue" (Steg *et al.* 2014) along with low fees may influence the time spent and recommendations of the designer. As previously mentioned, there is a further perceived lack of government support for environmental concerns which further aggravate a lack of professional commitment. The experts argue that the resulting lack of creative initiative in design influence public perception on landscape design practice and can lead to a lack of interest in the profession and a shortage of professionals. Furthermore, as in the literature, landscape designers should be encouraged to sensitise urban dwellers towards the aesthetic of biodiverse urban nature and provide the required psychological contact to nature (Colding & Barthel 2013) and highlight social-ecological interdependence (Ernstson 2013). This cannot be achieved without creative and quality concerns of designers and value cues to motivate this behaviour are currently lacking in the governance system.

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In summary, good design is associated with large budgets and long-term benefits. Corporates that connect design to status are incentivised towards expensive "green design", but the everyday client adheres to market logic. Landscape design has a perceived low priority and value in the built environment, which results in a lack of creative initiative taken and quality outputs. This is detrimental for public perception of the profession, green space and social-ecological integration.

9.4.4 Design as functional

In South Africa, design is considered by experts to be for people, and design quality goes beyond merely functional aspects. Yet, functional design is set above "purely ornamental" projects—projects can no longer "just look good". This explains why community concerns and sustainability ranked higher than aesthetics and design in the findings of the content analysis. This is seen by theorists as stemming from modernist preoccupations of "form follows function" and the utility focus of mass production and consumption since industrialisation, as noted by Treib (1995/2002). Thompson (1999) noted a similar concern for function among landscape architects in Britain, but cautions to not confuse the effective desire for a well-functioning design with functionalism[28].

Ironically, in South African designers are concerned that clients perceive landscapes as utility objects, which should be low maintenance or maintenance free. These functional and economic concerns equally form part of professional values and are possibly strengthened through professional conduct. Functional concerns are not only a modernist trend, but also relate to visual and economic concerns. Gandy (2013) explains the contrast between 19th century reformulation of urban nature for static visual appeal—which resulted in labour intensive urban parks due to intense regularisation, i.e., control of weeds—and the fiscal crisis since the 1970s that demanded low maintenance cost. These demands result in a limited palette of tried and tested low maintenance and high performance planting that is similarly criticised in the US (Quigley 2011).

Food gardens have direct human functional appeal, but are difficult to establish in urban environments in South Africa and largely seen as conflicting by experts. The food garden question is mainly one of ownership and management: Who will take care of it? Who will have the benefits? This implies management complications of securing the garden for a specific community and also the need to assign responsibilities. In South Africa, although food scarcity is a real problem (DAFF 2010), there are few precedents of well-functioning examples compared to Europe where these practices have a long social history. Barthel *et al.* (2010) specifically reiterate the importance of memory with

[28] Functionalism in design theory states that the form of an object should be strictly determined by its use.

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regard to resilience in food garden practices, due to experiential knowledge, which is crucial and can be passed on among members.

Biodiverse gardens are also perceived as hard to achieve in urban environments. Perceived difficulty is again mostly associated with social dynamics and management. Biodiverse gardens are further not associated with social functional requirements and preferences. This perception is similar in the UK (Özgüner *et al*. 2007). The idea of people needing to "escape" from the urban environment to more natural spaces prevails in expert opinions, but in South Africa these escapes may not be seen as belonging in urban areas, since context and appropriateness of design are highly regarded by professionals. Research has indicated that more natural landscapes are more calming for stress release and recovery (Özgüner & Kendle 2006). Yet, the psychological or therapeutic value of urban nature was not highlighted as a functional benefit in conversations with experts.

Some experts argued that green space is appreciated by the public, although at an unconscious level. Green space influences people's decisions and preferences without them being aware. This argument ties in with some of the biological theories cited in 3.4.2. A recent philosophical explanation sees materiality bound up with human finitude and our perceptions of time, which makes independent processes in nature seem poetically eloquent and enchanting (Gandy 2013b:1308). Research by Özgüner and Kendle (2006) has shown that people in the UK in general prefer natural spaces to designed spaces, and green environments rather than built environments. Sadler *et al.* (2011:190) hold that human appreciation of landscape aesthetic is intuitive but unconsciously set through cultural identity and therefore hard to change. In South Africa however, experts perceive a certain cultural apathy when it comes to the environment, which may present a specific challenge for local designers to foster public appreciation into a more conscious act. Experts feel that good design holds potential to influence public perceptions for the better. Professionals are seen to mediate knowledge to the public through their interactions. However, these additional functions of design are not yet common practice.

Summarising, although the functional utility of design is highly regarded, it is subject to socio-cultural expectations, which in South Africa appear to be somewhat apathetic towards the environment. Food and biodiverse gardens are also not seen as a social requirement in urban areas with difficult social dynamics to mediate and a lack of historic precedents. Furthermore, experts do not argue for the therapeutic and psychological value of green spaces. The potential of design to mediate knowledge is recognised but not yet seen as a standard functional requirement.

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9.4.5 Design as biodiversity?

In South Africa, experts do not see biodiversity as a design requirement; rather, it is seen as having to compete with basic infrastructure and socio-economic concerns. As stated in the previous section, experts perceive a cultural indifference towards the environment, in general. As confirmed by the literature, green space in South Africa is a "nice to have", not a must have (Schäffler & Swilling 2013). While aesthetics have been linked to the concept of sustainability, biodiversity has not yet been successfully associated with this concept. Landscapes that "look wilder" are thus perceived as more sustainable, yet neither designers nor the public question how these landscapes are more diverse. Callicott (2002) argues that the emphasis of the aesthetic pleasures of nature distorts conservation priorities and strengthens aesthetic values over ethical considerations. Gobster *et al.* (2007) reason that aesthetics as landscape patterns should be brought in closer alignment with ecological function.

In South Africa, experts feel that the public will not accept biodiverse gardens. Yet exposure to these environments may bring understanding. Gandy (2013:1307) explains that the aesthetic appeal of biodiverse landscapes is imbedded in cultural and ecological complexity: "the more detailed and engaged our knowledge of such spaces—and their ecological dynamics—the more sophisticated our grasp of their aesthetic characteristics." In their study of the relations between humans and biodiversity, Shwartz *et al.* (2013) found that older and more educated people preferred greater biodiversity. Meanwhile, research has shown that if people do not have early regular contact with nature, they are less likely to support environmental efforts (Kaplan *et al.* 1998 in Colding 2011:236). These studies emphasise the importance of exposing urban dwellers to natural environments. In further confirmation of the literature, biodiverse gardens are argued to be more enjoyable by horticulturalists in South Africa (Özgüner & Kendle 2006). It thus appears that landscape designers are the ideal promoters for the enjoyment of biodiversity by people.

> *I think people learn that and then they start getting excited about it. They suddenly start looking at the butterflies or the birds and they start counting their birds; and once you get them excited, they start learning about it, and they start reading more and more about this. There is no way they will go back to an exotic sterile garden* (Interviewee 9, November 2013).

The experts further heightened the need for safety and security in urban landscapes, which research confirms is a social requirement for formal landscapes (Özgüner & Kendle 2006). However,

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Jorgensen *et al.* (2002 in Özgüner & Kendle 2006) argue that spatial arrangement is most important for a sense of safety and need not be compromised by naturalistic vegetation. Research has shown that by maintaining intentionality—or evidence of care (Özgüner & Kendle 2006)—and providing human access in terms of the design of such spaces designers can help gain public acceptance (Goddard *et al.* 2012; Hofmann *et al.* 2012; Hunter & Hunter 2008).

Local experts feel that people do not like radical changes, but people do follow trends. The use of general indigenous plants has become very popular and is strongly associated with environmental sustainability in South Africa. In contrast, biodiversity is still seen as a vague term, and in South African landscape design it is perceived as something difficult to achieve, especially in urban areas. Quigley (2011) explains that there is an assumption that species adapted to the pre-urban ecosystem will fare equally well in structured urban landscapes, which is not always the case since urban conditions may be highly altered. Regional indigenous plants are increasingly used in South Africa, but more specifically in rehabilitation or restoration projects. This has become a specialisation avenue for some experts, as it especially embraces experiential knowledge.

> *It is becoming very specialised, there are very few guys that can do high end biodiversity design, and what's nice about it is […] you work with the consultants, I like it, it is a much more team work type of operation, and it is variable […] you try and experiment with different plants, you are growing new plants, it is very exciting stuff to be involved in* (Interviewee 9, November 2013).

Indigenous planting, however, rarely aims to establish plant communities in urban environments in South Africa. Plant communities are mostly reserved for habitats outside the urban core. Quigley (2011:87) explains that when plant communities are established, in general, there is a focus on visual aspects and a neglect of functional diversity in terms of plant interactions. Furthermore, the structural diversity needed in terms of plant strata is not only neglected but also hard to achieve since shrubs are often unwanted in urban areas for security reasons (Quigley 2011). Most often a large variety of species are placed together for ornamental purposes or specific human use with no intention to create reproductive or structural continuity (Quigley 2011). These installations remain completely dependent on human installation and maintenance (Quigley 2011:91) with no self-sustaining ecological ability.

Based on the former, there is a popular use of monocultures, and though mass planting is perceived by experts to be moving out of style in South Africa, the use of singular tree species along streets for

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visual appeal is still an expectation, as also noted by Quigley (2011:90) for the US. Other "sustainable practices" include the use of succulents due to low maintenance and the increased use of veld grasses, which have become aesthetic trends in South Africa but are also recorded in the US (Quigley 2011). Although these species may appear natural and have sustainability value, they do not contribute to biodiversity in terms of ecological functional and structural diversity (Quigley 2011:91). Quigley (2011:90) explains that urban vegetation is mostly artificially placed not to overlay or touch one another, which prevents interaction of strata and functional relations due to ornamental emphasis. Though species diversity may increase in number, structural and functional diversity is mostly not consciously considered (Quigley 2011:90).

The literature contains prevailing critiques of nativist approaches for their limitations in terms of aesthetics, epistemology and ideology in their interpretation of landscape (Gandy 2013b:1305). These sentiments, although not overtly expressed by the interviewed experts, do seem to frame broader arguments by experts of ecological approaches not being "appropriate" for all design locations. Thompson (1999:173-4) found that in Britain landscape architects see ecological approaches as superficial and tokenistic, not for all circumstances, and less important than social and aesthetic concerns. Özgüner *et al.* (2007) found that in the UK, landscape architects valued naturalistic landscape for wildlife conservation, environmental education, sustainable development and as cheaper to manage. Except for indigenous plants associated with sustainability and one expert mentioning systems and habitat importance, none of these arguments surfaced in the interviews. More similar to South African findings, UK respondents felt that public demand, site characteristics, appropriateness and funding should determine whether naturalistic or formal styles are used.

In sum, biodiversity as part of design in urban areas has to compete with public concerns for safety and aesthetics. The result is a selective use of wilder elements for visual effects but with little structural or Functional Value. Nativist approaches are also found limiting to cultural expression and appreciation, yet hold potential as combining different forms of knowledge and creating public awareness. Notably wildlife conservation and education is not yet associated with South African urban landscapes.

In light of the importance of context as discussed in the interviews, the next section considers a few contextual discourses.

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9.5 Contextual influences on design

The researcher asked the experts about geographic differences and urban rural differences. Appendices B and E respectively, contain the specific questions posed to experts and the subsequent narrative. These questions were guided by the literature, which distinguishes between different dependencies on ecosystem services in urban and non-urban areas (Egoh *et al.* 2012) and notes a need for local distinctiveness to be preserved from global tendencies and concerns (Ernstson & Sörlin 2013). Although the focus of this study is urban settings, the concept of rural was used in the interviews in order to allude to potential differences or unique value projections. The findings, however, do have implications for predicted urbanisation and are therefore included in this discussion. Another distinction, which emerged spontaneously from the discussions, was the importance of project size and context. This section considers four contexts and their implications as derived from the dialogues.

9.5.1 Global versus local

Global environmental concerns play off against the local uniqueness and socio-economic circumstances of a particular place. Conversely, global influences are also associated with knowledge and improvement in spite of fears of homogenisation. This association is noted prominently in the literature and unsurprisingly featured as part of discussions with the experts. Local references mainly cited political and economic forces influencing social realities and socio-cultural relations in the form of group agendas and dynamics.

The experts only acknowledged the environmental crisis at a global level, in contrast with the economic crisis, which had direct local consequences. Role players operate at different spatial scales (MEA 2005), and expectedly, conversations were centred at a local level of involvement. These findings are congruent with Gobster *et al.* (2007:963), who argue that phenomena outside of the ‘‘human scale’’ are less likely to evoke our concern and action in spite of the fact that ecological integrity and human well-being depend on the full spectrum of scales. Dominelli (2012) reiterates the importance of acknowledging different scales in holistic practice.

9.5.2 Project size and context

The experts perceive the context of the design as strongly determining the type of concerns it should address. In the UK-based study by Özgüner *et al.* (2007), designers voiced similar concerns about

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appropriateness and site characteristics, while Thompson (1999:174) in Britain also notes "circumstances" as guiding professional decisions. In South Africa for example, experts feel that small gardens cannot address the same issues as large corporate or public spaces. However, in terms of green infrastructure planning, the literature does not distinguish between public or private space, or among different types of green space. Instead, the focus is on the qualities of urban areas in terms of ecosystem services provision (Pauleit & Breuste 2011:281). Recent frameworks of integrating design with green infrastructure and ecosystem services suggest that a natural and social assessment (including public consultation) should reveal ecosystem services crises and priorities and steer local design decisions for each area (Ahern *et al*. 2014; Hansen & Pauleit 2014; TEEB 2011).

Swaffield (2013:1194) explains that design is essentially about place specific goals, values, interests and outcomes—it expresses cultural norms and social institutions. The "appropriateness" of biodiversity and all ecosystem services for specific locations and designs is a social and design discourse that may prove to remain contentious. This could be mainly bound by pre-conceptions of what biodiversity green spaces are and look like and difficulties associated with public acceptance and maintenance. There are also social connotations to what urban green urban spaces should be.

9.5.3 Place and governance: three discourses

From the interviews it transpired that consumer choices are different in different regions of South Africa. Due to the varied locations of the experts, the interviews revealed the influence of climatic and economic factors in the provinces of KwaZulu-Natal, Western Cape and Gauteng. The interviewees indicated that climate, for example, rainfall and vegetation, and economic dynamics related to business culture influence people's relation and perceptions of nature. This corresponds with findings by Goddard *et al.* (2012) that cultural norms, socio-economics and lifestyle behaviours influence human decisions.

As Swan *et al.* (2011) explain that formal or informal education, culture and lifestyle influence landscape vision and expectations. Education can lead to appreciation of non-visual landscape aspects, which need to be known and understood and associated with certain landscapes. Cultural preferences are mostly learned behaviour passed on in groups with certain religious or cultural connections to landscapes and species. Lifestyle refers to social group identity that determines consumption patterns (Swan *et al.* 2011:182). The general climatic and business conditions that influence lifestyle are also influenced by social structures, such as approaches in local governance. Accordingly, the interviewees further reiterated the importance of municipal management. As

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Swaffield (2013) explains, governance is concerned with shaping and projection of values and aspirations, which can include the environment. Governance also raises questions around aspects of social effectiveness, participation and legitimacy (Swaffield 2013).

The next section sets out the discourses surrounding the three distinct geographic regions, paying attention to aspects of climate, business and governance.

Durban, KwaZulu-Natal

There was a general perception that due to the ease of plant growth and availability of water in the subtropical Durban area, plants were cheaper and people were not willing to spend lots of money on landscaping. As a consequence of the climate and slower business environment, projects were less innovative and the public appreciated professional services less. Wildlife posed a greater challenge in terms of competition with humans in food gardens, and conflict is foreseen to arise from wildlife in urban areas due to biodiversity gardens. The experts felt that natural scenic beauty is taken for granted, and there is a greater attraction to the beach than to nature in general.

In contrast with seeming social apathy mentioned by experts, Durban municipality is one of the leading actors against climate change in South Africa (Cilliers *et al*. 2012). The focus in Durban is more on open space planning and environmental management, but additionally involves resource economics and social integration (Cilliers & Siebert 2012). Roberts and O'Donoghue (2013:191) highlight the need for local governments to "invest in protecting, restoring and managing ecosystems to enhance adaptive capacity in order to achieve the most sustainable and cost-effective outcome". The authors also underline the need for "community based climate change adaptation" in the Durban context. The adaptation deficit is accredited to factors, such as the deficiency of grey infrastructure, loss of green infrastructure and "a lack of capacity as a result of poverty, underdevelopment, poor governance and lack of skills" (Roberts & O'Donoghue 2013:170). According to the literature, if people do not perceive value in government services, it is unlikely that social values will be shaped in terms of people adopting the conduct promoted by government, due to a lack of perceived legitimacy (Harrison & Burgess 2003/2008; Russell-Bennett *et al.* 2009:212). The climate change initiatives in Durban are lamentably not made visible in green space design currently. It would appear that initiatives do not exploit the opportunity to mobilise landscape designers and raise awareness with the general public.

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Cape Town, Western Cape

According to experts, Cape Town is the most aware in terms of biodiversity and conservation due to the city's unique and visually appealing Fynbos biome and the high levels of education and awareness of the public in the Western Cape. The Cape Floristic Kingdom receives worldwide attention (Holmes *et al*. 2012; Rebelo *et al.* 2011). Cilliers and Siebert (2012) confirm that in terms of the approaches to urban ecological research done in Cape Town, the focus is on urban nature conservation—ecology in cities. Experts see the region's longer colonial history and need for cultural conservation as going hand in hand with concern and awareness of natural conservation. Tengberg *et al.* (212) and Plieninger *et al.* (2013) have identified this opportunity to link heritage concerns of cultural landscape with environmental conservation concerns through Cultural Services.

The media further enhances this concern for natural conservation. Cape Town has been featured as the World Design Capital for 2014, and this is expected to increase municipal action towards public projects and spaces in the city. Cilliers and Siebert (2012) assert that resolving conflicts between humans and nature involves community participation and poverty alleviation. McEwan *et al.* (2014) explain the intricacies of the potential commodification of nature through sustainable wildflower harvesting that perhaps make the floristic qualities of the Cape vegetation more directly beneficial as a means to socio-economic empowerment. McEwan *et al.* (2014) demonstrate that in spite of apparent harmony, Cape Town also faces cultural tension between future expectations and politics of uncertainty. The authors question whether Western-centric perceptions of science and knowledge are appropriate in the developing world context.

Johannesburg, Gauteng

Experts view Johannesburg as the main business centre in the country where developers have reason to invest in infrastructure that drives innovative design. This leads to greater specialisation in the industry. However, the Gauteng grasslands are less ornamental than the Cape fynbos and do not attract public attention and appreciation to the same degree. Schäffler and Swilling (2013) stress the need for ecosystem services to be valued publicly in Johannesburg and note the lack of planning or a citizen network to sustain this from the municipal side. The authors feel that service delivery protests discourage citizen involvement in sustainable municipal ecosystem management (Schäffler & Swilling 2013). A perceived lack of value in government services prevents people from adopting any conduct promoted through governance (Harrison & Burgess 2003/2008; Russell-Bennett *et al.* 2009:212).

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These place-based dynamics explain the need for different approaches to conservation based on natural and cultural settings (S. S. Cilliers 2010). The importance, however, of climate and vegetation and related connotations show the potential of landscape pattern to influence people's perceptions, as highlighted by Gobster *et al.* (2007). It also reiterates the cultural importance of how messages are framed to heighten their potential impact, as discussed by Schultz and Zelezny (2003).

It is concluded that, climate, business culture and governance affect lifestyle differently in different parts of South Africa. These factors influence the value given to the environment, which calls for different approaches to pro-environmental design to allow for holistic practice that address local and global scales.

The next section discusses the urban-rural distinction, which emerged as a further differentiation.

9.5.4 Rural areas

The references made to rural areas in discussions with experts, mainly pertained to site-specific endeavours at the residential or village scale. Rural areas in South Africa are seen by experts to require more functional utility gardens due to the lack of basic infrastructure in the area and an associated poverty. As explained by the UN-Habitat (2010:19,25) on Africa, outputs in urban areas far exceed rural areas, with urban areas scoring higher on economic, social and environmental indicators. Researchers explain that low population density in rural areas does not allow for the economic efficiency gains associated with urban areas (McDonald & Marcotullio 2011:194); hence, South African experts correctly perceived a lack of incentive for development of green spaces in these areas. There is also a perceived lack of appreciation from rural residents for ornamental gardens. As stated by an interviewee: "[n]obody wants to plant a tree in their garden if they are starving". The irony of such a statement is that people could plant fruit trees and in this way participate in alleviating their own food scarcity (DAFF 2010).

The real and perceived improved conditions in urban areas encourage migration, with Africa leading the global urbanisation rate (UN-Habitat 2010). The situation is not much improved in peripheral urban areas in Africa where new comers often settle:

> *The newer peripheral [urban] areas are typically controlled by adjacent local authorities and often classified as rural districts or customary land. This situation points to differences in institutional capacities, human and financial resources constraints, service levels and even political allegiances and orientations across administrative boundaries,*

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> *that make it difficult on those living in ever-expanding urban fringes to claim better conditions or services* (UN-Habitat 2010:20).

Some studies have placed the popular perception of a better life in African urban areas in doubt, arguing that living standards do not necessarily increase in urban areas (Turok & McGranahan 2013). This has implications for landscape design and biodiversity because the different local perceptions of designers on the functional and aesthetic "appropriate" requirements in rural and peri-urban landscapes are very different to what is deemed appropriate in urban areas. This is largely based on perceptions of what poor people need and would appreciate. Steg *et al.* (2014:107) question Inglehart's theory that suggests biospheric values will only emerge once basic survival and material needs have been fulfilled. In South Africa, a study by Molebatsi *et al.* (2013) indicates that residential setting in rural areas still had higher species richness compared to other land uses, while Lubbe *et al*. (2011) noted a preference for indigenous plants in less affluent areas. This indicates a positive affinity of rural South African people to native plants and species diversity, which is neither acknowledged nor emphasised or exploited by landscape designers.

Furthermore, despite an apparent increase in the amount of landscape design projects executed in historically disadvantaged and poorer socio-economic urban areas, research show that the government does not give green space provision the importance it deserves in reconstruction and development programmes in several towns (McConnachie *et al.* 2013). Rural areas remain neglected in terms of quality environments, mainly due to one-sided assumptions of what poor people prefer and need most. The different acknowledged aspects to human well-being are neglected, such as spiritual, therapeutic and psychological health (MEA 2005). Additionally the importance of public exposure to functioning ecosystems and acceptance of alternative forms of nature do not receive the required attention (Colding & Barthel 2013; Gandy 2013b).

Ironically, the restoration of natural vegetation is more associated with rural areas by landscape designers, but restricted to "natural areas" where large-scale infrastructure has been installed. The Working for Water National Public Works programme combines ecological restoration with poverty alleviation and is an often-cited "good example" by experts in South Africa. Yet, the direct dependence of rural dwellers on Provisioning Services in Africa (Egoh *et al.* 2012) and the commodification of nature through government conservation projects (McEwan *et al.* 2014) do not offer avenues for rural citizens to comprehend the importance of facilitated green spaces that includes biodiversity for human well-being. According to the predicted trend of urbanisation in

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South Africa, rural citizens may soon reside in urban areas, which implicate that they will be the urban residents that need to be accepting of multifunctional and biodiverse urban spaces. Yet, they will have no formative references that enable them to appreciate these spaces, since they did not grow up with them and were never exposed to the concept of biodiversity. Research has emphasised the importance of childhood education and early and repetitive exposure of children to nature (Aaron *et al.* 1994; Kaplan & Kaplan 1989). Although it could be argued that rural people are exposed to natural areas, which is not always the case, the significance of accepting domesticated or facilitated green space with specific criteria is what is of importance here. Molebatsi *et al.* (2010) explain that people become more dependent on Cultural Ecosystem Services in urban environments in South Africa and less on Provisioning Services. The onus is thus very much on the multifunctionality of urban areas that include all types of ecosystem services to promote their acceptability to all citizens. Cultural Services again feature as an ideal avenue, since these services foster ownership and stewardship, while providing an overall impression of other services it depends on (MEA 2005; Tengberg *et al*. 2012). Cultural Services—which are the most valued by landscape designers—therefore provide an avenue towards these multifunctional landscapes.

To conclude, there is a perceived lack of green space development and quality green spaces in rural areas due to perceptions and misperceptions of the needs of poor people. With predicted urbanisation in mind, the problem this poses is that people relocating to cities will have a limited understanding of urban nature. These limitations that influence perceptions, values and stewardship might be solved through emphasising multifunctionality in both urban and rural green spaces alike. Designers have the opportunity to overcome this challenge through Cultural Services.

9.6 Discussion of findings on values

> *I think some people do value gardens, and they value them for different reasons. Some have a prestige value they add to it, some is personal because they like plants, some are more practical for utility or use* (Interviewee 7, December 2013).

The analysis also identified and summarised articulation of different values towards landscape design as urban nature from the thick description and discourses. These statements mainly referred to assigned values but could also reflect held values. The researcher did not quantify the identified values but compared them to value orientations identified in the literature. This section makes three comparisons of which two coincide with comparisons made regarding the findings of the content

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analysis. It displays the content analysis conclusions alongside the interview findings for ease of reference and assimilation of findings.

The values articulated in semi-structured interviews are listed in Table 20. The table outlines the identified value projections, where they are displayed and grouped according to the value division of De Groot (2006), which distinguishes between ecological, socio-cultural or economic values. Similar to Gómez-Baggethun and Barton (2013), total value according to De Groot (2006) is a balance between economic, ecological (or security) and socio-cultural values, which will determine the long-term sustainability of the project and should also consider risk value or resilience.

Table 20: Division of values articulated by the interviewees (according to the classification of De Groot 2006)

Type of value (De Groot 2006)	Values articulated in semi-structured interviews
Socio-cultural values include	Functional/utility; prestige/status; aesthetics/ornamental; ownership; identity; conformity; morals/ethics; social-welfare; and cooperation.
Economic values	Utility gardens; job creation; poverty; infrastructure; profit; sustainability
Environmental values	Indigenous and rare species

Source: compiled by author (2014)

As Table 20 shows, the interviewees articulated socio-cultural values the most. This aligns with the social and community concerns most articulated in the profession-focused magazines, which relate to cultural ecosystem services. Economic values were in second place with a balance between the socio-economic goal of poverty relief directed by the government and profit-driven private initiatives. Gómez-Baggethun *et al.* (2010:1216) explain that current market mechanisms are inclined to favour individualism (egotistic values), while corrupting values of community and reciprocity (altruistic values) in developing countries towards economic self-interest. These actions also undermine conservation efforts (biospheric values) (Gómez-Baggethun *et al.* 2010:1216).

The experts also articulated the concept of sustainability several times, but notably, mentions were rather conditional on economics, in terms of efficiency and effectiveness, than ecological or environmental values. McEwan *et al.* (2014:207) confirms that since democracy in 1994, environmental issues in South Africa have been increasingly shaped by socio-economic goals and political expectations. Some rating systems that align with the status of large corporations lead to high technology sustainability as long-term durable option and are associated with high cost. Steg *et al.* (2014) explain that the activation of status as combined with high expenses at a public level can lead to pro-environmental behaviour but may not be inspired by biosperic values. Unfortunately these behavioural patterns are unrelated to environmental sentiments, which implies that behaviour will cease when benefits are taken away (Steg *et al.* 2014).

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In spite of frequent articulation, this specific vagueness of the concept of sustainability was also evident in the content analysis of the magazine project discussions. The interviews did not prominently feature practical decisions regarding direct drivers of change in ecosystems controlled by the industry, such as decisions on land use and land cover (MEA 2005). As Wu (2014) explains, the concept of sustainability is commonly misconceived to be aimed at maintaining the status quo, while sustainable initiatives should be implementing changes to improve future conditions.

The interviewees mentioned socio-political aspects like inclusion of job creation and skills development initiatives in state-run projects; these are mainly socio-economic issues of governance. There is a perceived tension between the status of the environment and social welfare. This discourse is very specific to the South African context, characterised by a lack of concern with human welfare throughout the country's history of slavery, colonialism and apartheid. The attitude of the governing authority in these historic regimes often placed animals or plants above human life of those discriminated against while scenic nature was often reserved for the benefit of the ruling population only. For example, in apartheid South Africa, while many non-whites received very little aid from government, money was invested in nature conservation projects; furthermore, non-whites were not allowed on the best beaches in the country or in nature reserves such as the Kruger Park (except as labourers), which were exclusively reserved for whites. McEwan *et al.* (2014:207) explain that conservation cannot be divorced from socio-economic concerns in South Africa due to the problematic position of conservation during colonisation and apartheid.

Table 21 has grouped the identified values in the data of both research instruments according to value orientations in environmental ethics, of Intrinsic, Fundamental, Eudaimonistic and Instrumental Value (Jax *et al.* 2013).

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Table 21: Values identified through interviews as compared by value orientation identified in environmental ethics and environmental psychology

Types of value orientation in environmental ethics (Jax *et al.* 2013)	**Environmental psychology (Thompson & Barton 1994)**	Values articulated in content analysis	**Values articulated in semi-structured interviews**
Intrinsic value in and for itself that implies moral obligation towards it;	**Eco-centric**	None	Morals/ethics
Fundamental Value as a basic condition for life on earth		Environmental management; Environmental restoration/rehabilitation; Biodiversity; Horticulture/plant choice; Habitat	Indigenous and rare species
Eudaimonistic Value as a basic condition for good human life	**Anthropocentric**	Sense of place; Heritage; Identity; Aesthetics; Design; Horticulture/plant choice; Social/community (tourism, safety, etc.); Education; Urban renewal; Law/environmental control	Prestige/status; aesthetics/ornamental; ownership; identity; conformity
Instrumental Value as a means to something else: functional utility		Medicinal plants; Social/community (tourism, safety, etc.); Urban agriculture/permaculture; Sustainability; Waste; Water wise; Pollution management; Mining rehabilitation; Climate change; Renewable energy; Recycling; Resource management; Green Building/technology; Education; Design	Functional/utility; cooperation; utility gardens; job creation; poverty; infrastructure; profit; Sustainability; Social welfare

Source: compiled by author (2014)

Like the findings of the content analysis, most values identified through the interviews fell in the Instrumental Value group of functional utility or, in second place, in the Eudaimonistic Value group as a basic condition for a good human life. Few values were articulated as Fundamental or Intrinsic in terms of nature. Chapter 8 discussed the problem of institutional constraints on value articulation (Lockwood 1999), indicating potential limitations imposed by designers on their audiences regarding Fundamental and Intrinsic Values of nature.

Differing from the content analysis, the interviewees mentioned morals and ethics with regard to the professional conduct of designers. However, as indicated in Table 21, these ethical and moral considerations were seen as socio-cultural in their projections. As explained by Jax *et al.* (2013), ethics do not only deal with value and valuation (axiology), but also encompass duties and obligations (deontology). While moral obligations can be direct in terms of interactions, they can also be indirect consequences of actions and their results. From the discussions, these results are perceived to be of social consequence and therefore the degree to which they reflect biospheric values is questionable.

Furthermore, the researcher compared the values projected to Landscape Values and tangibility and intangibility (as per Alessa *et al.* 2008 and Van Riper *et al.* 2012, based on the work of Rolston & Coufal 1991). Table 22 displays the results.

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Table 22: Comparison of values articulated in interviews with experts with Landscape Values identified by other authors

Landscape Values in Content Analysis	Landscape Values in Semi-structured interviews	Landscape Values (Alessa *et al.* 2008)	Tangibility (Alessa *et al.* 2008)
Environmental management; Environmental restoration/rehabilitation; Biodiversity; *Horticulture/plant choice; Habitat*	Indigenous and rare species	**Biological diversity**, provide places for a variety of biota	**Tangible**
Identity; Law/environmental control	Prestige/status; ownership; Identity; Conformity; Cooperation	**Cultural,** associated with the passing down of knowledge and traditions	
Heritage		**Historic**, places and things of natural and human history	
Social/community (tourism, safety, etc.)	Social-welfare	**Recreation,** outdoor, recreation activities and experiences	
Urban renewal	Job creation; Poverty; Profit	**Economic** valued for economic opportunities like tourism and fisheries	**Intermediate**
Habitat		**Wilderness**, because they are wild*	
Aesthetics; *Design; Horticulture/plant choice**	Aesthetics/ornamental	**Aesthetic,** valued for the scenery	
Biodiversity	Morals/ethics;	**Intrinsic,** just because they exist and unrelated to humans	
Sustainability; Waste; Water wise; Pollution management; Mining rehabilitation; Climate change; Renewable energy; *Recycling; Resource management*	Functional/utility Infrastructure; Sustainability	**Life sustaining**, produce, preserve, and renew air and water	
Urban agriculture/permaculture	Utility gardens	**Subsistence** provide necessary food and materials for humans*	
Green Building/technology; Education; *Design*		**Scientific,** learning about the environment	**Intangible**
Recycling; Resource management		**Future**, allowing future generations to know and experience	
Sense of place		**Spiritual,** sacred, religious, spiritually important	
Medicinal plants; *Sense of place*		**Therapeutic**, make people feel better, physically and/or psychologically	

Source: compiled by author (2014)

According to Table 22, the most articulated value findings from the content analysis—namely, social and community matters—are found among the tangible values. Design, aesthetics and sustainability are all considered intermediate. Thus, comparatively fewer value findings were found among the intangible value categories. This is even more drastic in terms of the findings from the interviews with experts; no intangible values were articulated in these conversations. In Table 22, there is a noticeable absence of scientific, future-oriented, spiritual and therapeutic value articulations in terms of expert articulation and sparse articulation of these themes in design project discussions.

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The researcher quantified value articulations from the content analysis and used them to get a sense of which ecosystem service categories were regarded as more "appropriate" for urban settings and which were neglected. The results of the content analysis discussed in Chapter 8 found that products obtained from ecosystems (Provisioning Services) and ecological functions (Supporting Services) are regarded as less important in landscape design practice than cultural non-material benefits obtained from ecosystems (Cultural Services) and benefits obtained from regulation of ecosystem processes (Regulating Services).

When the neglected ecosystem service categories are matched to Landscape Values in Tables 22, Provisioning Services could be paralleled to subsistence, an intermediate value, and Supporting Services to biological diversity, a tangible value. From this comparison, it can be deduced that although the Instrumental or functional utility of nature appears to be highly valued in landscape design practice, it would seem that material benefits obtained from ecosystems have not yet been incorporated in current thinking of landscape designers as necessary in urban green areas as suggested by urban ecological literature. Even more acutely illustrated, the Fundamental Value of biodiversity in regulation of ecosystem processes through biotic diversity in urban areas is not highly valued by professionals. This coincides with the literature on a lack of ecosystem functions inclusion in landscape design in the United States (Steiner 2014).

When further comparing the articulated ecosystem service categories from the content analysis with the findings of Table 22, it can be deduced that the importance of ecological processes (Supporting Services) in reconstructed urban nature are neglected in terms of Scientific—learning about the environment—and Future—allowing future generations to know and experience. Meanwhile, Spiritual and Therapeutic values are not seen as an essential part of conditions for a good human life—Eudaimonistic Value or Cultural Service. Furthermore, professional practice does not articulate the appreciation of Wilderness and Historic—places and things of natural and human history, in urban contexts. The Instrumental and the Eudaimonistic Values of intangible aspects need greater acknowledgement, along with the recognition of Intrinsic and Fundamental Values of nature.

To sum up, compared to the literature, landscape designers in South Africa neglect the Fundamental Values and Intrinsic Values of nature. This relates to the Intangible Landscape Values of Scientific and Future-oriented purposes of Supporting Services, as a Fundamental Value of nature, and spiritual and therapeutic Landscape Values, which are somehow not recognised as Eudaimonistic

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Values or part of Cultural Services. Wilderness and Historic aspects are also not highly valued and again reflect on a lack of Fundamental and Intrinsic Values of nature. Although utility value is highly regarded, Provisioning Services in urban areas are not yet acknowledged in South Africa. These perceived value biases of landscape designers are important because they may affect the inclusion of all people's values and appreciation of nature in urban green areas. All the neglected Nature and Landscape Values listed above have specific contributions to make in terms of human well-being and future resilience according to the literature.

9.7 Summary on social-ecological variables

This section discusses the identified interrelated and dependent components of the discourse on urban ecology in South Africa, as set out in the objectives of this study. Appendix F contains additional documentation of the identified social-ecological variables. However, according to the research questions the direct relevance of these variables for this thesis pertains to how they influence professional social practices for the operationalisation of values. This section presents a summary of the identified main variables and themes, as expressed by the experts in the semi-structured interviews.

9.7.1 Role players

Role players make decisions that affect ecosystems and their services (MEA 2005). Designers are role players that strongly influence assigned values in the landscape design process. The designer is influenced by economic concerns of time and profit, the professional institutions that standardise the profession, and the availability of the correct products and plants. Figure 51 graphically summarises designers as role players: steered directly by institutional guidelines (education and standards) and market concerns (time and profit) but also product availability.

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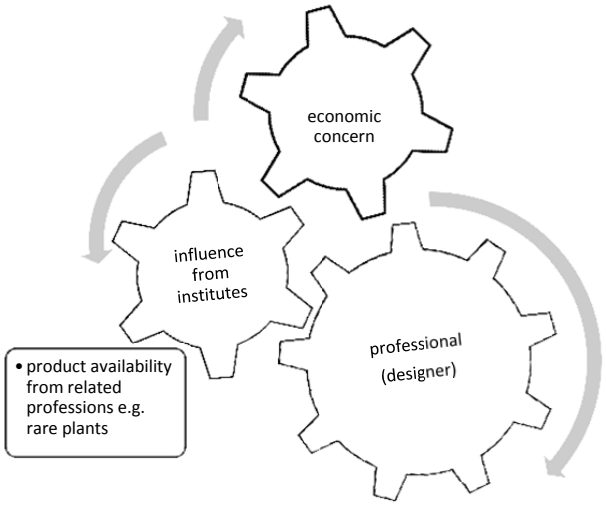


Figure 51: Designers as role players in the industry

Source: author (2014)

The identity of landscape designers lies in the creative and innovative endeavour of design. Design aesthetics are important and so are economic and functional considerations regarding client and public acceptance. Biodiverse and food gardens are seen as hard to achieve in terms of physical skills and social acceptance and management.

The client is the second most important role player in terms of assigned values, which are set in place by the project brief. Potential clients include developers, the state and the public. The private client is mainly concerned with profit but is also subject to government legislation and regulation, which may adhere to global policies. Additionally, influential groups and individuals may affect the brief, as well as public perception and the media. The state as client also has economic concerns, but is largely influenced by public needs and expectations, which are translated into government goals (in this case, poverty relief and skills development for the unemployed). The state is also subject to influence from small groups and individuals, public perception, the media and global policy agreements.

9.7.2 Drivers of change

Figure 52 summarises the drivers of change and the ecosystem services articulated by the interviews. Landscape designers have identified the main indirect drivers of change in terms of ecosystems and their services (MEA 2005) as economics, socio-political factors and cultural norms. The main direct driver of change in the hands of landscape designers is species introduction and removal, with some attention to external inputs and new technologies.

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Land use and land cover are prominent direct drivers of change (Alberti *et al.* 2008; Grimm *et al.* 2000; MEA 2005; Zipperer *et al.* 2011). However, the experts interviewed did not give these drivers of change the attention they deserve. This may be due to the perceived lack of power of landscape designers to influence these aspects, as explained by Steg *et al.* (2014). More often, the discussions with experts articulated the Cultural and Regulating ecosystem services, as per the content analysis (see Figure 52). It is interesting to note that the importance of Regulating Services such as storm-water control and flood mitigation which is highly valued in the US and Europe (Moore & Hunt 2012), did not pertinently feature in the discussion with experts.

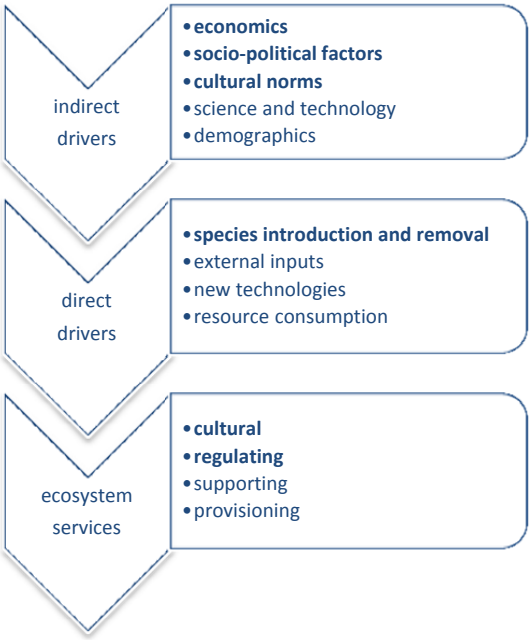


Figure 52: Summary of direct and indirect drivers of change in terms of ecosystem and their services, and the articulated services in the South African landscape design industry

Source: author (2014)

9.7.3 Resilience

Chapter 2 (refer to Figure 7 in 2.3.4) discussed the basic components of a social-ecological system for identifying vulnerability in terms of resilience. These include four components: (1) social norms and values; (2) management of actors; organisations; and (3) ecosystems functions and dynamics, which interact with (4) knowledge systems (MEA 2005). In terms of achieving social-ecological resilience, the experts identified knowledge systems as the most secure means, with management in second place. Knowledge is considered important in terms of the public, profession and government, regarding expertise and management. The experts identified the following avenues to improve

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knowledge: environmental education in schools for the public; improved university and practice education for the profession; using social media as a corrective force for the general public; dispersal of research and publications; marketing; and designers spreading awareness to client and the public by means of good example projects. However, Bolderdijk *et al.* (2013) suggest that an increase in environmental knowledge will only motivate people who consider caring for the environment to be a central personal value. This suggests the importance of childhood education, as confirmed by Mansbridge (1994).

Social scientists argue that the complex process of knowledge formation is largely socially constructed and to a lesser degree attached to the material environment (Berge & Luckmann 1966). Talis (1989 in Terre Blanche *et al.* 1999:278) argues that "[t]he reality that any individual inhabits is a vast inverted pyramid of discourse poised on a tiny apex of experience". Dominelli (2012) illustrates knowledge as having social and material components, while Gobster *et al.* (2007) argue for the material environment to have great impact on our perceptions, which in turn influence human values and behaviour. For this reason, the researcher considered project examples as a specific means to raise awareness and knowledge of ecosystem functions.

Management avenues identified by the interviews coincide with the literature, these include: reference written for projects in government (Box 2011); policy compliance (Box 2011); law enforcement (Box 2011); penalties; standards imposed by institutes (Box 2011); inclusionary processes (Wilson & Howarth 2002); systems thinking and rating systems (Box 2011). Although acknowledged in the literature as indicated, many of these options are top-down and punitive measure that motivate extrinsically only, which has been shown to not have long-term positive effects on human norms (Mansbridge 1994). From the literature, inclusionary processes combined with systems thinking, institutional standards and rating systems were proven to hold potential for management.

In terms of resilience, values were only ranked in third place, although the interviewees acknowledged the role of values in management and also in terms of social groups in the profession that generate knowledge together. The values of the client, the designer, the public and government are all important. Specifically, the experts directly identified the moral values of the public and professional ethics as powerful influences, as previously pointed out by Steg *et al.* (2014) and Dominelli (2012). Aesthetic and cost concerns narrow pro-environmental design possibilities. However, on a positive side, there is more municipal support and an increased environmental

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consciousness of other professions, due to global concerns of climate change. Steiner (2014) points out that this may equally result in a quest for legitimacy between different professions, which is also perceived by experts.

The interviewees did not mention ecosystem functions or processes in any direct way, yet they acknowledged the presence of urban nature and its potential psychological influence in terms of human decisions. The experts cited examples of "good work" in the profession as a powerful way to spread awareness. This idea resonates with Box's argument (2011:309) for targets of tangible achievements to encourage people and organisations to pioneer change. Some system models capture the importance of socio-cultural relations in terms of professional knowledge sharing and cooperation (De Groot 2006; Van Oudenhoven *et al.* 2012). This concept is also acknowledged by the works of Haas (1989) and Mansbridge (1994), which discuss "epistemic communities" as powerful means to fostering knowledge creation and social change.

To conclude, the importance of resilience against vulnerabilities makes it necessary to take into account drivers, role players, management, knowledge and values for operationalisation. Knowledge is largely socially constructed, which makes it value dependant but physical perceptions can aid awareness. The material components of knowledge that are subject to observation indicate potential for physical examples of pro-environmental design.

9.8 Conclusions

As stated by Özgüner *et al*. (2007:44), the urban landscape brings together a complex diversity of goals and objectives that professionals need to resolve. Designers reconcile not only science and politics, but also social legitimacy, through landscape design (Swaffield 2013:1195). This is not an easy task. This chapter reviewed the decisions and motivations of landscape designers, which are reflective of their values, and the associated discourses they employed when discussing design and contextual matters in the industry. The chapter considered the narrative of the findings from the semi-structured interviews as set against the research questions. It particularly identified and discussed four professional social practices highlighted by the interviews and considered their potential. Thereafter, it presented the main social discourses that surfaced in the interviews. The discourse included five local values of landscape design and four specific contextual influences on design. The next section compared the findings on values captured by the two research instruments with value categories identified in the literature. The section elaborated on the implications of the findings for the South African industry. The last section summarised the important variables for

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social ecological systems, pointing out important role players, and direct and indirect system drivers for landscape design.

This section considers the research questions, drawing conclusions from the many different components discussed in this chapter.

i) What have been the concerns addressed by landscape design practice in South Africa in the last decade?

In the last decade, historical variables that influenced landscape design projects included: (1) South Africa's political transition (since 1994), with its associated emphasis on social well-being and equity, which encouraged heritage projects, utility gardens and job creation as part of landscape design; (2) the economic boom (2000-2008) and recent financial crisis (since 2008), which changed the priority given to landscape design; (3) the ongoing environmental crisis with more recent emphasis on climate change, which influenced design style to be more pro-environmental and sustainable, and increased the general importance of the profession in the eyes of the public.

The most prominent variables that influenced landscape design broadly were budget, design brief, the client's attitude and knowledge, the designer's knowledge and creativity, considerations regarding sustainability and the social context. Political and economic concerns were more prominent than environmental concerns in the discussions. Social concerns and interactions featured as the main considerations for design. These findings are congruent with that of the content analysis but add specific nuances by revealing more in terms of a strong socio-political and economic drive in project considerations, which may also reflect a perceived change of focus rather than an extreme condition.

Of high concern for the identity of the profession is design in terms of innovation, quality and aesthetics. These are strongly projected cultural concerns with potentially embedded cultural biases. Supporting these concerns for quality is a second related discourse posing that design is for people—to meet public needs and appreciation in terms of aesthetics, economic and functional considerations. These three qualities are not mutually exclusive but competitive, hence posing high demands on designers who aim to meet all three. Biodiverse gardens are seen as difficult to achieve from a physical skills and social acceptance perspective. Socio-cultural issues of ownership and maintenance make both utility and biodiversity gardens challenging as public spaces. These

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perceived difficulties with biodiversity and utility gardens could potentially also reflect a rejection of knowledge that does not align with values, as described by Bolderdijk *et al.* (2013).

Context also has a great impact on embodied outcomes of the design. Aspects of place that have bearing on landscape design are climate and business style that can be considered an economic driver; both influence lifestyles. The management practices of different municipalities relate to governance, a socio-political driver that affects urban environments. Design decisions are further influenced by different approaches based on specific location, level of urbanity, project brief and size of the project.

The importance given to the environment is thus the result of existing natural environmental features and climate, combined with human cultural preferences, which are reliant on economic development tendencies. These factors influence the value given to the environment, which calls for different approaches to pro-environmental design to be more holistic by acknowledging both local and global scales. In terms of the drivers of change, Cilliers (2010a) acknowledge the influence of natural settings on conservation approaches, while the MEA (2005) indicates climate change and natural and physical drivers as direct drivers of ecosystems and their services; however, neither Cilliers (2010a) nor the MEA (2005) lists climate pertinently as a driver. This would appear to be a novel introduction and potential expansion of existing theory as an indirect driver that influence human perception and response in a biome divers country.

Rural environments are perceived by designers to differ in terms of user needs and investment incentives. These perceptions of designers and the state can have repercussions for predicted urbanisation in South Africa. The perceptions of rural residents towards urban nature are currently preconditioned by limited rural ornamental green space and multifunctional landscape examples. Current lack of green space development and quality in government social responsibility programs in rural towns (McConnachie *et al.* 2013) may be the result of sole recognition of functional requirements for these areas based on rural poverty (UN-Habitat 2010). These restricted interpretations of urban nature for low income rural citizens who are likely to become future urban dwellers not only currently disadvantage their well-being by not providing them with a variety of green space options required by poor people; but also compromises the future public acceptance of multifunctional and biodiverse urban spaces. This is because the lack of childhood exposure to nature has been shown to affect sentiments of stewardship towards the environment (Kaplan &

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Kaplan 19989). Designers may resolve this issue by emphasising the multifunctionality of green spaces in urban and rural settings alike by exploiting the role of Cultural Services.

ii) What do these concerns disclose about contemporary values related to urban ecosystem services, for example, which ecosystem services are valued and which are neglected by landscape design practice in South Africa?

Value preferences translate into a high regard for Cultural and Regulating Services and a low regard for Supporting Services. Professional Nature Values (Jax *et al.* 2013) mostly fell in the Instrumental Value group (i.e., functional utility) and the Eudaimonistic Value group (i.e., conditions for good human life). The study found few values to be Fundamental (i.e., basic conditions for life) or Intrinsic to nature (i.e., for itself, implying moral obligation), while the experts did not articulate Intangible Landscape Values (Alessa *et al.* 2008) at all. The importance of Intrinsic Values was discussed in previous sections. It suffices to say that Intrinsic Values are a very important component to neglect in environmental decision making because they are normative and people should have the opportunity to express assigned values consistent with their held values (Lockwood 1999).

The study found a discrepancy between what the literature promotes and the values of landscape designers. In combination with the findings of the content analysis, the comparisons show that although the Instrumental Value of nature is highly valued in landscape design practice, the material benefits obtained from ecosystems—Provisioning Services—have not yet been incorporated in current thinking around reconstructed urban nature. Even more acutely illustrated, professionals do not often articulate the Fundamental Value of biodiversity in regulation of ecosystem processes—Supporting Services—in terms of reconstructed urban nature.

The importance of ecological processes—Supporting Services—in reconstructed urban nature is also neglected in terms of scientific learning and future experience oriented purposes. Meanwhile, designers do not see spiritual and therapeutic Landscape Value—Cultural Services—as an essential part of conditions for a good human life. These intangible aspects (Alessa *et al.* 2008) were generally neglected both in terms of articulation by experts and in design publications. Furthermore, professional practice does not articulate the appreciation of Wilderness and Historic aspects as a Landscape Value in urban contexts. This can be problematic as the limited articulation of various possible values around landscape and nature by professionals can pose restrictions in terms of value articulation of individual stakeholders (Lockwood 1999). It may be argued that these specific aspects are not of value in the South African context, but although Wilderness or can be regarded as

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culturally specific, Cronon (2006) believes it has value to suggest aspects of otherness; Therapeutic and Spiritual value has proven Functional Values (Matsuoka & Sullivan 2011; Rohde & Kendle 1994; Tzoulas &Greening 2011); while Historic aspects embrace concepts of national and individual identity (Hull *et al.* 1994; Sörlin 1999); it is also argued that Scientific learning and Future experience for future generations are key aspects for resilience as a security value (Gómez-Baggethun & Barton 2013).

iii) Which contemporary professional social practices are articulating the value of certain ecosystem services in the landscape design community of practice?

The study identified eight professional social practices that hold potential for pro-environmental design: (1) education: research for improved understanding, (2) professional training and related government expertise; (3) the media: for awareness and trends to follow; (4) international policy compliance and associated public pressure; (5) legislation that applies penalties; (6) awards and rating systems; (7) good examples and display gardens; and (8) professional ethics and innovation.

The experts mentioned the essential contribution of the government and the South African Council for the Landscape Architectural Profession (SACLAP) in influencing the role and education of the profession, in endorsing and supporting environmental practice, and in increasing the number of appointed professionals by local and national government. In addition, the experts noted the importance of legislation for government and corporate projects. Legislation does influence what professionals deem important and the decisions they make. However, experts perceive the law as a source of negative motivation through punishment, which furthermore is largely not enforced. Thus, legislation does not address the problem of noncompliance by professionals or the general public.

People follow trends, market logic and financial benefit. These factors highlight the importance of advertising and marketing via the media, if pitched at the right audience. This reality points to the potential of rating and award systems. Rating systems are perceived to mostly influence corporate behaviour and projects with high cost and motivate behaviour not for ethical reasons but rather for status and financial benefit. The experts argued that high-tech solutions are not always the most sustainable. The advertising and examples of green initiatives resulting from green rating systems do hold potential to influence public perceptions and designers that follow examples of others in the industry.

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Award systems in the profession serve as benchmarks, promote quality and credibility, are useful for marketing and advertising, motivate staff, and teach. However, the criteria and application are important and therefore judges play a significant role. Different award categories are required, while the judging of designs need to acknowledge the contribution of the contractor. Award systems also have limitations. There are not enough incentives for participation in awards since not all designers are members of institutions. Awareness of awards remains largely inside the profession. Furthermore, the environment does not play a large enough role in the criteria used to determine which projects receive awards.

Education inside the profession is required to increase the Functional Value of designs. There is a perceived lack of plant, sustainability and technological knowledge. This may be addressed at primary school and tertiary education levels, but it does not resolve the current situation. Incentives associated with awards and rating systems can potentially stimulate education through participation of designers in these practices. These practices could also consequently lead to knowledge sharing and produce the much-needed examples required for professional credibility and public conviction.

iv) How can professional social practices operationalise values to socially produce essential ecosystem services?

The importance of long-term resilience against vulnerabilities makes it necessary to take into account drivers of change in ecosystems and their services. This involves socio-cultural relations of role players, management, knowledge and values when considering operationalisation.

The study identified knowledge as a prime consideration of social-ecological resilience in landscape design in South Africa. Since knowledge is largely socially conceived, it is value dependant to some extent (Bolderdijk *et al.* 2013). However, knowledge can alter perceptions in aesthetics and can also through cognition influence the value assigned by professionals to certain Functional Values that may construct other types of values (Lockwood 1999). Value articulation can affect knowledge generation and acceptance. Equally, the material components of knowledge that are subject to observation highlight the potential of landscape patterns and aesthetics. This connection indicates potential for physical examples of pro-environmental design to articulate values. When connected to symbolic aspects, meaning or aspects of experience, landscape patterns can be provocative, exciting human emotions and enabling potential for stewardship or change through transformative learning. Landscapes are constructed daily, and these landscapes can embody pro-environmental values.

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Additionally the discussions with experts indicated that

i. The design phase is seen as the essential decision-making component of the design process.
ii. Institutes impose standards and incentivise participation of designers in social practices.
iii. Competition among professionals improves knowledge and quality of work.

Based on the feedback of the experts and the discussion on the influence professional social practices have for intrinsic and extrinsic motivation (Chapters 8 and 9), the study identifies award systems as the social practice with the most immediate ability to bring together knowledge and physical examples with material benefit. Awards provide opportunities to foster research and innovation; encourage competition, recognition and advertising; and supply physical good examples with a focus on the design phase, through institutionally determined standards.

The awards process is a communal practice that provokes competition and excitement for human emotion, which is required for transformative learning. It has potential to activate the self, material incentives, and create the tangible examples of good practice that can be observed and experienced. In terms of operationalisation of professional values, the Chapter 10 reviews award systems to demonstrate their local potential.

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Chapter 10



erosion control

ESS image by Jan Sasse (TEEB 2011)

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CHAPTER 10: Operationalisation of Values through Award systems

10.1 Introduction

The literature review and fieldwork each revealed professional social practices of value articulation. Although the researcher identified several practices that articulate values of nature and specific ecosystem services, the research aimed to investigate the operationalisation of these values within the landscape design industry.

Environmental laws were one of the main professional social practices considered. Since policy and legislation are not shaped by the industry but rather through global and national drivers, operationalisation rather implies attuning the industry to existing pro-environmental legislation. While Du Toit and Cilliers (2014) have investigated the various existing environmental policies and laws, a study specifically focused on laws influencing and pertaining to landscape design practice could lend greater insight into this important influence on professional values. This study did not pursue legislative practices, since the experts interviewed felt sceptical about the lack of enforcement of the law, while professionals and the literature alike have indicated the negative association with law—i.e., extrinsic motivation through punishment.

A second social practice considered was rating systems. Experts recognised the potential and need for knowledge. Both awards and rating systems have the potential to articulate knowledge, and thus are considered professional social practices with potential. The corporate status associated with the practice of rating systems—which mainly binds them to large-scale projects and tax incentives—did not pose a convincing rationale for this practice. The incentives produced by rating systems are material and non-normative. These incentives do not produce long-term change and can further potentially erode exiting pro-environmental normative practices. For this reason rating systems did not pose a convincing social practice towards operationalisation. At the time of the research, the government-supported Green Building initiative had received much attention in South Africa. However, the Green Building approach does not provide an effective rating system for landscape designs. Rating systems that do emphasise ecosystem services exist but are currently not part of professional practice. Alternative green rating systems are currently being pursued in research in South Africa. This study uses a recently developed ecosystem services rating system, SITES 2014, in conjunction with the literature to identify shortcomings in local award systems, in terms of ecosystem service production.

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Based on the literature and contextual factors revealed by the findings of the fieldwork, the researcher recognises the potential of award systems as a social practice that could instigate change in the industry. In addition, the communal engagement promoted by the award systems as a social practice could consequently lead to knowledge sharing in the industry and produce important examples for professional and public conditioning not only in terms of real advantages but also alternative visual conceptions of urban nature through experiential learning. Award systems could focus directly on design and encompass important aspects of innovation, quality and contextual factors, which form a core part of the identity of the profession. Furthermore, since awards are not enforced, they are a more appropriate social practice for awareness spreading and consensual learning than the law or rating systems. They allow for alternative conceptions of knowledge to partake and through the excitement and activation of the self as a normative value cue, transformative learning opportunities are opened up. They can also be tuned to address specific value-related shortcomings identified by means of comparisons with the literature.

This study identified two existing award systems for landscape design practice in South Africa. The South African Landscape Institute (SALI) awards are bestowed upon institute members largely consisting of landscape contractors who also do in-house design[29]. SALI has three regional offices: in Gauteng, the Western Cape and KwaZulu-Natal. The Institute of Landscape Architects in South Africa (ILASA) Merit Awards are presented to institute members consisting of graduates in landscape architecture. ILASA has regional committees in Gauteng and the Western Cape.

The research questions enquired into three aspects of the award systems as a social practice inside the profession: (1) which values they articulate of urban nature; (2) which ecosystem services they reflect and neglect; (3) how to operationalise essential services.

Figure 53 shows a graphic illustration of the chapter layout. As a first approach, the researcher interviewed persons involved with the judging process of the awards for a number of years in order to gain a subjective understanding of the context of each award. This is presented in the first subsection. Then, the researcher reviewed tendencies for each of the award systems over the past five years. Thereafter, the researcher considered the criteria and categories for the awards in terms of which biodiversity and ecosystem services they address. Finally, the researcher used the literature to critically appraise the extent to which the existing criteria effectively articulate the four groups of

[29] *In-house design* refers to companies that do the design themselves. Since several companies are in construction also, this is term identifies projects designed by the same company that did the construction implementation. *Design by others* speaks for itself, referring to a project where one company did the design and another company implemented the construction.

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ecosystem services. The discussion and conclusion identifies key aspects for operationalisation. This chapter aims to use the award systems as an example of how professional social practices can be operationalised to promote a balanced social production of ecosystem services in the industry.

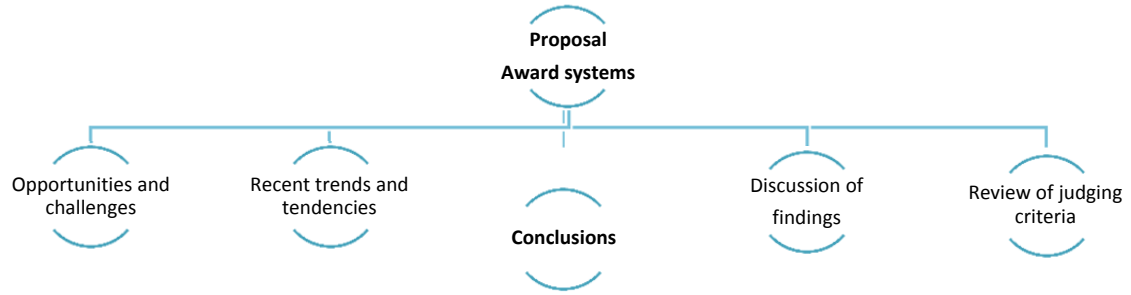


Figure 53: Graphic illustration of the chapter layout

10.2 Opportunities and challenges of two award systems

The researcher interviewed six individuals: two experts involved in management and judging for a number of years, and one participant, for each award system. Appendix B contains the questions posed to the interviewees on the awards. The process and analysis were the same as that followed for the semi-structured interviews with experts in the industry. The researcher recorded the interviews and took notes, which were then worked into a thick description. The process aimed to gather an understanding of the purpose, benefits, opportunities and constraints of current systems to interpret these towards potential operationalisation of values.

10.2.1 Purpose and achievements of the awards

The ILASA awards are presented every two years, with events alternating between Johannesburg and Cape Town. The goal of the awards is simply “the promotion of excellence in the profession” (Interview, November 2013). The SALI awards are presented yearly and strive to specifically improve professionalism and quality of work. This entails celebrating “good and appropriate” work in terms of functionality, context, budget and sustainability (Interview, November 2013). Both awards provide marketing opportunities, which motivate designers to participate in them. Experts felt that the two awards respectively achieved their stated purposes, but that too many awards have been granted in recent years.

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In 2004, the national judge for the SALI institute amended the criteria for the SALI awards, setting out specific goals. Over the following seven year period, the award system achieved its goals to promote: awareness of water harvesting; locally appropriate indigenous landscaping; "good functional design", which steers away from form and "pattern-making" or "themed gardens" towards functional requirements; and a longer term vision for landscapes after design, installation and maintenance period to achieve a mature end result (Interview, November 2013). Furthermore, the SALI awards addressed a perceived ignorance in the industry regarding unsustainable practices of water wastage and plants harvested directly from nature. The SALI awards provide a form of recognition and marketing for members to the extent that experts speculated that people join the institute to participate in the awards. Thus, the respective institutional purposes of the awards relate well with the objective of achieving operationalisation of values in terms of landscape design practice.

10.2.2 Benefits and shortcomings of current award systems with recommendations

The experts see the benefits of the SALI awards as the promotional material for marketing and advertising, and an opportunity for competition among members, which sets and raises standards of work quality. The process is further seen as educational for the judges due to their exposure to examples of good work. The presence of the award system is uplifting and educational to the industry through the comments received by the participants from the judges. Since landscape architects and growers are often used as judges, the process also promotes a better understanding between parts of the industry.

Critiques of the current SALI system mainly relate to an over emphasis on design as opposed to horticultural and installation quality, which potentially stems from the involvement of designers as judges. One judge offered that the design component should be kept purposefully separate in the adjudication of awards focused on construction implementation. The design influences the outcomes and connotation of the awards, which is not a true reflection of the achievement of projects entered into the construction implementation category only. During the judging, judges cannot observe everything in a short period of time, nor can they inspect or verify all crucial aspects. Therefore the information shared with the judges, which is submitted as part of the entry—for example, the budget, maintenance schedule, and client's brief—is important. The current feedback sessions provided after each year's judging for SALI members and judges are very useful in terms of voicing general judging concerns, although decisions are mainly the domain of the national judge to oversee changes implemented.

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The ILASA awards focus on a single profession and aspire to improve design, market the profession as a whole and create coherence among landscape architects—from students to professionals. The current system is seen as cost-effective, which is important for a small profession to lower member donations. Current concerns include the selection and quality of the adjudicators. Two adjudication panels are deployed to save on traveling costs, one in the north and one in the south of the country. A perceived challenge is the need for consistency between the two adjudication panels in terms of expertise and professionalism. Two interviewees recommended that the process of electing adjudicators should be revisited and a minimum amount of years in industry should be a pre-requisite for selection.

The criteria are a further challenge, as projects in the northern region (Gauteng and surrounds) are more commercial than in the southern region (Western Cape and surrounds). The interviewees argued that the criteria should not discriminate against the "type of project"; there should be different categories with varying criteria. A further recommendation was that the description of categories should also be clear so that the participants have realistic expectations. This is achievable if the criteria are made known to the participants, which seems not to be the current practice. There should be acknowledgement of "good" versus "excellent" work to gain more exposure through the awards (Interview, November 2013). Interviewees argued that the current process is too selective and much good work goes unnoticed in the industry.

The awards are seen to reward "excellent design", which can be a hard quality to define (Interview, November 2013). Most of the practices with excellent designers often enter projects for the awards, and this disqualifies them from being part of the adjudication. Interviewees suggested that perhaps other built environment professionals could be co-opted onto the adjudication panel, like in the case of the SALI awards, but this suggestion comes with the risk of external influences and prejudices driving design.

To summarise, the awards are seen to improve practice and set standards, yet the selection and influence of judges, the judging process and logistics and criteria appear to pose challenges for the importance of contextual (ILASA) and professional (SALI) differences. From these conversations, the importance of design as identity of the profession and contextual specificities were reiterated as per the findings in Chapter 9.

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10.2.3 Influence of the awards on what landscape design practitioners perceive as important

According to the experts interviewed, both the awards definitely influence what practitioners perceive as important, raise awareness about technological advances and requirements in the field, and disseminate new knowledge. These examples are copied and followed by others in the industry and the marketing derived from it is seen as a further positive spin-off.

In the case of ILASA, where the criteria are not made known beforehand, not all practices are aware of the awards' expectations. However, the interviewees felt that the awarded projects in themselves, as well as the comments from adjudicators, influence perceptions in the industry. In the process, landscape design practitioners are exposed to different approaches taken by their peers, and the practice could very well change mindsets through aspects currently perceived to be viewed by others as important. This is especially true if the reports of the adjudicators highlight novel solutions to design problems through the award-winning projects. A suggested good practice could be to have a design forum after the awards where the recipients could present their particular projects and various aspects could be explained in detail and then discussed.

The experts acknowledged the prospects of the awards to reach further potential regarding education in the profession.

10.2.4 Criteria used in the current judging

In terms of the SALI awards, participants often implement projects with a design done by others. However, the design part is seen as receiving too much weight in the judging—the quality of plant material may be good but is often hard to judge without being influenced by the quality of the design. The awards received market the design as well as the implementation, yet often the contractor only did the implementation. For this reason, the interviewees argued that more clarity is required in terms of the reasons for presenting the award.

The timeframe, scale and manner of the judging is challenging for the judges, especially in terms of the amount of time allocated to view the project. The interviewees argued that marks are often adjusted to an overall impression of the project and do not always include the individual criteria, making the judging more subjective. Furthermore, the interviewees suggested that scores alone might not be enough to influence learning through the adjudication process. Therefore, comments from the judges are very important but are often not a realistic expectation due to the time limits of the judges.

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The ILASA award criteria require revision to be specific to the different categories of the awards. Broad categories in relation to type of work done in South Africa were first revised in the 1980s and then slightly adjusted throughout the years. Each project is evaluated against its own brief—each according to its own merit. The interviewees pointed out that the broad criteria make this type of evaluation possible. Despite the use of criteria, the interviewees perceived judging for the ILASA as influenced by subjective aspects, such as design or overall impression. They raised the importance of comments from judges as a way of clarifying specific reasons for allocated marks. However, in the ILASA awards, the broad criteria are purposefully used, which poses specific challenges regarding subjectivity or personal interpretation of the criteria by judges.

After a general enquiry, the researcher specifically questioned the experts regarding the prominence of the ecosystem service categories in the award criteria.

10.2.4.1 Cultural Services: human well-being as a criterion

According to experts, the ILASA awards address Cultural Services to a small degree. The orientation of the project may be judged and if it “needs” to address social aspects, the project will be judged against it. The context of each project, including the brief, is in this way seen as the major deciding factor on whether a project requires addressing human well-being directly. Interviewees argue that human well-being is implicit or “hidden” quality of all projects (Interview, November 2013). Although this may be so, the enquiry was aimed to detect perceived importance of this design outcome and deliberate decisions as opposed to unintentional side effects.

The experts believe human well-being does not form part of the criteria of the SALI awards as such. However, the judging of the projects is influenced indirectly by the satisfaction of owners, manifested as “enthusiasm and pride”, and the emotional well-being of users (Interview, November 2013). The owners are often “obviously” aware of the sustainability achievements of a garden (Interview, November 2013). Arguably, human well-being is more a design aspect than a horticultural one, and contractors are not trained to optimise this criterion. The rationale is that the national judge as a designer may consider this aspect important in his evaluation, thus including this criterion as a subjective reflection. Interviewees argued that this bias of the national judge is visible in the highest awards presented; thus, human well-being arguably plays a role in the selection while not reflected in terms of specific criteria.

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Most often in landscape design projects, some Cultural Service from part of the project brief, for example, in the form of recreation, i.e., a sport field or children's play area. However, from the answers reviewed in this section Cultural Services and how they relate to human well-being, are not consciously articulated through the award criteria.

10.2.4.2 Regulating Services and sustainability

For both awards, time constraints force the adjudicators to rely heavily on the details in the entry submission and their assumed accuracy to judge this component. According to the experts, the SALI awards address Regulating Services by the criteria of "water harvesting and re-use" and through the planting palette that takes into account water wise usage in the criteria (Interview, November 2013). There is thus an environmental consideration of sustainable practices regarding water use. The experts perceive that the ILASA awards give Regulating Services due attention but not in depth. Past judging panels have recommended simplifying the adjudication sheet. According to the experts, the awards did articulate the aim of sustainability, but it was unclear the extent to which different Regulating Services were articulated. It was thus gathered from the interviews that Regulating Services were reflected in both award criteria to a certain extent.

10.2.4.3 Provisional Services: food, medicinal plants and usable plant products

The SALI awards do not promote but "allow" for entries concerned with Provisional Services in terms of specialised landscape construction (Interview, November 2013). The experts interviewed perceive these aspects as subject to the brief given by the client and "trends from overseas" (Interview, November 2013). In the last couple of years, several projects entered were not "ornamental, but productive" (Interview, November 2013); this is a suspected mind-shift for horticulturalists to purely consider functionality and not decorative effect. Again, experts perceive it as a "design consideration" (Interview, November 2013). Projects often consider economic sustainability, rather than social sustainability. However, urban agriculture and permaculture projects have been entered for awards in the past.

The ILASA awards do not have a specific category for Provisioning Services, but it is seen as "worthy" of inclusion (Interview, November 2013). Some practitioners have been implementing food gardens for a number of years. Food gardens are perceived as important topics in terms of current societal needs, therefore special emphasis ought to be given to different kinds of Provisioning Services during adjudication. The experts acknowledged the rising importance of Provisioning Services for urban areas, but did not think that the two awards criteria articulate them directly.

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10.2.4.4 Supporting Services: diversity of species and habitat creation

Supporting Services are not seen as always "appropriate" for inclusion in the SALI awards but did capture it in terms of "suitable companion planting" (Interview, November 2013). The experts argued that in the case of the Environmental Category of the awards the criteria should be amplified to consider habitat and companion planting as specific criteria. Currently, the category captures the concept of biodiversity through water usage and water requirements of plants only. The experts noted that plant selection by contractors often depends on what grows fast and is available in their nursery, as a cost-saving consideration. The experts did not think that the SALI awards addressed biodiversity or social and environmental sustainability. They argued that the aesthetics of biodiverse gardens would not be publicly accepted. Furthermore, achieving biodiversity is estimated to be very complex and not easy to achieve in practice.

The ILASA awards address the criteria of biodiversity and social and environmental sustainability, but did not do so in detail. Vegetation and plant material selection are adjudicated for each project and if deemed "inappropriate" the project will fail to receive an award (Interview, November 2013). Plant material selection is considered in terms of sustainability, water requirements, and association of species "suiting" to the context. The experts noted that the habitat of the plant species "should be appropriate" to the context, as an obvious consideration (Interview, November 2013), implying that the selected plants must be able to survive in the specific habitat of the project.

The awards do not directly articulate Supporting Services and regard them as an inherent "appropriate" or "suitable" quality of the context. Supporting Services are perceived as socially problematic and complex.

10.2.5 The future of the awards

In terms of the SALI awards, the South African Council of the Landscape Architectural Profession (SACLAP), the professional body for Landscape Architects, is in the process of admitting horticulturalists and landscape managers into the same professional body as Landscape Architects, but with their own category of registration. This is according to the requirements stipulated by the National Qualifications Act (NQF) since the body has so few registered members. SACLAP has plans to introduce appropriate environmental practice in terms of training to all members, which should lead to a greater body of landscape designers addressing environmental issues. In future, the

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required grading of contractors would be done through SACLAP and different categories of registration would be in place to encourage professional ethics at different levels.

The SALI awards will continue due to the argued benefits provided in terms of marketing and advertising. The experts believe a formal body to promote the industry is required. The different professions within the industry should work together, but their roles should be made more explicit. Rating systems like Green Building are seen to still exclude landscape design in the criteria they use. The experts argue that the "Landscape Value" needs to be explicitly connected to property values; for example, a monetary figure should be given to the value of the landscape and what it adds to the value of a property to articulate this. This suggestion equates to economic valuation as discussed in 4.5 and all the debates on commodification and incommensurability.

The role of ILASA and the profession is predicted to change due to the new categories and members in the SACLAP professional body mentioned above. The experts argue that a more frequent revision of awards and criteria is needed. ILASA has a specific purpose, namely, the promotion of excellence in the profession, and the merit awards work towards this same purpose. However, it is not obvious to what extent the awards can achieve this purpose. The awards are not seen as the only way to promote excellence. Other ways are seminars on landscape architecture and smaller workshops where exposure to the latest theory and practice can occur. SACLAP's continued professional development (CPD) system enforces these kinds of practices.

According to one interviewee, a problematic position of the awards is that "[n]ot all landscape architects are excellent designers—but who decides this quality?" (Interview, November 2013). The ILASA award system could be adapted to become a form of quality control, which requires landscape design practitioners to enter projects for every second adjudication cycle, similar to SALI. The experts also suggested another strategy: every entrant should accumulate a minimum of points in each category, which should become part of the SACLAP requirements for continued professional development. An interviewee suggested that points in the judging forms should be specifically allocated to incorporate the ecosystem services introduced during the interview.

The ILASA awards of Excellence are suggested to remain focused on just that—excellence. Experts felt that design solutions should be innovative, involving new methods and new ideas. Designs should be of a "world class standard" (Interview, November 2013). Designs should enrich the local community and the environment, as well as landscape architecture in South Africa in general. The

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experts argued that every landscape design practitioner should deliver "good work" since that is what they are being paid for. Awards should be reserved for those who go beyond the "obvious" and those who push the boundaries (Interview, November 2013). The interviewees felt that ILASA should attend to the future process of selecting and appointing adjudicators.

To summarise, the regulation of the profession through the professional body and institutions is perceived as an important factor for shaping the profession. The importance of financial value both as importance to the landscape and a motivation for designers to deliver good work indicate the perceived importance of money as incentive. The recommendations to make use of economic valuations coincide and differ from opinions in the literature. Design quality as innovation and enrichment has perceived elements of subjectivity. Aspirations of experts to design for the local context and efforts towards "world class" design seem to contradict each other.

10.3 Review of recent trends in the awards

This subsection considers tendencies in the last five to six years in terms of the two respective award systems and reflects upon indicative value orientations in the industry.

10.3.1 Tendencies in the SALI awards

Over the last five years, the SALI awards received 570 entries, equalling approximately 100 to 120 entries every year. Figure 54 lists the seven categories for award entrees. Out of the seven categories, the most popular for entries in the last five years have been: (1) Landscape Construction with In-house Design; (2) Landscape Construction with Design by Others; and (3) Landscape and Turf Maintenance, each receiving each roughly 25% of the entries (145 out of a total of 570 submissions) (Figure 54). The landscape and turf maintenance category has grown steadily over the last five years and in 2013 amounted to the majority of the total entries received at 37% (41 out of 112). Significantly, the In-house Design and the Design by Others categories have received equal numbers of entrees over the five-year period. The remaining 25% of the entrees is divided between the following categories: Water Wise, Specialised Landscape Construction, Specialised Turf Construction, and Environmental Landscape Work. The Specialised Landscape and Turf Construction categories are both based on recent innovation and technological advances in the industry, as well as construction excellence.

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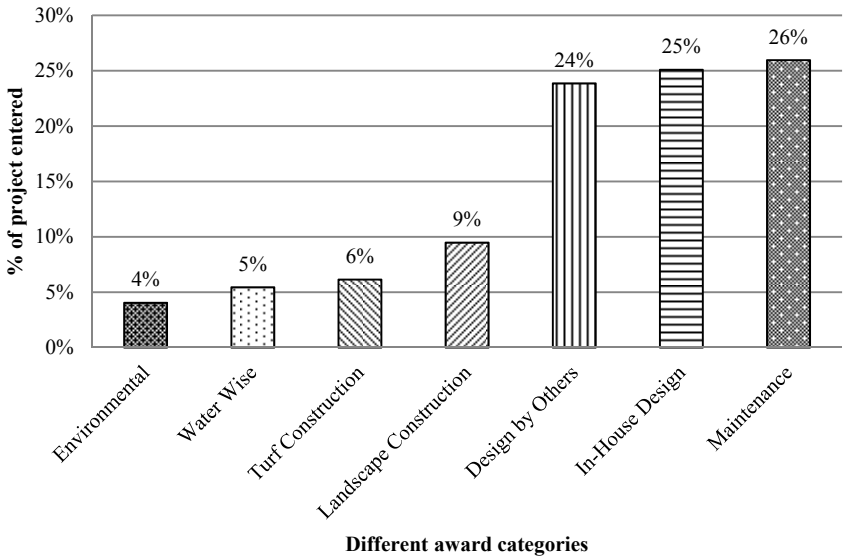


Figure 54: Percentage of projects entered into the different SALI awards categories in the last five years

Over the five-year period of study, the Environmental Landscape Work category received the least amount of entries, followed by the Water Wise category, which received only 23 entrees out of 570 (or four per cent). During the post-judging reflection session in 2013, the judges discussed the reason for this tendency. The lack of popularity of these categories is uncertain; perhaps it was a reflection of the state of the industry in terms of client briefings or an indication of a lack of knowledge and awareness on the side of the contractor. Significantly, though, out of the total 23 entries received for the Environmental Landscape category in the last five years, 18 entries were awarded gold awards, four won silver awards and one received a merit award. The category has thus received high quality entries.

The SALI awards received considerably more entries in 2010—54 entries more than in 2009, equal to a nine per cent increase. In 2011 and 2012, entries declined slightly, picking up again in 2013. This trend is largely ascribed to projects related to the 2010 FIFA World Cup, which manifested in many turf fields and other landscape construction around the country.

The award categories are gold, silver, bronze and merit, with all entered projects receiving a minimum of a merit award. During the reunion of the judges, they expressed concern about the increase in the number of projects awarded gold, resulting in an associated lack of prestige for any project awarded anything other than gold. Of the projects entered in the last five years, the percentage of projects awarded gold rose from 36% in 2009 to 57% in 2013, with a minimum

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increase of two per cent per year. The judges speculated about whether this referred to improved quality of work in the industry, implying that the criteria for judging, which are freely available to participants, steer the practices of participants who want to receive an award. The interviewees felt that participants understood the requirements to receive a gold award and therefore managed to tick the right boxes. The judges discussed the predictability of the award system as a perceived negative aspect and the national judge indicated the need for judges to be stricter when allocation marks.

Figure 55 outlines the types of projects entered in the 2013 SALI awards. Residential projects amount to 27%, divided between private residential projects or single houses (16%) and residential estates or housing complexes (11%). In second place, privately owned commercial and corporate projects made up 25% of the entries. In third place, public projects in the category of public realm and open space accounted for 23% of the entries. If sport fields and stadiums are added to public realm open space, together they amount for a majority in recreational projects at 31%. These quantities coincide with the results from the content analysis in Chapter 9, with residential and recreational as the two types of projects most often executed in South Africa.

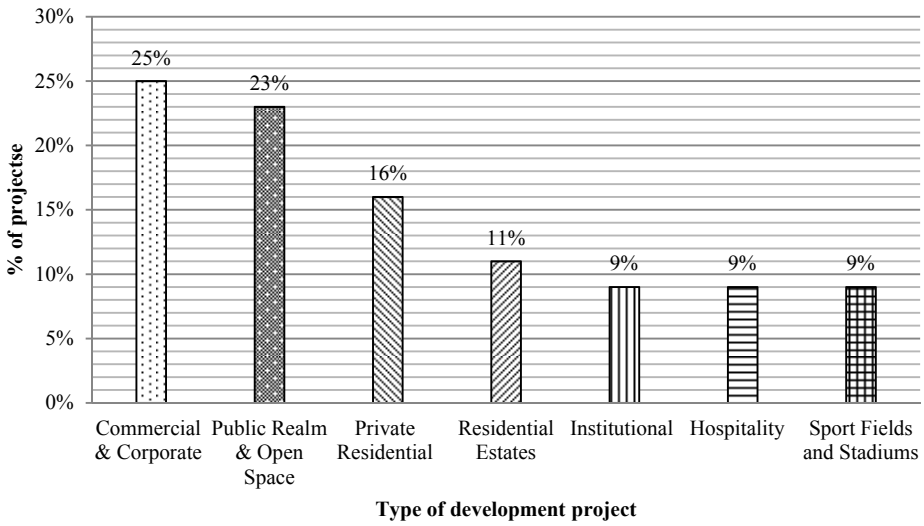


Figure 55: Development projects entered in the SALI awards by type for the 2012/2013 season (as a percentage)

The geographic spread of projects in main urban centres coincides with the findings of the content analysis. The regional breakdown of the 2013 entrees in terms of project per province equalled: Gauteng (49%), KwaZulu-Natal (27%) and the Western Cape (24%). Client brief and designer

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knowledge are important considerations for pro-environmental design. The largest body of clients consist of the state and corporate entities, followed by developers and private clients in residential projects. This has implications regarding the value articulated by client briefs.

10.3.2 Tendencies in the ILASA awards

A recent publication on South African landscape architecture (Stoffberg *et al.* 2012) features the ILASA Merit Award-projects from 1985 until 2009. The authors reflect on the tendencies in the industry that can be deduced from the nature of the award-winning projects, although the awards only amount for a small percentage of landscape architecture work.

The first tendency they identify is the greater emphasis on Strategic Environmental Assessments in terms of methods and procedures post-1994 in the Environmental Category. The Environmental Category prior to 1994 contained mostly studies that considered the management of environmental impact for major infrastructural works. This tendency relates to legislative changes. A second tendency is a move from more formal design to more naturalist, regionalist design, which incorporates ecological specificity and a unique sense of place. This tendency is as much a reflection on environmental policy as political aspirations towards local identity and perhaps global influence.

Since the democratic elections in 1994, an increased number of projects in South Africa have aimed to address historic socio-economic imbalances. Social and cultural aspects of post-apartheid South Africa also became prominent in terms of placemaking in the public realm. The large amount of memorial and heritage projects since democracy has allowed Landscape Architects to work with meaning, narrative and metaphysical qualities of sites.

The type of projects receiving awards further demonstrates the large amount of residential estates that emerged during the housing boom at the turn of the century. Lastly, in 2009 a category was added to the awards that recognises research, which could be an indication of the general acknowledgement of research in the design process (Stoffberg *et al.* 2012) and the growth and maturity of the profession.

The researcher further reviewed the tendencies in the five years since 2009. The ILASA awards occur every two years and thus three award seasons were reviewed: 2009, 2011 and 2013. Table 23 shows how the categories for the awards were adjusted during each of these award sessions. One significant change is the shift in wording from “media” (2009) to “technology” (2011) in terms of the

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Research Category (category 1). There is a definite search for innovation in terms of the word choice in the awards criteria. Another significant change is the combining of the Design and Environmental Planning Categories after 2009 to form the Planning and Design Category (category 2). The once-off sub-category of Design Projects Under Construction (category 2B) in 2009 may be due to a large number of 2010 FIFA World Cup projects in process at the time. A last interesting occurrence is that in the 2011 ILASA added, category 2C included a budget requirement (approximately five million ZAR) and category 2D a timeline (older than ten years) as additions to the former Completed Design Projects (category 2A). Another category was added, namely, Export of Services (category 3) for overseas project entries by members. These three new categories are arguably an indication of the industry's growth in terms of size, age and territory.

Table 23: ILASA awards categories (2009-2013)

Categories	2009	2011	2013
1	**Publications, media and research**	**Research, technology and publications**	**Research, technology and publications**
2	**Design**	**Planning and design**	**Planning and design**
2A	Design – completed projects	Design – project proposals	Project proposals:
2B	Design – projects under construction	Design – completed projects	Fully completed projects – Project value less than R5 million
2C	Design – project proposals		Fully completed projects – Project value greater than R5 million:
2D			Fully completed projects – Projects older than ten years:
3	**Environmental planning**		**Export of services:**

Source: author, based on ILASA (2013)

Completed Design Projects (category 2A) has been by far the most popular category for entry in the last five years, since Projects Under Construction (category 2B) and Environmental Planning (category 3) fell away in 2009. The second strongest category is Project Proposals (category 2C), with Publications and Research (category 1) in third place (Figure 56). Of the categories introduced in 2013 (see Table 24), the awards received 11 entries with a project value of less than five million ZAR and eight entries with a project value of more than five million ZAR. Only two projects were entered that were older than ten years (category 2D) and two projects were entered under Export of Services. The focus of the awards is thus clearly on executed and implemented design projects in terms of awards bestowed.

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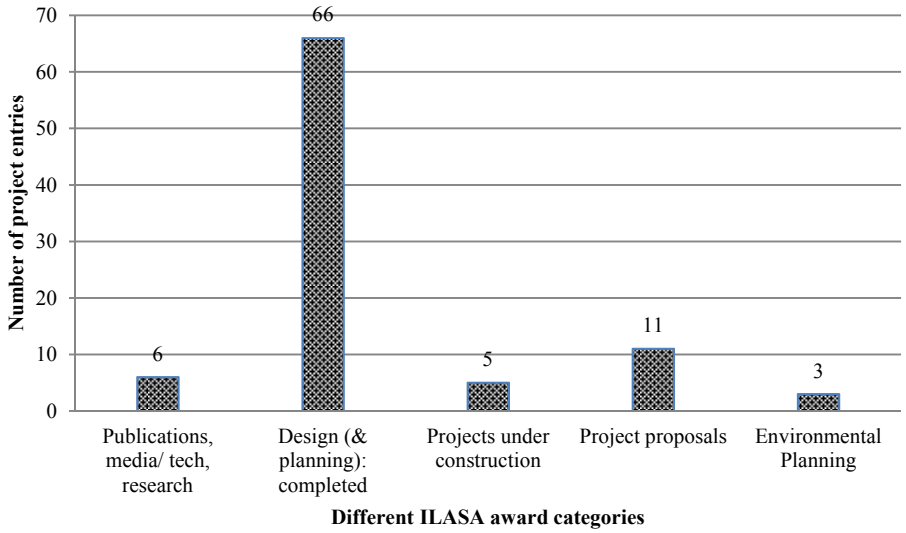


Figure 56: ILASA award categories and the number of projects entered (2009-2013)

The awards receive an average of 30 project entries or nominations every two years. On each of the three ceremony occasions in the last five years, 12 to 13 awards were presented, accounting for approximately 35% of the entrees. In each award session, ILASA presented approximately ten merit awards in the Completed Design Project Category. Apart from these ten design projects, ILASA awarded one Research Project and one Environmental Planning Project in 2009 and one Publication Project in 2013. Awards in 2013 went to four projects with a budget of less than five million ZAR and six projects with a budget of more than five million ZAR, even though more projects were entered in the latter category. This might be an indication of the importance of budget in creating award-winning project outcomes, as professed by experts in the previous chapter.

The ILASA awards received a total of 93 project entries from 2009 to 2013. The majority came from the Gauteng region with the Western Cape in second place (Figure 57). In addition, the ILASA awards received several projects from other provinces and three from abroad.

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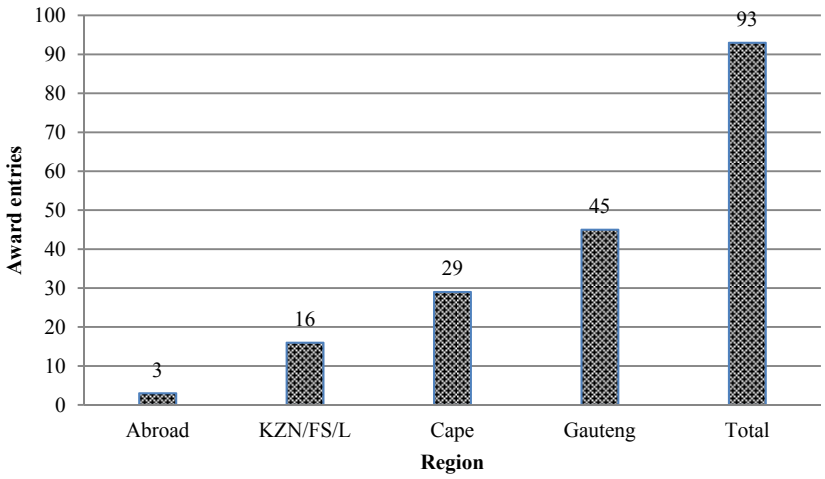


Figure 57: Regional distribution of ILASA awards project entries (2009-2013)

Despite a majority of entries coming from Gauteng, in the last five years the regional distribution of awards allocated was as follows: Western Cape (15), Gauteng (14), other provinces in South Africa (4) and abroad (1). On the last three occasions, the Western Cape received the Precedential Discretion Award—the most outstanding and excellent projects entered—each time, while in 2011 the award was shared between the Western Cape and KwaZulu-Natal.

Figure 58 lists the 31 project entries received in 2013 by project type. Most projects were recreational, implying public open space and amenities, followed by private commercial space, institutes and offices, in that order. Residential estates and private gardens seem to feature far less in the ILASA awards compared to the SALI awards.

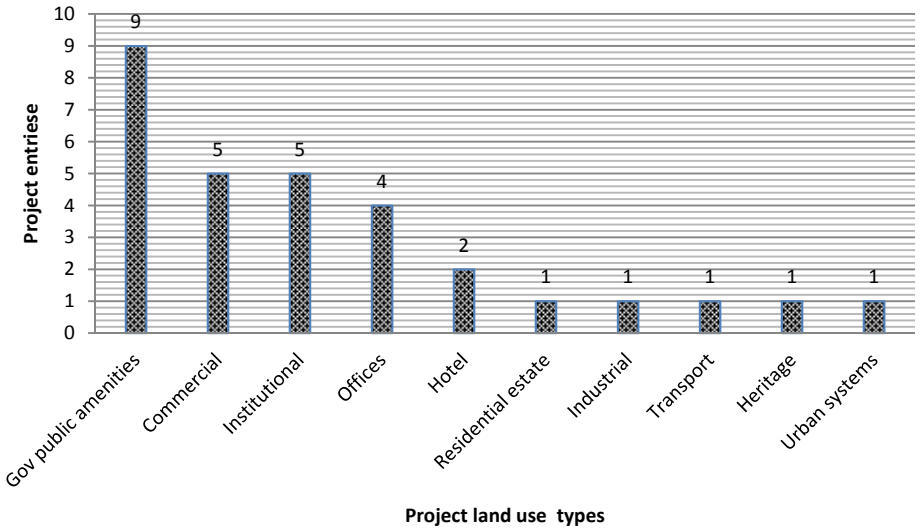


Figure 58: ILASA award entries received in 2013 showing types of land use

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In summary, the national economic and political influence on the nature of projects is evident from the above discussion. The importance of state and corporate projects is perceived in terms of numbers, which again highlights these client briefs and values. Aspects of research, time and budget in award categories are an indication of growth and diversity regarding the profession.

10.4 Review of the judging criteria

This subsection discussed the criteria of the awards as related to the research questions.

10.4.1 ILASA criteria

As discussed in the previous section, there are three categories for award entries in the ILASA awards since 2009: (1) Publication, Media and Research; (2) Design (Proposals and Completed Projects); and (3) Environmental Planning. In 2013, the ILASA awards merged the Environmental Planning Category with the Design Category and added the Export of Services Category to consider work done outside the borders of South Africa (Table 23). Table 24 lists the judging criteria used for both Design and Planning Proposals and Project Category (left column). There are six broad subsections of criteria used, namely: Intent, Context, Design, Integration, Sustainability and Overall Value.

Table 24: ILASA awards judging criteria for the design and planning category

ILASA AWARDS EVALUATION CRITERIA	Ecosystem service articulated
1.0 INTENT	
a) Statement of intent	Vision = cultural
b) Response to brief	Cultural
2.0 CONTEXT	
a) Response to historical, cultural, socio-political context	Cultural/Provisioning
b) Response to financial, regional, local and environmental context	Regulating/Cultural
c) Within legislative boundaries	Regulating/Cultural
d) Response to environmental context	Regulating/Supporting
3.0 DESIGN	
a) Innovation	Cultural/Regulating
b) Aesthetics	Cultural
c) Functionality	Cultural/Regulating
d) Appropriateness	Cultural/Regulating
e) Environmental considerations	Regulating/Supporting
4.0 INTEGRATION	
a) Inclusion/coordination with other disciplines	Cultural/Regulating
b) Integration with architecture, urban design and or environmental design context	Cultural/Regulating
5.0 SUSTAINABILITY	
a) Green practises	Regulating
b) Protection/Conservation	Supporting
c) Use of local resources and re-use of resources	Regulating
6.0 OVERALL VALUE	
a) World class standard	Cultural
b) Enrichment of South African landscape architecture	Cultural
c) Difference to people's lives	Cultural/Provisioning
d) Difference to the environment	Regulating/Supporting

Source: author, based on ILASA (2013)

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The right column in Table 24 lists the ecosystem service that according to the researcher is most indicative of the value articulated by each criterion. If critically considered, all of these headings—except number five, Sustainability—articulate mainly socio-cultural value and place human preference and appreciation in paramount position. The interpretation of these terms could potentially be strongly influenced by the judges' world view and cultural norms, or may be agreed upon by judges prior to commencement of the judging.

Since design and design evaluation is a cultural construct in itself, unsurprisingly, the majority of the criteria articulate cultural preferences and human well-being (Cultural Services). Fourteen criteria can potentially articulate Cultural Services (see Figure 59). The subsection of Sustainability is associated with Regulating Services, but is particularly vague (for example, point 5a Green practices). The researcher identified twelve criteria that can potentially articulate Regulating Services (Figure 59). Only three of the twenty criteria can be argued to have strong potential to articulate Supporting Services, namely: 3e Environmental considerations (as Design); 5b Protection/Conservation (as Sustainability); 6d Difference to the environment (as Overall value) (Table 24). None of these criteria explicitly considers biodiversity or habitat creation, but arguably they have some potential to be interpreted and evaluated in these terms by pro-environmental judges. Only two criteria out of the twenty can be argued to potentially address Provisioning Services; these are: 2a Response to historical, cultural, socio-political context and 6c Difference to people's lives (see Table 24 and Figure 59). These criteria primarily articulate Cultural Services but could be used to reward the use of food or medicinal gardens.

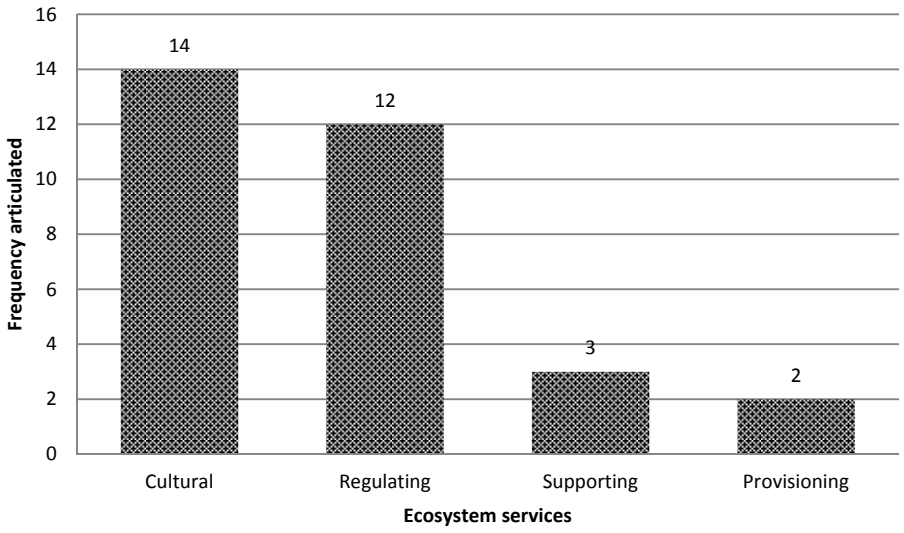


Figure 59: ILASA award criteria and the frequency they articulate the four groups of ecosystem services

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For the ILASA wards there are four specific types of awards, as follows: (1) Award of Excellence, (2) Just Trees Award, (3) Precedential Award and (4) Special Award. Respectively, they have the following rather unspecific criteria. The Award of Excellence must portray the value that Landscape Architects contribute to the built environment, and the Just Trees Award is reserved for projects that contain containerised trees. The Precedential Award is for the most outstanding and excellent projects entered, while the Special Award recognises the contribution made by an individual in terms of the promotion of the profession of landscape architecture in general.

The criteria of the ILASA awards are thus mainly articulating Cultural and Regulating Services with lesser, vague articulation of Supporting and Provisioning Services.

10.4.2 SALI criteria

The SALI awards accept project entries for seven categories: (1) Water Wise; (2) Specialised Landscape Construction; (3) Landscape and Turf Maintenance; (4) Specialised Turf Construction; (5) Environmental Landscape Work; (6) Landscape Construction with Design by Others; and (7) Landscape Construction with In-house Design. Tables 25, 26 and 27 display the following categories, respectively: In-house Design, Environmental Landscape Work, and Water Wise. Only these three categories are illustrated here, as they require the participant to be the designer of the project. Appendix G contains the criteria from all the other SALI award categories.

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Table 25: SALI awards criteria for the landscape construction with in-house design category, mainly articulating Cultural and Regulating Services

Category (a) LANDSCAPE CONSTRUCTION WITH IN-HOUSE DESIGN	
Criteria	**Ecosystem service**
1. Compliance with brief/design	Client = Cultural
2. Relationship to site & structures	Context = Regulating
3. Innovation of design	Techno = Regulating
4. Design details	Design = Cultural/Regulating
5. Sustainability of design	Regulating
6. Innovative use of materials	Design = Cultural/Regulating
7. Earthworks, shaping & drainage	Regulating
8. Quality of plant material	Regulating
9. Choice of plant material	Cultural/Supporting/Provisioning
10. General soil preparation	Regulating
11. Quality of finishes	Cultural/Regulating
12. Maturation success	Regulating
13. Irrigation/water conservation	Regulating
14. Value for money	Cultural
15. General impression	Cultural
16. Comprehensive portfolio	Information sustained

Source: author, based on SALI

The In-house Design Category articulated Regulating Services 11 times, Cultural Services seven times and Supporting and Provisioning Services one time each (Table 25). The Environmental Category articulated Regulating Services eight times, Cultural Services five times, and Supporting Services three times, but did not articulate Provisioning Services (see Table 26).

Table 26: SALI awards criteria used for environmental landscape work category, mainly articulating Cultural and Regulating Services

Category (c) ENVIRONMENTAL LANDSCAPE WORK	
Criteria	**Ecosystem service**
1 Compliance with brief	Cultural
2 Innovation in approach	Design/Regulating
3 Protection of existing elements	Regulating/Cultural/Supporting
4 Sustainability	Regulating
5 Rehabilitation of natural elements	Regulating/Supporting
6 Water conservation	Regulating
7 Construction: suitability of materials	Cultural/Regulating
8 Construction: quality	Cultural/Regulating
9 Plant selection & suitability	Cultural/Regulating/Supporting
10 Comprehensive portfolio	Information

Source: author, based on SALI

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The Water Wise Category mainly articulates Regulating Services, although the addition of mulch can also lead to improved soil formation as a Supporting Service (Table 27).

Table 27: SALI awards criteria for the Water Wise Category, mainly articulating Regulating Services

Category (g) Water wise	
Criteria	**Ecosystem service**
1 Mulching	Regulating/Supporting
2 Irrigation	Regulating
3 Irrigation water meter	Regulating
4 Rain sensor	Regulating
5 Recycling/water harvesting	Regulating
6 Selection of plants	Regulating
7 Correct placement of plants	Regulating
8 Sustainability	Regulating
9 Water storage	Regulating
10 Other initiatives	Regulating
11 Comprehensive portfolio	Information

Source: author, based on SALI

In summary, in five of the seven project categories, the majority of the criteria refer to Regulating Services with Cultural Services in second place (Figure 60). Two categories have more criteria articulating Cultural Services: Landscape and Turf Maintenance and Specialised Landscape Construction. In all but one of the seven categories, namely, Specialised Landscape Construction, there is at least one criterion addressing Supporting Services. Out of the 86 criteria in total, Supporting Services are articulated in ten criteria, of which the first three occurred in the Environmental Landscape Work Category (Table 26), namely: protection of existing elements; rehabilitation of natural elements; plant selection and suitability; choice of plant material; soil preparation x2; maturation success x2; quality and condition of plating and mulching. Only the In-house Design Category (Table 25) has one criterion that can potentially incorporate Provisioning Services under the criterion choice of plant material.

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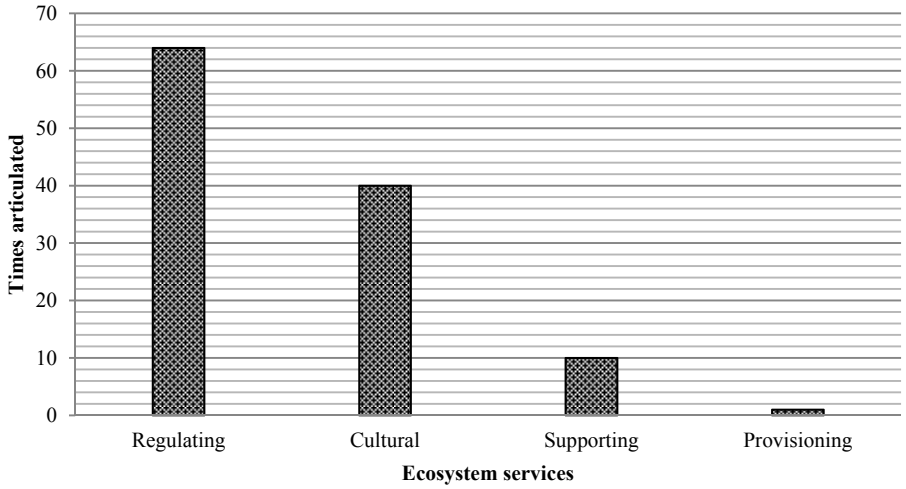


Figure 60: SALI awards criteria for all categories by type of ecosystem services articulated

Twelve special trophies are given, each sponsored by a different company, namely: Best Novice Entry; Best Use of Colour in the Landscape; Most Innovative and Original Use of Plant Material; Rand Water Trophy for the Best Water Wise Entry; Best Specialised Landscape Construction; Best Landscape and Turf Maintenance; Best Specialised Turf Construction; Best Environmental Landscape Work; Best Landscape Construction with Design by Others; Best Landscape Construction with In-House Design; SALI National Judge's Discretionary Award; and the SALI Shield for Excellence in Landscaping (Overall Award).

The SALI awards articulate Regulating Services most, followed by Cultural Services. Comparatively, Supporting and Provisioning Services are not articulated much. This tendency is similar for all award categories together and specifically for the categories for In-house Design and Environmental Landscape Work.

10.5 Discussion of findings

Although the two award systems are fairly distinct and the criteria used for judging are very different, the ILASA and SALI awards have several similarities. This section considers the findings of this chapter and relates them to the literature in order to identify important aspects that would enable the awards to promote a more balanced production of ecosystem services. The section also summarises the aspects that could play a key role in the operationalisation of values.

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10.5.1 Opportunities of identified discourses

This chapter summarised themes or discourses emerging from conversations with experts for both award systems. Several discourses coincide with and reiterate the social discourses uncovered in Chapter 9. Table 28 presents a summary of the aspects and practices identified by the researcher within these discourses to facilitate the realignment of the awards towards a more balanced articulation of ecosystem services. This section discusses a few important opportunities that can lead to operationalisation of values.

Table 28: Identified discourses are interpreted regarding their implications for the awards and opportunities they present for operationalisation

Local discourse	Implication for the awards	Opportunity for operationalisation
1) The concept of "excellence" in the profession: "good" versus "excellent"; "world class standard" is voiced connecting to "trends from overseas".	The awards set a national standard and set the industry on par with the rest of the world.	Reframing of messages (Schultz & Zelezny 2003) around neglected ecosystem services can be related to these accepted statements of quality used in the industry.
2) The awards promote "good and appropriate work". This equated to professionalism and quality of work in terms of functionality, context, budget and sustainability or "good functional design".	What is deemed "appropriate" here refers to specific context related issues and functional design solutions to address these.	All ecosystem services therefore could be related to contextual issues and functional design solutions as a viable argument for their inclusion.
3) Locally-appropriate refers to social and environmental issues in South Africa and the design brief from the client, since each project is evaluated on its "own merit". The orientation of a project and its context along with the satisfaction of owners and users, are perceived to dictate ecosystem service requirements.	Locally "appropriate" refers mostly to a social response in first place in terms of the clients' brief; environmental responses are mostly focused on sustainability but rarely on the ecological functions and processes.	The inclusion of ecological functions and processes is part of design importance (Steiner 2014) and could be related to local identity of place through local plant selection (Hunter 2011; Kümmerling & Müller 2012).
4) Environmental issues needs to be addressed and training is required.	Knowledge is seen as the main driver of ecological design and professional social practices of the awards.	The judging and prize-giving could be harnessed to promote consensual knowledge (Mansbridge 1994) and rectify gaps identified during the award process.
5) Sustainability is perceived as good environmental practice but referred to through limited practices of *water wise* and *water harvesting*, *indigenous choice* and *long-term vision* of projects. Sustainability has exclusionary prejudices and practices that are associated with it, including high technology, status and tax incentives.	The concept of sustainability could be demystified and taken beyond the status quo (Wu 2014). Distinction should be made between social versus environmental versus economic sustainability.	A far greater variety of Regulating Services found in the literature could be considered and associated with this acknowledged concept of sustainability.
6) There is a lot of emphasis on innovation in terms of design, new knowledge and technological advances.	Innovation or improvement is deemed important and related to technological advances.	The concept of ecosystem services could be associated with innovation and technological advances.
7) There is value given to expertise and professionalism.	Prejudices and subjectivity are juxtaposed to expertise, professionalism and experience.	Professionalism, expertise and experience could be made more inclusive in terms of stakeholders, processes, benefits, access etc.
8) Design is played-off against horticultural and installation quality, and there is a perceived need for professional roles to be more distinguished.	Design is seen as superior to installation, involving decision-making and problem solving.	Instead of design being seen as control mechanism a process of joined creativity could be encouraged that allows various forms of knowledge to enrich the process (Ahern *et al.* 2014)

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*9)*The awards are a way of teaching, influencing "new knowledge", awareness, perceptions, mindsets and understanding in terms of examples but also through the judges' comments.	The awards can be combined with other practices mentioned, including workshops, seminars and CPD (continued professional development) to promote excellence.	Social practices have potential for consensual knowledge creation (Mansbridge 1994). The norms of frequent associates or persuasion by public figures (Aaron *et al.* 1994) also play a part in these social gathering, along with correction of misperceptions of facts (Aaron *et al.* 1994) and targets of tangible achievement (Box 2011).
10) Competition among and recognition of "members", indicate small social group dynamics.	Feedback, detail discussion, forum, consistency, transparency and social coherence are important for the progress of the award systems.	Social practices of the awards could lead to interactions and communications, which are important for knowledge creation.
11) The monetary value of landscape and planting are emphasised.	The awards is seen as marketing and advertising opportunity for companies and profession as a hole, with focus on financial incentive in terms of work creation.	There is importance of economic value and incentive (Box 2011) provided in the current system that could be maintained.
12) Time constraints are seen to impede quality.	Non-Western interpretations of time as entangled (McEwan *et al.* 2014) are not emphasised.	More emphasis could be placed on long-term benefits of ecosystem functions and processes and insurance value (Gómez-Baggethun & Barton 2013). Logistics and products that facilitate processes could diminish time constraints. Alternative interpretation of time needs emphasis.
13) Biodiverse is seen as complex and hard to achieve and set against functional and cost effective planting.	Ecological aspects are perceived difficult and costly. There are also perceived difficulty in installation of biodiverse or food gardens, this hinders behavioural response (Gobster *et al.* 2007).	The availability of products, species and knowledge could be utilised to successfully operationalise these practices and reduce perceived effort and time while improving professional ability and inclination to influence these outcomes (Steg *et al.* 2014). The functionality and cost effectiveness of biodiverse gardens could further be emphasised.
14) Aesthetics, pattern making and themed gardens are juxtaposed to functional requirements including productive gardens.	Functional design is currently perceived as unrelated to aesthetics.	Ornamental qualities of productive plants could be optimised and exploited.
15) Decorative effect is juxtaposed to biodiverse aesthetics and public acceptance.	Aesthetics are seen as opposed to biodiversity and not publicly acceptable.	The aesthetics of biodiversity could be emphasised and exploited.
16) Qualities of nature are seen as implicit.	Benefits for humans from nature are "automatically" there and need not be part of design intent.	Principles of green infrastructure and resilient planting design as summarised in Chapter 5 could be articulated.
17 Plant habitat creation should be distinguished from planting creating habitat.	The idea of habitat is associated with flora and not with fauna.	The concept of structural diversity of plants and specificities around species and life forms that share urban environments, could be made more tangible.

Source: author (2014)

The vague articulation of all ecosystem services is problematic in current criteria, as they do not provide value cues (Steg *et al.* 2014) for all ecosystem services required in urban areas. The prominent articulation of Cultural Services holds potential as their manifestation influence the value given, perception and management of all ecosystem services (Plieninger *et al.* 2013; Tengberg *et al.* 2012). The prime importance of design as innovation, economic, functional and aesthetics that relates to contextual influences which could make the design *appropriate*, indicates the required reframing of messages (Schultz & Zelezny 2003) regarding Supporting and Provisioning Services to make them more *acceptable* to professionals. The encouragement of multifunctionality (Hansen &

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Pauleit 2014) of landscape design could further bridge these concerns, but will require specific attention to cultural concepts of aesthetics (Gobster *et al.* 2007; Hunter 2011).

Reframing of messages (Schultz & Zelezny 2003) around neglected ecosystem services can be related to accepted statements of quality used in the industry. The concept of ecosystem services could be tied in with cultural concepts of innovation and improvement. Furthermore, all ecosystem services could be related to contextual issues and functional design solutions as a local legitimate argument for their inclusion. Meanwhile, the inclusion of ecological functions and processes as part of design importance (Steiner 2014) could be related to local identity of place through local plant selection (Hunter 2011; Kümmerling & Müller 2012).

The current award systems provide important economic value and incentives (Box 2011) to participants, which should be maintained. A far greater variety of Regulating Services could be considered and associated with sustainability, while principles of green infrastructure and resilient planting design, as summarised in Chapter 4, could further be articulated. The concept of structural diversity of plants as habitat and specificities around species and life forms that share urban environments could receive more attention.

More emphasis could be placed on long-term benefits of ecosystem functions and processes and insurance value (Gómez-Baggethun & Barton 2013). An alternative conception of time as entangled in indigenous knowledge is a potential local avenue to explore (McEwan *et al.* 2014). The availability of products, species and knowledge could successfully operationalise neglected practices and reduce perceived effort and time while improving professional ability and inclination to influence these outcomes (Steg *et al.* 2014). The functionality and cost effectiveness of biodiverse gardens could further be emphasised. Ornamental qualities of productive plants and the aesthetics of biodiversity could also be articulated and exploited.

Professionalism, expertise and experience could be more inclusive in terms of stakeholders, processes, benefits, access, etc. Instead of design being seen as control mechanism, a process of joint creativity could be encouraged that allows various forms of knowledge to enrich the process (Ahern *et al.* 2014; Swaffield 2013).

Social practices of the awards could lead to interactions and communications, which are important for knowledge creation. Judging and prize-giving could be harnessed since these professional social

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practices have potential for consensual knowledge creation (Mansbridge 1994) and produce value cues for pro-environmental behaviour (Steg *et al.* 2014). The norms of frequent associates or persuasion by public figures (Aaron *et al.* 1994) also play a part in these social gathering, along with correction of misperceptions of facts (Aaron *et al.* 1994) and the creation of targets of tangible achievement (Box 2011). Combined with current practices of advertising and publications the distribution of this knowledge could also be expanded in terms of access and networks (Ernstson 2013). The next section considers the opportunities identified by recent trends.

10.5.2 Opportunities of recent trends in the awards

The review of each award system over the past five to six years revealed several tendencies and trends. These trends give an indication of values already endorsed by the current system. These values could be amplified to include much-needed goods and benefits for human and environmental well-being in urban areas.

In term of current neglect of Supporting Services, recent trends of more “natural”, ecological, locally indigenous plantings could be taken to the next step by introducing awards criteria that articulate the required green infrastructure and ecosystem services these can provide.

Since democracy, historical and political factors have encouraged placemaking and public realm design, including projects related to heritage and commemoration. This search for identity and equity relates well with approaches to green infrastructure (Hansen & Pauleit 2014) and could be exploited. This is especially important in terms of correcting misperceptions that socio-economics and environmental priorities are not aimed at the same goal, namely human well-being. Furthermore the false perception that poor people do not require green spaces for mental and physical well-being needs to be rectified.

Based on the discussion among the judges it was argued that the client briefs and designer knowledge were the reasons for less environmental work entered for the awards. Client briefs and designer knowledge are thus possible constraints for environmental design. Research into the industry could augment the identified gaps in knowledge, but also contribute to working towards greater multifunctionality and avoiding one-sided brief interpretations of landscape function.

Public realm open space and commercial and corporate projects are the two main sources of income for landscape design professionals. Accordingly, the major clients are either the state or corporate

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entities. Since both these agencies are more prone to adhere to international policy and trends, they could set the trend for smaller scale projects run by developers and private home owners.

The importance of maintenance work for job creation could be exploited to lessen the perceived difficulty associated with food gardens and their management. The increase of residential estates in the country also provides opportunity for communal allotment gardens.

The influence of regional climatic and cultural aspects cannot be ignored and should be taken into account when considering values versus required ecosystem services. For example, the public acceptability of veld grasses and their maintenance is a different consideration to wildlife creating menace in subtropical urban areas. Locally appropriate solutions to areas of conflict could be found.

Opportunities presented through recent trends in the awards, existing social discourses and reconsiderations of the actual criteria of the awards could enable these social practices to operationalise values towards a more balanced social production of ecosystem services.

10.5.3 Comparative discussion of judging criteria

This study compared the criteria for the design categories of the two award systems to the ecosystem services recommended by the literature specifically for urban areas, as discussed in Chapter 5. Some of the services highlighted by the literature, such as Supporting Services, “pollination”, “seed dispersal” and “soil formation”, need some thought for conversion into award criteria. The SITES (2014) rating system scorecard (Appendix H) has achieved this. The comparison in this study aimed to investigate whether the awards articulated the ecosystem services that the literature considers important for urban areas. This section does not present a detailed reformulation of the awards criteria since such a task would require co-creation with members and stakeholders. The section, however, does compare the existing award criteria to the ecosystem services for inclusion in urban areas promoted by the literature as a means to identify shortcomings and make recommendations.

Observing both the literature and the criteria for the two award systems (Table 29), Regulating Services are the most numerous for each of the systems compared, except the ILASA, which has more Cultural Services with Regulating Services in second place. Cultural and Regulating Services are arguably more important for urban areas (Costanza *et al*. 1997), yet the criteria of the literature is much more evenly distributed in numbers, with Supporting Services having as many criteria as

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Cultural Services. The literature has more criteria for Supporting and Provisioning services than each of the awards, which indicates a lack of balance in evenly spread criteria from the awards. Although the SALI awards do penalise projects where alien invasive plants are found on site, the awards did not list any ecosystem disservices, which would represent penalties in the awards. The SITES scorecard does not account for ecosystem disservices either. However, several authors highlight the fact that ecosystem disservices should equally be acknowledged (Ernstson & Sörlin 2013; Gómez-Baggethun & Barton 2013; Lyytimäki & Sipilä 2009).

Table 29: Ecosystem services for urban areas highlighted by the literature compared to criteria of each award system

Ecosystem services and disservices in urban areas (Colding 2011:233; Gómez-Baggethun & Barton 2013:237; SITES 2014)	*SALI Landscape construction with in-house design (additional criteria from Environmental and Water wise were added)*	*ILASA merit awards for design projects*
	Provisioning Services	
LITERATURE (4)	**SALI (1)**	**ILASA (2)**
• Food, • Fuel, energy (for example, firewood) • Medicine • Ornamental flowers	• Choice of plant material	• Response to historical, cultural, socio-political context • Difference to people's lives
	Regulating Services	
LITERATURE (10)	**SALI (23)**	**ILASA (12)**
• Climate regulation: carbon sequestration • Air purification: filtering and fixation • Temperature regulation • Water flow regulation and run-off mitigation • Erosion and sediment control Retaining soil within an ecosystem. • Moderation of environmental extremes, Reducing vulnerability • Noise reduction • Waste treatment • Pollination and seed dispersal • Pest regulation through biological control	• Relationship to Site & Structures • Innovation of Design • Design Details • Quality of Finishes • Sustainability of Design • Innovative use of Materials • Earthworks, Shaping & Drainage • General Soil Preparation • Quality of Plant Material • Choice of Plant Material • Maturation Success • Irrigation/Water Conservation • *Construction suitability of materials* • *Construction: Quality* • *Protection of existing elements* • *Rehabilitation of Natural Elements* • *Plant Selection & Suitability* • *Water meter/rain sensor* • *Recycling/Water Harvesting* • *Selection of Plants* • *Correct Placement of Plants* • *Water Storage* • *Other Initiatives*	• Response to financial, regional, local and environmental context • Within legislative boundaries • Response to environmental context • Innovation • Functionality • Appropriateness • Environmental considerations • Inclusion/coordination with other disciplines • Integration with architecture, urban design and or environmental design context • Green practises (sustainability) • Use of local resources and re-use of resources • Difference to the environment

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Cultural Services		
LITERATURE (6)	**SALI (12)**	**ILASA (14)**
• Recreational (physical) • Aesthetic value • cognitive development • pedagogy (educational) • meditation, inspiration, spiritual experiences (mental) • Social relations (cultural)	• Compliance with Brief/Design • Design Details • Quality of Finishes • Innovative use of Materials • Choice of Plant Material • Value for Money • General Impression • Comprehensive Portfolio • *Construction suitability of materials* • *Construction: Quality* • *Protection of existing elements* • *Plant Selection & Suitability*	• Statement of intent • Response to brief • Response to historical, cultural, socio-political context • Response to financial, regional, local and environmental context • Within legislative boundaries • Innovation • Aesthetics • Functionality • Appropriateness • Inclusion/coordination with other disciplines • Integration with architecture, urban design and or environmental design context • World class standard • Enrichment of SA Landscape Architecture • Difference to people's lives
Supporting Services		
LITEATURE (6)	**SALI (5)**	**ILASA (4)**
• Habitat: for plants, birds and other animals • Soil formation • Seed dispersal • Pollination • Water cycling • Conservation of biological and genetic diversity and evolutionary processes	• Choice of plant material • *Protection of existing elements* • *Rehabilitation of Natural Elements* • *Plant Selection & Suitability* • *Mulching*	• Response to environmental context • Environmental considerations • Difference to the environment • Protection/Conservation
Disservices		
LITEATURE (3)	***SALI (0)***	***ILASA (0)***
Cultural disadvantages in terms of ○ Health ○ Economics ○ Aesthetics	○ Alien invasive plants must be removed based on legislation	
TOTAL 29	TOTAL 42	TOTAL 32

Note: The underlined criteria could be directly matched between the literature on ecosystem services and the awards. Italicised criteria in SALI awards were criteria added to the in-house design category from the water wise and environmental categories.

Source: compiled by author (2014)

The high articulation Cultural Services is similar to the fieldwork findings cited in Chapters 8 and 9. Cultural Services provide an opportunity to influence the perception, value and management of ecosystems (Tengberg *et al.* 2012). The numerous criteria for Cultural Services in both awards—including concepts of "innovation", "value for money" or "response to brief"—can thus be argued to ascertain possibilities for positive ecosystem perception and management. However, this does depend on the way these Cultural Services manifest and the degree to which there is allowance for multifunctionality.

The award judging criteria are broad and vague in comparison with the literature. The researcher interpreted many criteria in the two awards to match with an ecosystem service, which allowed the comparison of criteria in the table—for example, "general impression" could be interpreted in terms

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of "aesthetics". The interpretation of the researcher could be argued as value-laden, or influenced by the values of the researcher. However, the criteria require similar interpretations by judges during the award judging, which would make the judges interpretation inevitably subjective and value-laden. Often the awards criteria have categories that could influence or provide an ecosystem, but the criterion itself does not articulate this services—for example, "choice of plant material" in the SALI awards or "difference to people's lives" in the ILASA awards could both imply the supply of Provisioning Services—or not. Arguably, the interpretation of "difference to people's lives" as food production, for example, can only take place once food production is seen as a valuable and acceptable component of urban nature, which did not seem to be the case in discussions with the experts.

Of the 26 ecosystem services identified in the literature only two could be matched directly with a criterion found within the SALI awards and the ILASA awards. Respectively, these were "aesthetics" (Cultural Service) and "protection/conservation" (Supporting Service) by ILASA and "water recycling and re-use" (Regulating Service) and "rehabilitation of natural features" (Supporting Service) by SALI. Notably, the two SALI Award criteria came from the Water Wise and Environmental Landscape Work categories respectively, and not from the general In-house Design category, which had no direct matches (Table 29). Value cues are required to trigger and influence underlying values (Ernstson 2013; Sörlin 1999; Steg *et al.* 2014) but also to present alternative yet scientifically validated interpretations of what benefits could be provided in reconstructed urban nature for human well-being. As explained in previous chapters, "[f]or values to be considered in a decision they must be expressed in some way" (Lockwood 1999:396). Important value cues are thus not present in the award systems regarding many important ecosystem services and functional values required in urban areas.

Similar to the findings discussed in Chapter 9, the criteria of both awards emphasise the importance of design as innovation, aesthetics, economic and functional. Similarly to the fieldwork, design as biodiversity does not feature in the criteria. Although "green practices" and "sustainability of design" are used as criteria by each respective award system, these remain vague in terms of interpretation and are arguably unrelated to ecosystem functions and processes. Supporting Services did not receive much articulation in criteria, yet protection, rehabilitation and environmental considerations could address aspects of biodiversity and required ecosystem functions and processes.

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The award criteria and the criteria taken from literature alike were compared with the Nature Values (Jax *et al.* 2013) of environmental ethics. Table 30 presents the comparison. At an initial glance the criteria appears to be well spread among the different types of Nature Values with two criteria from each system in the Intrinsic Value group. The importance of Intrinsic Values has been reiterated throughout the thesis based on its value pro pro-environmental decisions (Lockwood 1999).

Table 30: Awards criteria compared to value orientations identified in environmental ethics and environmental psychology

Types of value orientation in environmental ethics (Jax *et al.* 2013)	**Environmental psychology (Thompson & Barton 1994)**	*Literature (Colding 2011:233; Gómez-Baggethun & Barton 2013:237; SITES 2014)*	**Values articulated in SALI design awards**	**Values articulated in ILASA design awards**
Intrinsic value in and for itself that implies moral obligation towards it	**Eco-centric**	*Habitat: for plants, birds and other animals, Soil formation, (2)*	*Protection of existing elements, Rehabilitation of Natural Elements (2)*	Difference to the environment, Protection/Conservation (2)
Fundamental value as a basic condition for life on earth		*Pollination and seed dispersal: habitat for birds, pollinators and insects, Habitat: for plants, birds and other animals, Soil formation, Seed dispersal, Pollination, Water cycling, Conservation of biological and genetic diversity and evolutionary processes (7)*	Choice of plant material, Quality of Plant Material, *Protection of existing elements, Selection of Plants, Correct Placement of Plants, Rehabilitation of Natural Elements, Plant Selection & Suitability, (7)*	Response to environmental context, Environmental considerations, Difference to the environment, Protection/Conservation (4)
Eudaimonistic value as a basic condition for good human life	**Anthropo-centric**	*Pest regulation through biological control, Noise reduction, Ornamental flowers, Air purification. Temperature regulation, Recreational (physical), Aesthetic value, Cognitive development, pedagogy (educational), Meditation, inspiration, spiritual experiences (mental), Social relations (cultural), Cultural disadvantages in terms of aesthetics and health, (11)*	Innovation of Design, Design Details, Quality of Finishes, Innovative use of Materials, Choice of Plant Material, Quality of Plant Material, *Construction: Quality, Construction suitability of materials,* Compliance with Brief/Design, Design Details, Quality of Finishes, Innovative use of Materials, General Impression, *Protection of existing elements, Plant Selection & Suitability (14)*	Response to historical, cultural, socio-political context, Innovation, Appropriateness, Integration with architecture, urban design and or environmental design context, Response to financial, regional, local and environmental context; Statement of intent, Response to brief, Response to historical, cultural, socio-political context, Aesthetics, World class standard, Enrichment of SA Landscape Architecture 11)
Instrumental value as a means to something else: functional utility		Food, Fuel, Energy for example Firewood, Medicine Ornamental flowers, Climate regulation, carbon sequestration, Air purification, Temperature regulation, Water flow regulation and run-off mitigation, Erosion and sediment control, Moderation of environmental extremes: Reducing vulnerability, Breaking down waste, *Cultural disadvantages in terms of* Health and Economics (14)	Relationship to Site & Structures, Sustainability of Design, Earthworks, Shaping & Drainage, General Soil Preparation, Maturation Success, Irrigation/Water Conservation, *Construction suitability of materials, Water meter/rain sensor, Recycling/Water Harvesting, Water Storage, Other Initiatives,* Value for Money, Comprehensive Portfolio, *Construction suitability of materials, Construction: Quality, Mulching (15)*	Difference to people's lives, Response to financial, regional, local and environmental context, Within legislative boundaries, Functionality, Inclusion/coordination with other disciplines, Green practises (sustainability), Use of local resources and re-use of resources, Functionality, Appropriateness (9)

Source: compiled by author (2014)

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All three systems place more emphasis on anthropocentric than on biospheric values, with ILASA having the strongest bias in this respect. The researchers subsequently compared the criteria with the identified Landscape Values in the literature review (Alessa *et al.* 2008; Van Riper *et al.* 2012). In Table 31 the different criteria can be observed that could be matched with the Landscape Values. There are seven Landscape Values that hardly feature in the awards criteria. Five of the 13 Landscape Values were not expressed by the criteria of the two awards at all, and another two criteria were only addressed by one of the awards and one criterion. It may be argued that these criteria are derived from people responding to natural and non-urban environments and not applicable to urban areas; however, the literature emphasises the importance of articulating values for consideration in decision-making (Lockwood 1999; Sörlin 1999). It can thus be argued that designers are responsible for articulating values though these values may not be all present in all projects.

Table 31: Award criteria compared to Landscape Values identified by other authors

Values articulated in SALI design awards	***Values articulated in ILASA design awards***	***Literature (Colding 2011:233; Gómez-Baggethun & Barton 2013:237; SITES 2014)***	**Landscape Values (Alessa *et al.* 2008; Van Riper *et al.* 2012)**	**Tangibility (Alessa *et al.* 2008)**
Rehabilitation of Natural Elements, Choice of Plant Material*, Protection of existing elements, (3)*	Difference to the environment, Protection/Conservation, (2)	*Habitat: for plants, birds and other animals, Soil formation, Soil formation, Seed dispersal, Pollination (4)*	**Biological diversity**, provide places for a variety of biota	**Tangible**
Relationship to Site & Structures, Plant Selection & Suitability, Choice of Plant Material, Innovation of Design, *Other Initiatives, Construction: Quality, Construction suitability of materials,* Compliance with Brief/Design, Design Details, Quality of Finishes, *Comprehensive Portfolio (10)*	Environmental considerations, Response to historical, cultural, socio-political context, Enrichment of SA Landscape Architecture, Statement of intent, Response to financial, regional, local and environmental context; Urban design and or environmental design context, Appropriateness, Integration with architecture, Within legislative boundaries, Inclusion/coordination with other disciplines (10)	*Pest regulation through biological control, Noise reduction, Ornamental flowers, Social relations (cultural), Aesthetic value,* Cultural disadvantages in terms of aesthetics (6)	**Cultural,** associated with the passing down of knowledge and traditions	
Rehabilitation of Natural Elements (1)	Response to environmental context, Response to historical, cultural, socio-political context, Urban design and or environmental design context, Protection/Conservation (4)	*Conservation of biological and genetic diversity and evolutionary processes (1)*	**Historic**, places and things of natural and human history	
		Recreational (physical), Cognitive development, pedagogy (educational), Social relations (cultural) (3)	**Recreation,** outdoor, recreation activities and experiences	

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Innovation of Design, Design Details, Quality of Finishes, Innovative use of Materials, Choice of Plant Material, Quality of Plant Material, Innovative use of Materials, *Relationship to Site & Structures, Earthworks, Shaping & Drainage, Maturation Success, Irrigation/Water Conservation, Water meter/rain sensor, Recycling/Water Harvesting, Water Storage, Other Initiatives, Value for Money, Comprehensive Portfolio, Construction suitability of materials, Construction: Quality, Sustainability of Design (20)*	Environmental considerations, Innovation, Response to brief, Difference to people's lives, Response to financial, regional, local and environmental context, Functionality, Green practises (sustainability), Use of local resources and re-use of resources, Functionality, (9)	*Ornamental flowers, Food, Fuel, Energy for example, Firewood, Medicine, Breaking down waste, Water cycling, Temperature regulation, Climate regulation, carbon sequestration, Erosion and sediment control, Moderation of environmental extremes: Reducing vulnerability, Pest regulation through biological control, Cultural disadvantages in terms of economics (14)*	**Economic** valued for economic opportunities like tourism and fisheries	**Inter-mediate**
Rehabilitation of Natural Elements (1)			**Wilderness**, because they are wild*	
Choice of plant material, Quality of Plant Material, *Plant Selection & Suitability,* Design Details, Quality of Finishes, General Impression, Innovative use of Materials, *Mulching, Relationship to Site & Structures (9)*	Innovation, Aesthetics, World class standard, Appropriateness, Integration with architecture (5)	*Aesthetic value (1)*	**Aesthetic,** valued for the scenery	
			Intrinsic, just because they exist and unrelated to humans	
Protection of existing elements, Choice of plant material, Quality of Plant Material, *Selection of Plants, Correct Placement of Plants, Plant Selection & Suitability, Mulching, General Soil Preparation, Sustainability of Design, Recycling/Water Harvesting, Water Storage (11)*	Difference to the environment Protection/Conservation, Response to environmental context, Environmental considerations, Innovation, Functionality, Green practises (sustainability), Use of local resources and re-use of resources *(8)*	*Pollination and seed dispersal: habitat for birds, pollinators and insects, Habitat: for plants, birds and other animals, Soil formation, Water cycling, Conservation of biological and genetic diversity and evolutionary processes, Temperature regulation, Climate regulation, carbon sequestration, Air purification. Water flow regulation and run-off mitigation, Erosion and sediment control, Moderation of environmental extremes: Reducing vulnerability, Breaking down waste, Cultural disadvantages in terms of health (14)*	**Life sustaining**, produce, preserve, and renew air and water	
	Difference to people's lives (1)	*Food, Fuel, Energy for example Firewood, Medicine (4)*	**Subsistence** provide necessary food and materials for humans*	

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		Cognitive development, pedagogy (educational) (1)	**Scientific,** learning about the environment	**Intangible**
			Future, allowing future generations to know and experience	
		Meditation, inspiration, spiritual experiences (mental) (1)	**Spiritual,** sacred, religious, spiritually important	
		Meditation, inspiration, (mental), Medicine, Social relations (cultural) (2)	**Therapeutic**, make people feel better, physically and/or psychologically	

Source: compiled by author (2014)

Similar to the findings of the fieldwork, the intangible values were completely absent in the SALI and ILASA award criteria. The benchmarks from the literature also had few criteria in the intangible realm, but at least did address therapeutic, spiritual and scientific learning aspects. In comparison with the awards criteria the literature only failed to articulate three of the criteria namely, wilderness, intrinsic and future knowledge and experience.

Intrinsic Values were not addressed by any criteria, similar to the fieldwork findings, while wilderness and subsistence were also sparsely acknowledged. Historic aspects of nature and humanity were better articulated than in the fieldwork but still sparse, along with biodiversity. The most articulated criteria were economic, life sustaining, cultural and aesthetic criteria, in that order, which relates to Cultural and Regulating Services. Significantly, the literature also places economic and life sustaining values far higher than other values. For the SALI awards, economics rated far above other values, and for ILASA, cultural values were slightly higher than the rest; this potentially distinguishes design from a more construction-oriented outlook at the two institutions.

A curious aspect is that recreation was not implied in any of the SALI or ILASA award criteria, but was contained in at least three criteria of the literature. This absence is potentially due to the fact that the client's brief is very important to designers and the brief stipulates what is to be included, which usually comprises some form of recreation. This is indicative of the fact that landscape architects are reluctant to suggest additional recreational or other aspects to be included in a project, which may hamper increased multifunctional designs. The awards articulated aesthetic value far more than the literature, reiterating the importance of this value in South Africa. However, Thompson (1999) pertinently suggests that aesthetics be added along with ecological and social aspects that drive landscape architecture in the UK and even called it the heart of the profession. This does seem to be a general aspect of importance in landscape design, which in this case is perhaps not sufficiently

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acknowledged in the ecosystem services conceptual tool. Since an over emphasis on the visual appreciation of nature has been criticised (Callicott 2002), this may be difficult territory to tread.

One of the most significant aspects (see Table 31) is the fact that considerations for future knowledge and experience, and scientific learning were completely absent in the awards criteria and very sparse in the literature. Similar to the fieldwork, this lack of concern for the future indicates the dire need for a social response to enable greater resilience.

Moreover, parallel to the findings of Chapter 9 regarding the importance of design, the ILASA awards have several criteria related to contextual response and appropriateness, while the SALI awards also refer to "relationship to site and structures". Although these are positive articulations of local character and identity, from the conversations with award experts it appears that landscape values are perceived as monofunctional, which need not be the case—for example, why can an aesthetic garden connected to status not supply food, or an innovative design using latest technologies not be biodiverse? From discussion with experts these psychological barriers exist in terms of what could be combined and what is deemed "appropriate" or "world class".

The study finds that the award systems do not currently encourage multifunctional landscapes. Since Cultural Services are consistently the most articulated, the fact that they can be enjoyed in bundles creates opportunity for multifunctional inclusion of other goods and services, which is a much desired outcome in land use science and policy (Plieninger *et al.* 2013). Reframing of messages (Schultz & Zelezny 2003) around Provisioning and Supporting Ecosystem Services could point out their worth regarding the importance of design and aspects of contextual appropriateness, two aspects that are highly values in the industry.

In terms of the public, it is important to accentuate the self-enhancing values these services offer. This articulation is especially important for the poor, since food gardens and ecological functions are direly needed in poor rural and urban areas to alleviate the acute needs of a large percentage of the South African population. A multifunctional approach to ecosystem services could eliminate perceived conflict in terms of "either/or" decisions in design and broaden possibilities for designers and the public. In order to promote multifunctionality in urban landscapes and the inclusion of multiple ecosystem services, including biodiversity, attention must be given to existing landscape patterns, and cultural and aesthetic values (Gobster *et al*. 2007; Hunter 2011).

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10.6 Conclusion

Chapter 10 considered the potential of award systems as a social practice to operationalise values regarding a balanced production of ecosystem services. The respective institutional purposes of the awards to improve practice and promote excellence relate well with the objective of operationalisation of values in terms of landscape design practice. The prospect of the awards stimulating educational activities in the profession makes them still more suitable for operationalising these values. Furthermore, the fact that the awards are inevitably given to implemented projects or completed works holds potential for best practice examples and transformation in urban areas through contact with real life examples that can be an impetus for experiential and transformative learning. Importantly the awards provide material benefit and normative incentive for participation.

The research questions were slightly modified and used to reach specific conclusions regarding the award systems for this study:

i) What have been the concerns addressed by landscape design ~~practice~~ *awards* in South Africa in the last decade?

The awards reiterated the importance of design quality. Design quality as innovation and enrichment, however, has perceived elements of subjectivity, which reveals the different values held among professionals when it comes to design. For example, aspirations of experts towards “world class” design seem contradictory in terms of the importance of local context.

The SALI awards highlight a good geographic spread of projects in main urban centres. The central considerations for pro-environmental design include the client’s brief and designer’s knowledge. The state and corporates comprise the largest body of clients, followed by developers and private clients in residential projects. This fact has implications regarding the importance of values articulated by these clients.

Over the last two decades, the ILASA awards have been influence by local economic and political historic changes. The current high number of state and corporate projects highlights the significance of the client’s brief and values. Recently added aspects of research, time and budget in award categories are indicative of growth regarding the profession and different types of projects.

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The judging process, logistics and awards criteria appear to pose challenges for both award systems. Concerns voiced by the experts regarding the selection process and influence on the awards by the judges highlight contextual differences in ILASA and professional differences in SALI. From these conversations, the importance of design as the identity of the profession and contextual specificities was reiterated as per the findings in Chapter 9.

Despite the use of criteria, judging was still perceived as being influenced by subjective aspects, such as design influencing construction project evaluation and "overall impression" favouring visual aspects. The experts raised the importance of comments from judges as a way of clarification, which is an important consideration. Furthermore, the ILASA awards purposefully use broad criteria, which pose specific challenges regarding subjectivity or individual subjective interpretation.

ii) What do these ~~concerns~~ *award criteria* disclose about contemporary values related to urban ecosystem services, for example, which ecosystem services are valued and which are neglected by landscape design ~~practice~~ *awards* in South Africa?

The criteria for the two award systems were analysed by aligning them with ecosystem services recommended for inclusion in urban areas, the Nature Values of environmental ethics (Jax *et al*. 2013) and the Landscape Values of environmental psychology (Alessa *et al.* 2008). The general findings were similar to the findings of the field work instruments in that criteria that reflected Cultural and Regulating Services were more than Supporting and Provisioning services, also that of the literature which indicates an imbalanced focus despite the importance of Cultural and Regulating Services for urban areas (Costanza *et al.* 1997).

Specifically neglected by all the awards criteria and by the literature was the concept of the Intrinsic Value of nature. Some criteria were interpreted to possibly meet this value, but it brings up the question of deliberate versus non-intentional values. In terms of the more nuanced description of the Landscape Values, Intrinsic Values could not be matched with the criteria, which rather articulated biodiversity as a habitat for biota. Similar to the former findings of the research intangible values were specifically neglected by the awards criteria, perhaps since it would be hard to measure as intangible non-physical aspects. These were therapeutic value, spiritual value, future knowledge and experience, and scientific learning, which reflect also security aspects of ecosystem services (Gómez-Baggethun & Barton 2013).

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Although the literature did articulate intangible values, there were few criteria. Similarly aesthetic value was only articulated once by the literature, which can be seen to indicate a lack of understanding of its importance for the industry and the public in general. This is indicative of the literature's underestimation of the worth of these aspects for urban areas. Another criterion neglected by both the awards and the literature is the aspect of wilderness. Cronon (1996b) argues that this concept can lead to greater inclusivity and acceptance of non-use values when introduced in urban environments.

Strangely, recreation was completely missing as a criterion of the awards, perhaps due to the fact that it is seen as implicit in the brief, yet this is not always the case. Biodiversity and aspects of natural and cultural history were better articulated by the awards criteria than in former comparisons with the fieldwork.

iii) Which contemporary professional social practices *of the awards* are articulating the value of certain ecosystem services in the landscape design community of practice?

The importance given to contextual appropriateness of design seems to inhibit possibilities for greater inclusion of ecosystem services, mainly due a lack of considerations toward multifunctionality. These approaches do not consider the presence of service providing, connecting and benefitting areas (Hermann *et al*. 2011) in determining priorities regarding ecosystem services. The extent to which stakeholder participation (Hansen & Pauleit 2014) shapes these design requirements is also not clear, since the client's brief, and therefore values, receive priority.

The importance of innovative, aesthetic, functional and economic design concerns and the neglect of biodiversity as a design concern further contribute to Cultural and Regulating Services being perceived as more important design considerations. The neglect of ecosystem functions and processes by designers coincides with the observations of Steiner (2014) in the US.

There is also a perceived idea among interviewees of design as management and not as "process" (Swaffield 2013). Depreciation of knowledge of contractors excludes "different ways of knowing" (Ernstson 2013) to enrich the design process.

Time constraints pose limitations on potential long-term quality and "insurance value" (Gómez-Baggethun & Barton 2013) of projects. Meanwhile, the rising popularity of maintenance as job creation hinders the endorsement of different forms of urban nature that encourage natural

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processes and diminish dependence on human management, which is also positive for biodiversity (Kümmerling & Müller 2012).

Lastly, many services of nature such as air-cooling or storm-water infiltration are seen as an "implicit quality of all green spaces". This hinders specific design attempt to include a greater possibility of ecosystem services.

iv) How can professional social practices *of the awards* operationalise values to socially produce essential ecosystem services?

The study proposes that the numerous opportunities identified within current trends and existing social discourses (Table 29) in landscape design practice in conjunction with revised award criteria could enable operationalisation of values for a more balanced social production of ecosystem services. The combine findings of these three considerations culminated in eight specific approaches to operationalisation that specifically relate back to the discussions of local concerns and contextual matters presented in this chapter.

First, there is the opportunity to reframe messages (Shultz & Zelezny 2003) and better align ecosystem services specifically with functional use values, innovation and technology, well-being and particular aspects of local context specific to each project. These are highly endorsed aspects in the current industry. The aesthetic value of biodiversity that is valued especially by horticulturalists could be emphasized in these framings, as well as the local identity captured through the use of regional indigenous species.

A second approach focuses on sharing available information on landscape process knowledge and endorsing a greater spectrum of ecosystem services. This approach could give specific attention to Provisioning and Supporting Services, including ecosystem functions and puts more emphasis on long-term benefit, plants as habitat for species through structural diversity, practical decisions with regards green infrastructure and resilience as set out in Chapter 5.

An approach that relates to the former is sharing of information on ways of valuing nature and landscape. This entails placing emphasis on the aspect of Intrinsic Value (Lockwood 1999) and other ethical values, as well as the consideration of Landscape Values with specific emphasis on intangible aspects (Alessa *et al.* 2008) and a specific emphasis on security value (Gómez-Baggethun & Barton 2013) in terms of scientific learning and future experience and knowledge (Alessa *et al.* 2008).

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This study recommends that the criteria be stated more explicitly to reflect the ecosystem services recommended for urban areas. However, a broad spectrum of ecosystem services from all categories should be included, including therapeutic value and spiritual well-being, which are not among the ecosystem services for urban areas. The Landscape Values and Nature Values can be used as a point of reference.

Maintaining the material benefits of advertising and marketing that the awards offer and promoting the availability of products and species required to make biodiversity design easier are two ways to reduce cost and effort for designers (Schultz & Zelezny 2003; Steg *et al.* 2014). This can facilitate greater pro-environmental behaviour.

Social rituals for knowledge spreading (Barthel *et al.* 2010) should be part of the awards. These rituals should endorse various forms of knowledge, and combined with other practices can create consensual knowledge (Haas 1989; Mansbridge 1994) through inclusive interactions and communication.

The concept of multifunctional landscapes (Hansen & Pauleit 2014) provides an opportunity. Instead of seeing different aspects of design as mutually exclusive, combinations of different services can be promoted. The concept of recreation, which did not feature in the criteria of the awards since it is part of the brief, can be explored since opportunities for much-needed recreational activities should be expanded by the designer.

Cultural Ecosystem Services are particularly popular in South Africa, as well as in other places. They specifically hold relevance for the previous point of including a variety of services into the landscape. Cultural Services also connect well with the important aspects of aesthetics, since they are generally very tangible and easy to enjoy and appreciate. Perception of these services influences how other services are valued (Plieninger *et al.* 2013; Tengberg *et al.* 2012).

Socio-economic factors are an important consideration for South Africa, which are generally seen as competing with green infrastructure and the environment (McEwan *et al.* 2014; Schäffler & Swilling 2012). The neglect of the current awards criteria for life sustaining aspects and utility gardens is unacceptable in a country where food scarcity, poverty and unemployment are the order of the day (DAFF 2010; StatsSA 2012). Furthermore job creation can alleviate maintenance and management

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around food gardens, which are currently of concern. Social ecological goals should be closer aligned by emphasising all the aspects of human well-being that are fulfilled through ecosystem services.

The study recommends the inclusion of the concept of ecosystem disservices in discussions (Ernstson & Sörlin 2013; Gómez-Baggethun & Barton 2013; Lyytimäki & Sipilä 2009). The researcher's perception is that many landscape choices are rather based on disservices than on services. This perhaps calls for a pertinent acknowledgement and a discussion of these perceived negative functional values in comparison with the benefits they can provide to many.

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Chapter 11



medicinal

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CHAPTER 11: Final Conclusions and Future Research

11.1 Introduction

The study aimed to identify the role of landscape design practitioners in contributing to a more biodiverse and sustainable urban future. This aim had an underlying premise: change is required in the world based on projected urbanisation coupled with ecosystem degradation (Myers *et al.* 2000; UN-Habitat 2010). Many studies propose a vision for cities to become places of biodiversity, optimising land use to provide the services cities require. Although this is an ambitious goal in comparison with current trends of cities causing fragmentation and further loss of biodiversity (Lindenmayer & Fischer 2006), from a scientific point of view it seems attainable. Landscape designers are involved in urban green spaces with potential for green infrastructure and ecosystem services, but how do they respond to this opportunity and what is their professional responsibility? Furthermore, what is deemed to be a valid objective and value outcome when it comes to design for a better future? How will green spaces be improved, who must benefit from improvements and how can they be measured? These were some of the questions that the study grappled with in order to answer the research question posed at the onset.

The overarching question that steered the research specifically asked how values in landscape design practice can be operationalised so as to achieve a balanced social production of ecosystem services. It became clear during the study that bringing together concepts of ecosystem services and human values is a complex task. The literature reviewed in the first chapters revealed that little is known about ecosystem functions and processes and precisely how much biodiversity is required to maintain these properties for ecosystem services. Furthermore, indicators for capturing and measuring ecosystem services are complex and often require data that is not readily available. Initial explorations of social-ecological systems noted a variety of challenges facing urban futures. Questions of value have several ethical positions, while the conceptual tool of ecosystem services has limitations. Operationalisation thus became a multifaceted consideration, since it is not only functional, but also a political position with normative implications.

In answering the research question, this study had two objectives:

- To establish best practice in the functional production of ecosystem services in urban environments as set out by current scientific literature
- To make a practical proposal for operationalisation of values inside South African landscape design practice to achieve this best practice

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Proposals towards improvement are daunting, due to a variety of concerns with foreseen and unforeseen implications for humans and nature. In retrospect, Harvey (1989:199) summarises the complexities of urbanised human 'nature' produced through proposals and representations in an industrial system, the frustrations of which were also present during the development and in the conclusion of this study:

> *Capitalism these last two hundred years has produced, through its dominant form of urbanization, not only 'second nature' of built environments even harder to transform than the virgin nature of frontier regions years ago, but also an urbanised human nature, endowed with a very specific sense of time, space, and money as sources of social power and with sophisticated abilities and strategies to win back from one corner of urban life what may be lost in another […] This is also the kind of fragmented and often contradictory political consciousness that permeates our intellectual representations and proposals as to what a genuinely humanising urban experience might be all about.*

As presented in Figure 59, this chapter summarises the findings of this study and discusses the achievements of the study objectives by answering the research questions and considering the contributions made. The chapter further reflects on the implications of the findings and considers possible suggestions for existing theory and final recommendations for implementation. It ends with proposed areas for future research.

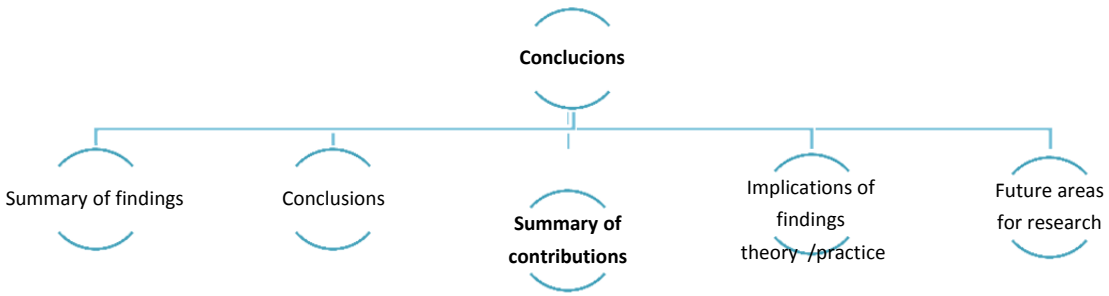


Figure 61: Graphic illustration of the chapter layout

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11.2 Summary of findings

Before answering the research questions and reflecting on possible contributions of the study, this section summarises some important findings. The study investigated held values in the landscape design industry by looking at publications of outcomes in design practice over the last ten years and through discussions with experts in the field. The investigation revealed variables and role players that impact the industry and influence assigned values in landscape design. The study identified the most important broad-based contextual and historical influences in the profession in the past two decades as local socio-political and socio-economic circumstances that meet global environmental conditions. The literature also recognised those influences as significant drivers of ecosystems and their services (MEA 2005). The study found specific concerns in the South African landscape design industry, which are influenced at three levels, namely, the large-scale contextual variables at a global and national scale mentioned above, the local disciplinary identity and the regional contexts influenced by climate, business and lifestyle. It appears that in South Africa the intangibility of global environmental problems as a phenomenon outside human scale is overridden by immediate concerns at human scale, as predicted by Gobster *et al.* (2007). Coinciding with the local subject literature, local concerns are mainly socio-economic.

The study found that socio-economic challenges have several pertinent implications for landscape design. First of all, landscape and city greening has a connotation of elitism. Although many green spaces have been installed in historically disadvantaged peri-urban areas since 1994 (Stoffberg *et al.* 2012), historical 'whites only' areas contain proportionately more green spaces than newly developed social housing provided by the state (McConnachie *et al.* 2013). Green spaces are erroneously regarded as competing with socio-economic objectives and not as opportunities to contribute to well-being and environmental improvement. Currently green spaces are not responding to the many dire needs of the urban poor but remain monofunctional areas and often low budget replicas of parks found in more affluent city districts.

Based on experts, the political change of the country towards democracy has resulted in landscape design with increased emphasis on social equity, job creation and aspects of cultural heritage. Yet, the economic fluctuations from boom to crisis from 2000 to 2008 influenced the scale and budget of projects, which impacted the standard and quality of design projects. Furthermore, the use of local labour for park installation as a means of job creation and skills development has short-lived financial outcomes; while there is lost opportunities for long term engagement between green

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spaces and practices of civic involvement that could augment household income and sharing of knowledge (Barthel *et al.* 2010).

From the conversations of experts there is a perceived lack of support from government for environmental concerns. This perception has consequences for morale in the profession and the perceived importance of environmental issues in areas of low economic income. The quality of projects depends very much on the time and commitment from designers as part of personal and professional ethics, while designers respond to the direct brief from the state with a lack of motivation to expand or deliberately add additional services through multifunctionality, other than what is unintentionally included. These socio-economic concerns are also influenced by the context at different scales.

Global environmental concerns have increased the importance of the profession and emphasised sustainable design. Yet, despite the global concern for greater sustainability that does affect the state through international policies adopted, there is a decrease in numbers and a shortage of professionals. This is also indicative of the lack of endorsement from the state and a general public perception with regard to the awareness, perception and importance of the profession. Some experts feel that this is due to past and present perceptions of landscape design involving unskilled manual labour and being an opportunity for those with no training.

At a national and local scale, the identity of the profession lies in innovative and quality design endeavours. Concerns for aesthetics and creativity do not feature in low-income areas where economics and functional considerations override others. There are no incentives for biodiversity or utility gardens, and real and perceived difficulties are associated with these. In each project, the client in conjunction with the designer determines design outcomes, and the knowledge of the designer plays a crucial part. Yet the importance of the brief seems to hinder additional proposals with regard to a deliberate amplification of possible benefits derived from green infrastructure. Although social responsibility and sustainability are functional aspects acknowledged by the profession, the interpretation of these terms varies based on public versus private projects and the location of the project or level of urbanity.

At the regional level, both climate and business style influence lifestyle and determine landscape design outcomes. The importance given to the environment is the result of environmental features subject to climate, combined with human cultural lifestyle preferences, which are influenced by

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economic development tendencies and municipal governance. In South Africa, possibly due to the great diversity of biomes and visible differences in their vegetation, there are distinct effects—notably, climatic differences, landscape features and resulting native vegetation—that have not been pertinently discussed by the literature as a driver of ecosystems and their services.

Design outcomes in rural environments differ from those in urban areas due to perceived different user needs and investment incentives. Although it is recorded that the ecosystem services depended on in rural areas are different from those valued in cities (Egoh *et al.* 2012), green spaces seem to be based on perceptions of what poor people require most which result in a lack of quality green spaces. When considering future urbanisation, the value given to rural green spaces and the services it should supply cannot be deemed very different from urban areas, lest it shapes the perceptions of an urbanising population on what facilitated green space must be. Although people modify their values at times—and especially in new environments—there is the risk that one-sided interpretations of green space found in rural areas may hinder opportunities for civic involvement and civic perceptions on what green space should be. Narrow perceptions of green space can be the consequence of limited former examples in rural areas, but it can also result from a perceived difference in city style that restricts socially acceptable forms of green space engagement, for example food gardens. Regardless, the current limited quality and aesthetic investment in rural green spaces is not only to the detriment of current rural people but also to the detriment of future urban people.

From the research findings, professionals perceive social dynamics as central at all three of the above-mentioned scales. As a consequence of these prominent social dynamics, experts consider knowledge and management highly important for future resilience in the industry, while norms, values and ecosystem functions seem to receive less attention. However, knowledge is to a certain degree value dependant (Bolderdijk *et al.* 2013); while ecosystem functions and processes are required for the delivery of all ecosystem services (MEA 2005). This study accordingly aimed to identify workable relations between local values and dynamics and the objectives of the study.

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11.3 Conclusions

The thesis statement hypothesised that a contextually appropriate social practice among professionals in landscape design can be identified that effectively operationalises values to socially produce essential ecosystem services.

In retrospect the thesis statement made two underlying assumptions that also had to be verified in the study: (1) that values of designers influence their practice consciously or unconsciously; and (2) that existing professional values were important for operationalisation.

The literature review provided support for the first statement since recent studies place much emphasis on the importance of values and the way they influence beliefs, assumptions and management preferences (Ives & Kendal 2014; Steg *et al.* 2014). Steg *et al.* (2014) confirms the fact that many value influences are unconscious.

The literature did emphasise the importance of existing values (Aaron *et al.* 1994; Byrne 2011; Kaplan 2011). The literature also demonstrated how many studies engage with value concepts to understand the reasons for stakeholder preferences, yet few had proposals with regard to operationalising values. Most studies rather identified hotspots and aimed to reduce possible conflict (Alessa *et al.* 2008; Hofmann *et al*. 2012; Le Maitre 2012; Van Riper *et al*. 2012; Zipperer *et al.* 2011), yet argue and indicate the importance of existing beliefs and values. Schultz and Zelezny (2003) make the proposition that aligning new positive environmental messages with self-enhancing held values has potential to trigger behavioural response.

It has to be noted that experts were not questioned directly about their own personal practice or values, but rather consulted with regard to South African tendencies in general. These tendencies were discussed in terms of drivers and social practices that may be producing specific outcomes in landscape design practice. This approach may be argued to have pitched the focus toward more extrinsic factors than intrinsic ones, arguably concealing more normative responses from the experts. This may explain a strong emphasis on tangible aspects and less on the intangible, as encountered throughout the findings of the study. Regardless, the research followed the premise of the literature that values are unconsciously projected (Steg *et al.* 2014) and made use of the narratives to identify value statements or projections. Furthermore, the study focused on experts for their confidence and outspokenness about their beliefs that would be influenced less by the

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researcher (Lockwood 1999). In line with the qualitative tradition, the study aimed to maintain the integrity of the narrative and considered context-derived themes as representative of values.

When testing the thesis statement, the research found it difficult to identify an appropriate practice for effective operationalisation as a practical proposition, since the study remains a theoretical and philosophical proposal in essence that cannot be tested in real life situations. The selected practice for operationalisation also entailed a political question of social legitimacy—designers may be reluctant to adopt suggested changes into institutional structures of practice. A collaborative process (Wilson & Howarth 2002) of co-creation (Russell-Bennett *et al.* 2009) is the only means to a potentially successful outcome.

Further, when seeking to verify the thesis statement, identifying essential ecosystem services proved difficult. The literature warns that actual demand for ecosystem services should be weighed up with replacement cost, direct and indirect value and insurance value (Gómez-Baggethun & Barton 2013; Hansen & Pauleit 2014). This exercise also implies consideration of synergies and trade-offs regarding spatiality, temporality and reversibility and spatial scales (Hansen & Pauleit 2014) of service providing, benefiting and connecting areas (Hermann *et al.* 2011). To weigh up these decisions, available and accessible environmental databases are required to formulate indicators for green infrastructure and ecosystem services, which in the case of South Africa are not in place. The study therefore recommends the use of the literature to identify important ecosystem services for urban areas (e.g., Colding 2011; Gómez-Baggethun & Barton 2013; SITES 2014) as a good measure, and suggests the recommended amplification of the spectrum of services an area provides (Hansen & Pauleit 2014) and inclusion of all categories of services (Hermann *et al.* 2011) through design intervention.

Notably, although all ecosystem services are important for human and environmental well-being, the ecosystem services present in each design project must be prioritised based on specific contextual demands and trade-offs. However, in terms of landscape design, the study puts forth that for each project the designer should articulate and consider the importance of the essential ecosystem services. This articulation is not only for the client and those with control over land use and cover, but to enable awareness and consideration by the designer self. The aim being to eventually also spread awareness to the general public and user. Yet, as pointed out in the introduction of this chapter, the conceptual tool of ecosystem services has shortcomings in the

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values it articulates. The implications of these findings and the meeting of the research objectives are discussed by means of the research questions.

11.3.1 Question 1: What are the current concerns addressed by landscape design practice in South Africa?

The fieldwork conclusions in Chapter 8 and 9 illustrated that design practice outcomes are largely concerned with functional social recreational benefits and delivering what is considered a good human life. Yet, the study posits that there are no pertinent efforts from the designer's side to amplify these functional benefits besides adhering to government requests for skills development and job creation through project implementations. The study suggests that a lack of scope in design interventions is partially due to designers' demonstrated high regard for the design brief—the clients brief implies addressing human needs, and this aspect is not further questioned. This is also suggested to be a reason why designs are found to be conceived as rather monofunctional in purpose by designers with functional, aesthetic and biodivbersity goals competing and conflicting with one another. The importance of the brief further speculates about a lack of stakeholder participation, which did not feature in the discussions. The importance of the client, and the designer's role to influence the client's expectations and understanding of Functional Values, are implications of these findings.

To rectify this, the study suggests a drastic reframing of messages around the self-enhancing values of green space and ecosystem services. Although experts reiterated the functional role of design, context and brief restrained proposals result in drastic neglect of ecosystem services and Nature Values. The findings propose that sustainability concerns in South Africa are focused on utility and economics, potentially swayed by socio-economic considerations, reiterating the problem of vague concepts that have multiple interpretations. The study posits that the concept of sustainability in South Africa reflects government emphasis on transformation, poverty relief and skills development, while green space is regarded an elitist concept that does not respond to these eminent needs. The unfortunate reality is that current green space values endorsed by designers fail to address many real needs due to watered-down interpretations of sustainability and a disregard of the role the environment plays in human well-being as demonstrated by the literature in Chapter 2, 3 and 5.

The study further argues that the concept of good design as multifunctional and multifaceted must be strongly emphasised in the industry. The findings indicate that the diverse important qualities of good design are often played off against each other with a perceived understanding of being

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mutually exclusive or compromising one another. Aesthetic, functional and sustainable design objectives all influence plant choice, which is an important consideration for designers in South Africa, but often only adhere to one of these objectives. As illustrated in Chapter 5, practical considerations for plant selection can foster resilience in social-ecological systems through functional qualities but also responding to social and cultural preferences (Hunter 2011). Biodiversity and the insurance value it provides through resilience, is the building block for all other services (MEA 2005) and can improve the well-being of those who need it most. The findings show that currently this is mainly overridden by strong aesthetical and functional economic determinants. Level of urbanity, project location, size and budget are main considerations for what should be included in designs, this is in contrast with suggestions from the literature that describe all types of green spaces to contribute to green infrastructure and ecosystem services.

The findings also suggest that experiential learning is distinguished from artistic intuitive responses, similar to the critique offered in the literature stating that ecological approaches stifles creativity (Treib 1995/2002). In South Africa this is problematic because, horticultural and biodiversity interests depend on experiential knowledge and have to be recognised as equally important to aesthetics and other cultural pursuits. The importance of incorporating different knowledge systems as sources for cultural inspiration and conservation efforts are emphasised by a number of authors (Ahern *et al.* 2014; Hansen & Pauleit 2014; MEA 2005). Currently the topic of Indigenous Knowledge Systems (IKS) hardly features in the South African industry, excluding other ways of understanding and valuing nature from public spaces. From the fieldwork, design and aesthetics are central to the identity of the industry and relates to pursuits for innovation and quality for human appreciation, plus economic and functional benefit. Design is perceived as the highest ideal of the profession and since it is a cultural construct that has been informed mainly through Western art philosophy and ideology, its seemingly noble searches are currently in conflict with local priorities and ways of knowing.

The study proposes that concepts of aesthetics—currently used for design generation by designers—also be explored as didactic tools. Although aesthetics features as an importance cultural consideration for designers from the findings it is not related to intangible aspects of scientific learning and future knowledge and experiences of future generations. This is a lost opportunity, since aesthetic appreciation can be influenced through knowledge and values and in return effect human action toward nature (Gobster *et al.* 2007). The existing qualities of place, symbols, experiences and social interactions (Barthel *et al.* 2010; Hull *et al.* 1994; Stedman 2003) can all be

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employed for experiential and transformative learning while fostering attachment and satisfaction, as clarified in Chapter 3. This study suggests that learning from the environment and considering future generations also relate to the security value of green spaces (Gómez-Baggethun & Barton 2013) that need greater public attention in South Africa.

The topics of concern and social discourses revealed through the fieldwork findings are considered reflections of held and assigned values in the industry, which currently influence accepted forms of urban nature in South Africa. The study concludes that cultural interpretations and framing of green space endorsed by the values of professionals are currently discriminating against social and ecological aspects to the benefit of the majority of the population in South Africa.

11.3.2 Question 2: What do these concerns disclose about current values related to urban ecosystem services? E.g. which ecosystem services are valued and which are neglected by landscape design practice in SA?

The study posits that the values endorsed by landscape designers neglect the aspects that are currently most required in terms of green space. Both Provisioning and Supporting Services are considered insurance value of nature in terms of food provision and ecological threshold through ecosystem functions, which are regarded of high importance in terms of future risk assessment or resilience (Gómez-Baggethun & Barton 2013; Goulder & Kennedy 1997). These services can alleviate socio-economic concerns and improve quality of life of the urban poor, while maintaining the current high biodiversity that South Africa offers.

A concept that is not included in the ecosystem service approach is that of Intrinsic Value, which is inherently normative. The study proposes that the concept of Intrinsic Values is articulated in the industry. The literature reiterates the importance of this specific Nature Value for environmental decision-making (Jax *et al.* 2013; Lockwood 1999). In the South African industry, nature is mostly valued for Instrumental reasons with little mentioning of any moral obligation or non-use appreciation. These value projections resemble one sided monofunctional understanding of public green space either in the functional modernist sense or in the artistic cultural sense (Treib 1995/2002). Together with the ecosystem services findings, the Nature Values articulated indicate that professionals do not acknowledge the Fundamental Value of Supporting Services. These limited appreciations of designers have repercussions for their clients' and the public's understandings of the role of biodiversity in cities. Slightly contradictory, the functional utility of Provisioning Services is not highly valued, which reflects their deemed inappropriateness in urban contexts by landscape

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designers. This is also reflected in the lack of concern for Landscape Values of subsistence. Quite unexpectedly the literature in Chapter 3 shows that Provisioning Services through allotment gardens have also proven to provide biodiversity values through pollination, soil improvement etc., while building resilience through the ecological memory of citizens (Barthel *et al.* 2010). Examples are required that demonstrate the myriad benefits and indicate ways of dealing with ownership and management of Provisioning Services in competitive urban areas. Although foreign examples are available the study proposes that a learning-by-doing approach (Kato & Ahern 2008) would be most efficient in South Africa where few workable examples exist as precedents.

The study proposes the concept of Cultural Services is used as an approach to operationalise values. The popular and reoccurring emphasis on Cultural Services that featured throughout all the reach findings show that it best aligns with current values on landscape design by landscape practitioners. Cultural concerns were also important as Landscape Values in the award systems criteria. The literature describes many pertinent benefits of Cultural Services that embrace concepts of multifunctionality and transdisciplinarity, while encouraging care and stewardship (Plieninger *et al.* 2013; Tengberg *et al.* 2012). In terms of existing landscapes, the symbolic base for attachment can be altered without affecting overall attachment (Stedman 2003); this implies that Cultural Service appreciation can also lead to potential appreciation of other services as these become apparent.

It is advised that intangible Landscape Values become an educational concern in the industry. These values show constant neglect in all of the findings. They include the spiritual and therapeutic values of landscape, and the scientific learning and future knowledge and experiences of generations (Alessa *et al.* 2008). These requirements due to their lack of tangibility and metaphysical character cannot compete with tangible benefits in current practice. Designers need to know the Functional Value of metaphysical components and respect the values of those that depend on them. Scientific learning and future knowledge and experiences are crucial social components for social-ecological resilience (Gómez-Baggethun & Barton 2013). As suggested earlier in this section, these intangible aspects represent Supporting Services and their Fundamental or “insurance” value. Spiritual and therapeutic values seem to be neglected Cultural Services, that are not seen as essential for a good human life, which is contradictory with what the literature review in Chapter 3 has shown (refer to, for example, Hull & Michael 1995; Matsuoka & Sullivan 2011; Rohde & Kendle 1994; Tzoulas & Greening 2011).

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Although somehow controversial, it is suggested that the cultural construct of wilderness be utilised as a way to introduce the idea of non-use in urban areas (Cronon 2006b). This construct lends itself to critical self-consciousness and can arguably lead to a much-required respect of otherness (Cronon 2006b) in the South African urban environment. Local designers did not articulate the more tangible Landscape Values of wilderness, which indicates the deemed unseemliness of the concept for urban environments. This has definite implications for the perceived level of acceptability of urban biodiversity gardens, as confirmed in discussions. Arguably, designers do not perceive wilderness and natural history as tangible aspects. Experts further mentioned cultural history and concepts of heritage but mostly as a response to government briefs. The study posits that historic cultural and natural aspects are not part of current design values and purposefully explored and celebrated in design projects. These findings call for further enquiry and investigation of these specific values in the industry.

This study considers these findings as reflections of underlying and assigned values in the industry (Ives and Kendal 2014). Value cues from clients and stakeholders and situational factors influence the accessibility of held values and impact on decisions and behaviour of designers (Steg *et al.* 2014), which is argued here to specifically call for the articulation of essential ecosystem services. In spite of identifying a sound group of ecosystem services in the literature that are recommended for urban areas in Chapter 5, the study found that when compared to Landscape Values (Alessa *et al.* 2008) in Chapter 10, these ecosystem services also neglected specific human values for nature and landscape—although to a lesser extent than South African landscape practice. The study is therefore of the opinion that not only the important urban ecosystem services from all four categories from Chapter 5 should be important references in practice, but also the Nature Values and Landscape Values identified by environmental ethics and environmental psychology. Several of these values, for example, spiritual and therapeutic values, are included in the ecosystem service framework, but authors in the literature did not highlight these specifically for urban areas. Using a greater variety of values as a reference for urban green space can prevent institutional restrictions from limiting the values of all stakeholders, as proposed by the literature.

11.3.3 Question 3: Which professional social practices currently articulate the value of certain ecosystem services in the landscape design community of practice?

The study selected the award systems as the most appropriate of several identified professional social practices in the industry, that currently socially influence the production of ecosystem services in Chapter 8 and 9. The importance of social dynamics in the design process and aspects such as the

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client's brief and values form part of this collective practice that influence the landscape design community. Other communal practices that influence values in the profession are: legislation, education, government support, rating systems, good project examples, institutional standards, knowledge sharing, the media, research and publications. It is argued in the study that the majority of these are already and can be further endorsed through the award systems.

At the core of this argument is the fact that the awards both articulate values and strengthen knowledge, as indicated in the findings of the fieldwork. The found perceived importance of knowledge and education as drivers towards greater resilience in the profession can be easily harnessed through the award systems. In particular, knowledge sharing and project examples manifested as powerful opportunities in discussions with experts. Since new knowledge can be value dependant (Bolderdijk *et al.* 2013), the award systems offer a platform for discussion, input and participation which can influence Functional Value that construct other values types (Lockwood 1999). The literature specifically recommends strengthening intrinsic, normative values for pro-environmental behaviour (Steg *et al*. 2014). The study argues that value cues and situational factors provided by the award systems can strengthen normative values while also incentivisng through material benefit. Rating systems, legislation and government support all embody important professional social practices but are more difficult to impose within the profession since they are associated with extrinsic motivation, which is non-normative and short-term. These shortcomings were not only illustrated by the literature but also reiterated by experts during the fieldwork.

The award systems are recommended for the following reasons elaborated in Chapters 4 and 9. They motivate the profession both intrinsically and extrinsically. Awards receive media publicity and provide good examples of design projects. The process is educational and leads to knowledge sharing through comments from judges or publications. According to discussions with experts, awards reflect institutional standards and promote research, while creating competition and mimicry in the industry. Importantly, awards also address the design phase of the project, which has been identified as the main decision-making phase; the relation of the awards to the design phase is further significant since design is related to professional identity and therefore the award system has the potential to activate the self that could effectively motivate increased pro-environmental behaviour (Steg *et al.* 2014).

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However, a shortcoming of the current award system revealed in Chapter 10 is that it does not articulate all functional values of ecosystem services, while excluding aspects of Nature and Landscape Values recognised by the literature.

11.3.4 Question 4: How can professional social practices operationalise values to socially produce essential ecosystem services?

This study recommends that the award criteria be stated more explicitly to reflect the ecosystem services recommended for urban areas. However, a broad spectrum of ecosystem services from all categories should be incorporated, including therapeutic value and spiritual well-being, which are not among the ecosystem services for urban areas. The Landscape Values and Nature Values can be used as a point of reference. The discussion of these shortcomings in the awards criteria is elaborated under recommendations for implementation.

The study proposes five broad approaches for operationalisation of professional values. These approaches are based on the identified social discourses in the industry in Chapter 10 and the recommendations from the literature in Chapter 4. The literature recommends the use of value cues and situational factors to strengthen normative goals for pro-environmental behaviour (Steg *et al.* 2014). For social practices to produce essential ecosystem services, positive value cues and situations must be exploited. Social practices contest or confirm normative and assigned values by means of value cues (Steg *et al.* 2014), but they also reflect held values to a large extent (Ives & Kendal 2014; Jax *et al.* 2013). If value cues resonate with held values, they can strengthen normative values and result in pro-environmental decisions and behaviour (Schultz & Zelezny 2003; Steg *et al.* 2014). The suggested approaches therefore build on existing practices and elements of high esteem in the industry, like design, aesthetics and innovation, to operationalise professional values.

A first consideration for operationalisation in the industry is social interaction and communication through social rituals (Barthel *et al*. 2013; Mansbridge 1994). The institutes that are seen as responsible for setting standards play an imperative role in fostering communication and shared rituals. The awards generate important rituals in the two identified institutes in landscape design in South Africa. Social networks mobilise information and knowledge (Ernstson 2013; Latour 2005), and institutes provide an important entry point into these networks. Focused communication and social interactions can clarify vague concepts identified in this study such as biodiversity, green infrastructure and sustainability. This is proposed through the identification and separation of individual processes and consequences with regard to these terms (Bunnell 1999 in Lindenmayer &

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Fischer 2006:239). Information sharing on landscape process knowledge and different ways of knowing nature and its values can also amplify acceptance of different types of knowledge in the industry. Social rituals for knowledge spreading (Barthel *et al.* 2010) as part of the awards, can endorse various forms of knowledge, combined with other social practices it has potential to create consensual knowledge (Haas 1989; Mansbridge 1994).

In second place, the study proposes the alignment of important held values for design in the industry with value cues that indicate the association of these design values with essential ecosystem services and specifically neglected tangible and intangible values in the industry. The values identified in Chapter 8 are design innovation and quality for social and community enjoyment, aspects of sustainability and aesthetics that also guide plant selection, all of which can be matched with to some extent with specific ecosystem services which need not be linear. For example, the use of a regionally indigenous and diverse plant palette could be associated with design innovation, while the therapeutic value of aesthetics may be emphasised. This value association process should entail a strategic reframing of messages (Schultz & Zelezny 2003) to explain the self-enhancement values of many neglected services and values: Supporting and Provisioning Services, Intrinsic and Fundamental Nature Values, intangible Landscape Values etc.

The study recommends that socio-economic opportunities for alignment between ecosystem services and human well-being are embraced. Socio-economic concerns are generally seen as competing goals with the environment (McEwan *et al.* 2014; Schäffler & Swilling 2012). The neglect of criteria for life sustaining aspect and utility gardens is not acceptable in a country where food scarcity, poverty and unemployment are at the order of the day (DAFF 2010; StatsSA 2012). Furthermore, concerns around the maintenance and management of food gardens can be turned into an opportunity for job creation and employment. Social and ecological goals should be more closely aligned by emphasising the aspects of human well-being that are addressed by ecosystem services. Reduction in cost and effort has been earmarked by the literature to endorse pro-environmental behaviour (Schultz & Zelezny 2003; Steg *et al.* 2014). The hedonic cost and effort—identified in Chapter 8 and 9—that designers associate with the above design activities, may be balanced out by maintaining the material benefits of advertising and marketing that the awards offer, and an increased availability of products and species to facilitate biodiversity design.

As a third strategy for operationalisation, the concept of Cultural Services specifically has great potential for value association, due to its high regard by professionals. Cultural Services also connect

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well with the importance of aesthetics, since as explained by the literature they are generally very tangible and easy to enjoy and appreciate. The perception of these services influences how other services are valued (Plieninger *et al.* 2013; Tengberg *et al.* 2012). This leads to a fourth proposal of intentional multifunctionality. Currently, local practices seem to be rather monofunctional regarding ecosystem services, with some cultural constraints in accepting certain services and values in urban areas. For more inclusionary design projects, the promotion of the concept of multifunctionality is very important (Ahern *et al.* 2014; Hansen & Pauleit 2014) and can bond values and services to make them more locally acceptable. Both the concepts of Cultural Services and multifunctionality embrace much needed inclusion of transdisciplinarity and respects for different knowledge systems.

A fifth proposal is that aesthetics can shape the power embodied in landscape patterns or qualities (Gobster *et al.* 2007) to create examples of good practice (Ahern *et al*. 2014). The values people assign to place often relate to physical environmental qualities (Stedman 2003) and aesthetics (Gobster *et al.* 2007), lived experience (Tuan 1977) or symbolism (Hull *et al.* 1994) and collective experiences and memories (Barthel *et al.* 2010), which give meaning, attachment and satisfaction to people (Stedman 2003). These findings from the literature reiterated by the fieldwork highlight the prospect of exploiting good physical examples through their observation, experience and symbolic meaning. This concept is not only meaningful for the profession to learn as they go, but as importantly it is a vehicle for didactic purposes with regard to the public (Colding 2011).

There is a further proposal to acknowledge ecosystem disservices that is recommended by many (Ernstson & Sörlin 2013; Gómez-Baggethun & Barton 2013; Lyytimäki & Sipilä 2009). The perception that landscape choices are rather based on disservices than on services calls for a pertinent recognition and a discussion of these perceived negative Functional Values. From the fieldwork, many reasons for not including aspects in a given landscape are perceived to be based on the cultural preferences of individuals rather than Functional Value for people and the environment.

Albeit broad guidelines, the study managed to identify from the literature measures for best practice to increase the functional production of ecosystem services, and based on the fieldwork, it made a practical proposal for operationalisation of values to achieve this best practice in the local context. The study confidently state that value considerations in landscape design practice should be a conscious matter and ecosystem services should be deliberately provided. It can be concluded that a contextually appropriate social practice among professionals in landscape design can be identified that effectively operationalises values to socially produce essential ecosystem services.

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However, besides the concern for ecosystem services the study also identified value aspects that do not receive attention in the industry, some of which are also not addressed by the conceptual tool of ecosystem services. This leads to recommendations regarding the ecosystem services concept, which is discussed under implications for existing theory. The awards system operationalisation is further elaborated in recommendations for implementation. The summary of contributions discussed in the next section expands on the achievements of this study by reflecting on the outcomes that were anticipated at the beginning of the study.

11.4 Summary of contributions

1) This study provides a summary of current concerns in landscape design practice in South Africa and relates them to Functional values, ecosystem services, Nature Values and Landscape Values, as identified in the literature. To enable effective management of any system, a sound understanding of the status quo is required. These underlying values are important in the industry because they lead to valued and neglected ecosystem services in landscape design practice, which influence greatly how nature is perceived and valued by society. This is important since the literature demonstrate that these values and social perceptions can not only affect security value for resilience but also result in inequality, lack of social justice, access and distribution of nature services (Ernstson 2013; Gómez-Baggethun & Barton 2013).

In terms of the values delineated by the fieldwork findings in this study, there appears to be a lack of articulation for Intrinsic and Fundamental Nature Values. Although at first stance one may argue for a free cultural selection of own values, the fact that landscape designers do not endorse these values is not a reflection of the South African public's attitude toward Intrinsic Nature Values. Intrinsic Value beliefs specifically have the potential to influence environmental decisions, because they are normative (Lockwood 1999). From the fieldwork it would appear that landscape designers are not articulating these values in their endeavours with stakeholders and through design initiatives, which poses restrictions on value articulations in particular institutions where these designers are involved and on society in general. As far as objective and functional use values of nature is concerned this study posits that Intrinsic Values should be articulated as a matter of good practice.

2) For the approximately ten-year period reviewed, the researcher could not detect specific tendency changes over time in the industry, as the trend remained similar throughout. However, the experts interviewed remarked a greater general awareness and consideration for environmental,

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heritage, socio-cultural and socio-economic factors in design projects compared to the past. Yet, socio-cultural and socio-economic requirements for low maintenance or maintenance free projects and minimalistic design still indicate that urban nature is regarded mainly as a utility object and not employed towards human well-being. General environmental attitudes were further associated with regionally identified business and governance cultures, as well as characteristics of climate and vegetation, which influence lifestyle and values assigned to urban nature.

The study determined that above all, South African landscapes professionals and clients favour Cultural and Regulating Services more than Provisioning and Supporting Services. Regulating Services are regarded as the most valuable service by the literature (Costanza *et al.* 1997) and are generally considered most needed in urban areas, along with Cultural Services (Molebatsi *et al*. 2010). Cultural Services are regarded as immensely important since they depend mainly on Supporting but also on Provisioning and Regulating Services (MEA 2005), while the manifestation of Cultural Services affects the way ecosystems are perceived, valued and managed (Tengberg *et al*. 2012). Cultural Services thus affect the overall impression and acceptance of other services and can be instrumental in proposals for multifuntionality and value association, as stated in 11.3.4.

A very important implication of the study is the significance of Cultural Services in South Africa. The current expression of Cultural Services appears to be monofunctional, which leads to a perceived incompatibility of different services. Since Cultural Services are often enjoyed in bundles, they specifically hold potential for multifunctionality in landscape design (Plieninger *et al*. 2013). Cultural Services thus provide an opportunity for the inclusion of disregarded aspects of Nature Values, Landscape Values and ecosystem services such as the ones mentioned below.

A current challenge related to the integration of ecosystem services and green infrastructure in landscape design practice in the US is the failure to include ecosystem functions in design (Steiner 2014), which in South Africa manifests as a lack of local appreciation for Fundamental Nature Values. In contrast with many European examples (Barthel *et al.* 2010), in South Africa Provisioning Services are not seen to be compatible with urban spaces due to negative social perceptions and questions of ownership. The intangible Landscape Values of spiritual, therapeutic, scientific learning and future knowledge and experience, along with values of wilderness or natural and cultural history, are specifically neglected in discussions.

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3) This study identified several professional social practices of value to professionals from the fieldwork. Those with potential to strengthen normative values have greater prospects for behavioural change based on the literature (Mansbridge 1994; Steg *et al.* 2014). In confirmation of existing theories, social practices articulate specific values that lead to ecosystem service production in landscape design practice (Ernstson 2013). This is achieved by means of value cues (Steg *et al.* 2014), which according to actor-network theory wield power and knowledge by making use of artefacts to legitimise assigned values and social arenas (i.e., situational factors) to defuse them through social networks (Latour 2005).

4) This study proposes award systems as a locally appropriate professional social practice that can articulate the value of essential ecosystem services and lead to their production in landscape design practice. Awards motivate intrinsically and extrinsically, which has further potential for norm activation (Steg *et al.* 2014). The award system as social practice also allows for the growth of consensual knowledge (Haas 1989) and diffusion of knowledge and practices in the industry (Goddard *et al.* 2012).

Despite a lack of data to formulate specific indicators regarding ecosystem services and green infrastructure, frameworks for social-ecological integration (see Ahern *et al.* 2014; Hansen & Pauleit 2014) and rating systems related to ecosystem services (see SITES 2014) exist. However, these are not currently employed in practice in South Africa. This study argues that professionals need to participate in scientific discourse and play an important role in informing the public and stakeholders. This can only happen once existing knowledge is put into practice, questioned and feedback received from operational aspects. This study therefore recommends a learning-by-doing approach (Ahern *et al.* 2014) to contribute to the scientific discourse and create consensual knowledge about available know-how in the industry on best practice.

This research considered current literature on recommended ecosystem services required in urban areas (Colding 2011; Gómez-Baggethun & Barton 2013; SITES 2014) and processes for selecting site-specific ecosystem services (Ahern *et al.* 2014; Hansen & Pauleit 2014; SITES 2014). The literature findings were then used to identify shortcomings in existing professional social practices such as the awards in South Africa. It is suggested that these important ecosystem services be supported by a greater articulation of Landscape Values, since intangible aspects and Intrinsic Nature values with recognised importance are not articulated by these services.

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5) This study identified interrelated and dependant components of the discourse on urban ecology in landscape design practice in South Africa. The study found that landscape design values are not congruent with contemporary scientific discourse.

Ultimately, urban nature is perceived as cultural and economically functional. It is only considered for direct use in specific situations since Provisioning Services are perceived as socially difficult to manage in terms of ownership. The presence and role of biodiversity is not seen as essential for urban environments. Biodiversity is perceived as difficult to establish and reconcile with societal norms and perceptions of what urban nature "should" be.

In South Africa, aside from landscape designers, other important role players in landscape design were identified: the client (either private or the state) and the general public. The private client is more profit-driven but can push highly regarded innovation and quality in design. The state is mainly concerned with poverty relief and skills development, and places economics before quality that challenges creative outcomes. Public perceptions, the media and international policy influence design to a lesser extent since there is a lack of immediacy.

Direct drivers of change cited identified in the fieldwork were primarily the introduction and removal of species, while professionals do not give the merited attention to direct drivers such as land use and land cover, which affect ecosystems and their services. Economics is the main indirect driver of change, followed by socio-political and socio-cultural drivers in landscape design. Important indirect drivers such as demographics and climate change feature less. The study posits that landscape designers are not operating to fully affect the urban environment by not purposefully engaging with aspects of land use and land cover. Furthermore, the neglect of aspects of demographics and climate change would also suggest some ignorance with regard to projected urbanisation, current levels of poverty and food scarcity in South Africa that designers can play a meaningful role in.

Although knowledge and management are considered as highly important in terms of future resilience, values and ecosystems functions seem to receive less attention. Consequently, current landscape design values in the industry favour Instrumental Utility and Eudaimonistic Values over Fundamental and Intrinsic Nature Values. The neglect of value considerations and ecosystem functions would appear to be two fundamental current considerations for social-ecological resilience (MEA 2005).

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11.5 Implications for existing theory

1) This study reiterates and develops existing theory regarding the social production of ecosystem services to include the perspective of landscape design community of practice. Although professionals are acknowledged in the subject literature in decision-making and can be interpreted as potential agents in system models, their held values are mostly disregarded. Values should be acknowledged more pertinently in system models such as is done by Van Oudenhoven *et al*. (2012).

From the discussions it was derived that in South Africa little attention is given to environmental justice in terms of the integration of access and user values through participatory or transdisciplinary processes, a shortcoming also reiterated by the literature in general (Hansen & Pauleit 2014). This social requirement places even greater importance on the values held by designers, since it indicates the extent to which designers' values may limit engagement in inclusionary processes. The values articulated by designers can also place a limit on stakeholders in engagement processes, as the stakeholders would be reluctant to express other values as those articulated by designers (Lockwood 1999).

When considering professional ethics not only as axiology, but also deontology as promoted by Jax *et al.* (2013), ethics do not only deal with value and valuation but also encompass duties and obligations. The literature explains that moral obligations can be direct in terms of interactions, or indirect consequences of actions and their results. This study posits that as in the case of medical surgeons or lawyers, with regard to the future of the planet, landscape designers needs a more specific ethical code to adhere to since their role in social-ecological resilience is critical and can be exploited to the benefit of all.

2) The study affirms the findings by S. S. Cilliers (2010a) that climate and vegetation response and character influence how people value urban nature in terms of the general importance assigned to a specific vegetation type, the visual appeal that it holds, and the perceived autonomy versus need for human intervention to assist vegetation growth. The visual appearance of existing vegetation may be included as land cover or vegetation structure in system models, but the researcher did not find it discussed as a pertinent driver of social actions and human response.

When vegetation grows easily without human help, it is often considered less valuable and taken for granted by clients. Theoretically it follows that the increased threat to vegetation and potential difficulty with vegetation growth could increase the value assigned to it. However, it was also found

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that the visual appeal of the vegetation (for example, Cape Floral Kingdom versus the Grassland biome) influences its value, and similarly species that struggle to survive may be replaced by sealed surfaces. Gobster *et al.* (2007) has emphasised this aspect in design, and Hunter (2011) has noted that landscape patterns can be manipulated according to social appeal to gain social buy-in. However, regionally indigenous and biodiverse plant communities and remnant patches are bound to the perceived visual appeal of existing native vegetation which in South Africa is regionally very distinct. Since knowledge can increase aesthetic appreciation (Gandy 2013), this finding highlights the importance of designers obtaining the required knowledge during their training to enable the articulation of the value of regional vegetation to clients.

3) This study confirms the importance given by the literature to good examples as objects of tangible achievement in the industry. The literature encourages these project examples (Alberti *et al.* 2008; Colding 2011; Ernstson 2013), since they hold potential for influencing perception in the industry and among the general public through experiential learning and the effects of landscape patterns on perceptions and affect (Ahern *et al.* 2014; Gobster *et al.* 2007). The effect of the current award systems and the examples they produce to influence the media and the following of others has been confirmed by the findings from the fieldwork.

4) The study confirms the use of the conceptual tool of ecosystem services for social system interpretation and understanding (Ernstson 2013; Ernstson & Sörlin 2013). The comparison of ecosystem services jointly articulated by the research instruments with possible Nature and Landscape Values in the literature, revealed finer nuances of local perceptions and how designers acknowledge or deny the Functional Values of specific services. This method of combining ecosystem services and value considerations has proven useful in this study, since it became also apparent that ecosystem service neglect Intrinsic Value articulation.

5) The study adds to current critique on the shortfalls of the conceptual tool of ecosystem services, since it does not allow for the articulation on Intrinsic Nature Values. Lockwood (1999) has emphasised the importance of this concept for environmental decision-making. It is proposed that this important value be incorporated with the ecosystem service framework, since this normative value is important for social-ecological resilience. Yet, this may call for a reframing of the way ecosystem services are currently defined. This study posits that Intrinsic Value like biodiversity can be considered a service that maintains genetic diversity.

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6) The study sustains the concern of competing socio-economic factors with the environment found by various authors (E. J. Cilliers 2010; McEwan *et al*. 2014; Schäffler & Swilling 2012). Theory predicts competing goals will override pro-environmental behaviour due to situational factors (Steg *et al.* 2014). The association of pro-environmental behaviour and socio-economic benefits may result in a proprietary—rather than protective—attitude towards nature, for example, viewing nature as a commodity (McEwan *et al.* 2014). Steg *et al.* (2014) indicate, however, that in spite of basic material needs people can act pro-environmentally based on their underlying values. Kaplan and Kaplan (1989) have indicated that early and repeated interactions with nature are necessary to enable pro-environmental behaviour later in life. This reiterates the importance of "natural" environments for children in urban landscapes as future city dwellers or designers alike.

The study reveals prominent distinctions between urban and rural approaches to landscape design, which need to be addressed based on future predictions of urbanisation in Sub-Sahara Africa. Given the persistently high rates of poverty and inequality in South Africa—with 29% of the population living in slums (UN-Habitat 2010) and an official unemployment rate of between 30-40% (StatsSA 2012), it is likely that new urban dwellers arriving from rural areas will remain in poverty unless systematic changes occur that allow multifunctional and ecosystem service diverse landscapes in rural, urban and peri-urban areas.

Based on the fieldwork findings this study posits that rural and low-income communities have perceived less incentive for investment by developers and perceived higher preferences for utility gardens. These perceptions may limit the inclusion of biodiverse ecosystems and specific Cultural Services by designers in rural areas—for example, spiritual and therapeutic uses, which are already neglected in South Africa—may be seen as not urgently required in rural areas. If landscapes in rural areas are treated differently by designers than urban landscapes, new urban emigrants from rural areas will have had a lack of exposure to facilitated landscapes that include multiple ecosystem services. This discrepancy will shape the perceptions and held values of these rural citizens, which can result in these individuals not valuing and caring for multifunctional and ecosystem service diverse landscapes in urban environments. The study thus questions the use of distinct rural versus urban approaches to ecosystem service provision through facilitated landscapes. The literature has not highlighted this aspect.

Landscape design in South Africa has a tremendous opportunity to contribute to building a sustainable democracy, with equity of social and economic opportunity, through integrative

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landscapes that serve multiple needs of the majority population. Biodiversity and climate change considerations, urban food gardens, as well as medicinal or therapeutic gardens, are direly needed by all South Africans, including the poor, and cannot be excluded based on perceived values held by some.

11.6 Recommendations for implementation

The recommendations for implementation mainly centre on the award systems investigated. By reviewing current award systems, the researcher identified several weaknesses in terms of evaluation criteria used by the awards. The awards criteria are purposefully vague, which allows for contextual interpretation. However, this approach fails to articulate the majority of ecosystem services recommended for urban areas. The award systems reviewed acknowledge only two of 26 recommended ecosystem services. However, not only the ecosystem services are deemed important, since there were many Landscape Values that were pertinently not recognised for urban areas through the ecosystem services. Many of these intangible aspects are of high importance for human health (e.g., therapeutic value) but also for resilience (e.g., scientific learning). Moreover, existing international rating systems or award systems in the industry do not reflect several recent findings in terms of vegetation and green space requirements for enhancing green Infrastructure functions and resilience. A first recommendation is that the award criteria should be adjusted to better articulate and deliberately reflect existing knowledge on green infrastructure and ecosystem services.

Scientific literature indicates essential ecosystem services for urban environments. Although each project may contain specific contextual services according to environmental and social requirements, an extensive range of services relates to the broader regional and global context and could be incorporated as part of multifunctional green infrastructure. It is recommended that the criteria of the awards be made more specific and relate to this scientific knowledge in order to enable a greater variety of ecosystem services to be articulated and valued socially. For example, ecosystem services consisting of ecosystem functions and processes are not regarded as being of high value for urban areas by existing awards, while their value in terms of socio-ecological resilience as insurance value has been reiterated (Gómez-Baggethun & Barton 2013). Similarly aspects of food production are not regarded as important for urban areas by the existing award systems, while food scarcity and hunger is a prime factor in South Africa (DAFF 2010). The importance of total green space over patch quantity, size and connectivity (Ikin *et al*. 2013) is another example of aspects currently not reflected by award criteria. The award systems and related criteria need not enforce

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implementation of all ecosystem services in each project, yet they can shape knowledge, awareness and inform practitioners of essential ecosystem services.

Furthermore, professional social practices—including but also beyond the award systems—need to specifically articulate a greater variety of ecosystem services to provide cues for norm activation and have potential to affect social behaviour. However, to be effective value cues need to relate to the identified held values in the industry of design aesthetics, quality and innovation through improved functioning and economic value.

The industry should work to reduce the perceived and actual costliness of biodiverse gardens in terms of time and effort. This requires the correction of misperceptions of facts (Aaron *et al.* 1994), continued professional development and knowledge sharing. Design aesthetics and innovation should not be seen as competing with biodiversity but rather as supported by biodiversity.

The study has revealed that design professionals do not currently articulate all Nature Values and Landscape Values, which limits the inclusion of many ecosystem services and functions in current urban landscapes. The award systems could also aid the articulation of plural and diverse values for urban nature by means of categories, criteria and social practices that accompany the awards, for example talks at prize-giving events.

The study recommended five broad strategies to operationalise the awards, that provide potential for situations where normative goals can be strengthened: (1) by means of instigating and reinforcing social rituals through the award systems process; (2) by aligning non-recognised Functional Values with held values; (3) by endorsing the concept of multifunctionality, which also goes hand in hand with reframing of messages; (4) through the concept of Cultural Services that shape perceptions of other services; (5) by exposing and celebrating examples of best practice for professional and public benefit.

It if further recommended that these changes be implemented via an inclusionary process of co-creation to enable each institute to take ownership of the development and internally negotiate acceptable processes with members.

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11.6.1 Examples of exemplary landscape design projects

After much discussion on ecosystem services and values throughout the thesis, one may ask what kind of landscapes would be desirable as models or demonstrable projects. This section briefly discusses five examples of landscape design projects that respectively present co-creation opportunities, allow for multiple ecosystem services inclusion, and specifically address neglected services and values identified in the study. Not one project meets all the criteria, but these projects demonstrate that the aspirations of the thesis are not over idealistic.

11.6.1.1 Street Edge Alternatives (SEA), Seattle, Washington (2001)

The SEA project is mainly concerned with Regulating Services in the form of storm-water management. The project is located in a low density residential area that lacked sidewalks and drainage infrastructure. The design involved a complete reconstruction of the street and its drainage system to reduce impervious areas and install storm-water detention ponds. The design moved away from traditional piped systems and mimicked the natural landscape prior to development. Impervious surfaces were reduced to 11 % less than a traditional street, through the provision of surface detention in swales and the planting of over 100 evergreen trees and 1100 shrubs. What is noteworthy about the project is that it did not compromise homeowner access and parking needs on the street. The result of the design was a reduced total volume of storm-water within its capture area by 97 % for the following two years (Matsuno & Chiu 2010).

Transportation systems and pedestrian safety are negatively affected by flooding of streets. Besides infrastructural relief provided through road surface maintenance and pedestrian ease of movement, the impacts of urban environments on streams inhabited by salmon are significantly reduced. Subsequently, the quality of the storm-water also became a concern in order to reduce pollution and restore aquatic habitat. The design further made an effort to use native wetland and upland species in combination with rock and gravel. Large-scale trees were retained and the landscape designed was aimed at creating an aesthetic environment that also attracts people (Matsuno & Chiu 2010).

The project, hence, moved beyond a concern for Regulating Services of storm-water management to also include Cultural Services of pedestrian access, safety, physical activity, sense of place and aesthetics; and Supporting Services of increased local biodiversity, habitat creation and improvement. As a final benefit, the project saves on infrastructure cost—in the form of formerly required pipes and tanks—by up to 25% for the municipality (Matsuno & Chiu 2010).

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What is noteworthy about the SEA project is the success of the co-creation process. The project was developed by planners from Seattle's Public Utilities (SPU) in union with local community groups. Researchers from the University of Washington have been involved in quantifying the project outcomes. The landscape design included gathering spaces where mailboxes were clustered, which improved community cohesion and interaction. The streets are maintained with the help of homeowners on adjacent properties and by SPU. Local residents have started adding their own preferred planting to the street. The project has spread environmental awareness and action, creating stewardship through design (Matsuno & Chiu 2010).

Besides the co-creation process and long-term community buy-in, the specific contributions towards intangible aspects, such as the therapeutic and spiritual value of sense of place, are as important for the purpose of this thesis as the scientific learning and future experience for future generations.

11.6.1.2 Green Point Park, Cape Town (2011)

An exemplary local example is the inclusion of a biodiversity garden in Green Point Park in Cape Town, adjacent to the erected sports stadium for the Fédération Internationale de Football Association (FIFA) World Cup held in South Africa in 2010.

The site historically played a role in city life and housed activities such as livestock grazing and staging sailing regattas in a seasonal wetland. In 1923 the Green Point Common was granted to the city council by the Union Government as an area for recreational use by the general public. By the end of the century, the Common had become largely overgrown and dilapidated sports facilities separated by fences limited public access—an attraction that did remain was Sunday markets held at the facilities. In the new millennium, the municipality had a goal to transform the area into a high quality multifunctional park which would contribute to the regeneration of the city. The 100 ha Common, which also contained a golf course, was reconfigured to house the stadium, retain certain sports fields, and include a 12.5 ha park (Knoll 2011).

Oberholzer and Van Papendorp Landscape Architects took great care to design a park with spaces that would be accessible and inviting to a diverse range of users of different ages and with different physical abilities (Henson 2012:100). The park comprises a network of pathways, multi-functional spaces, children's play areas, an amphitheatre, a wetland and a biodiversity display garden. Trees serve as windbreaks and there is a strong presence of water (Knoll 2011). The water source is the original mountain springs that supplied the city with water, which has been diverted to the Common

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by gravity for irrigational purposes. A turbine and waterwheel were installed for the generation of electricity for a future-envisaged tea garden and eco-centre. In 2011, the park attracted 3000 to 5000 visitors daily (Henson 2012:100).



Figure 62: Green Point Park, multifunctional green open spaces for recreation and sport

Source: author 2014

The inclusion of a biodiversity display garden was an initiative that originated with the designers and was supported by a council member. Today, this garden attracts schools and other interest groups, who visit it for educational and awareness purposes (Van Papendorp, personal communication, 2013). This illustrates how a landscape designer can initiate a project for biodiversity awareness and well-being. The park is not only a place for social interaction and recreation within a green context but also a place to observe and learn about ecological interdependence. This experience can engender public appreciation and an attitude of stewardship towards the earth (Van Papendorp in Knoll 2011).



Figure 63: Green Point Park, biodiversity display garden with storyboard panels

Source: author 2014

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The landscape architects made use of a local expert in planting design—Marijke Honig—for the design of the biodiversity garden. The garden contains more than 25 000 plants and features 300 plant species indigenous to the greater city area. The garden is designed around three themes: 1) people and plants—illustrating the plants people use, e.g. for food, medicine and construction; 2) a biodiversity discovery trail—explaining the meaning and value of biodiversity, why it is threatened and how to garden responsibly; 3) a wetland walk—connecting to the history of the site as an original seasonal wetland. The people and plants section also displays the Khoikhoi lifestyle and huts in the local environment imagined around 500 years ago, connecting natural and cultural history. Storyboards, plant labels, educational art as visual symbols and interactive displays are used to interact with people. The educational goal of the garden rests on enthusiasm for natural heritage, an understanding of biodiversity and the welfare of future generations (Knoll 2011).



Figure 64: Green Point Park (left) the wetland walk within the context of the city; (right) educational art as part of the biodiversity display garden

Source: author 2014

As identified in the thesis findings, these value themes of the Intrinsic and Fundamental Value of biodiversity, historic aspects of natural and human history, scientific learning about the environment and future knowledge and experience of generations are not frequently articulated by landscape designers. The park also addresses Regulating Services by dealing with drainage, water cleansing and windbreaks; Supporting Services through local and diverse planting that includes the four local Veld Types and water habitats; and Provisioning Services of food and medicinal plants, though this is more educational than truly provisional; Cultural Services through recreation, physical activity, aesthetics, sense of place and cultural and natural heritage. The intangible aspects of spiritual and therapeutic value are not pertinently addressed. However, the garden specifically spreads awareness and educates people about the value of Supporting and Provisioning Services, the two services that are generally not articulated in landscape design practice in South Africa.

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11.6.1.3 Three local examples with distinct focuses

1) Although local artists were used for the artwork at Green Point Park, a component that was not evident as part of the design process was co-creation. Due to the apparent disconnect between the values of designers, government, and citizens and the need to consider actual demands in ecosystem services, co-creation in design is advocated by frameworks (Ahern *et al*. 2014; Hansen & Pauleit 2014). An example of a project that did make use of co-creation is the Khayelitsha Harare Precinct 3 (2009) in Cape Town by *Klitzner Architects and Landscape Architects*. The project is located in the harsh social and environmental conditions of the Cape Flats (Henson 2012:128). The project consists of a route of play courts, playgrounds, squares and pedestrian walkways that improve pedestrian safety towards schools, public transport nodes and the Central Business District. The multifunctional park area, additionally, includes meeting rooms, shops, places of trade and a clinic.



Figure 65: Khayelitsha Harare Precinct 3, community engagement as part of the design and execution of the project

Source: Urban Redevelopment Authority 2015. [Online].
http://www.leekuanyewworldcityprize.com.sg/features_khayelitsha.htm. [Accessed 26 June, 2015].

As part of the brief, the local community was involved in the design development and construction, which also entailed the transfer of skills. Recreation and sports facilities have been well combined with storm-water design, allowing seasonal and peak flooding to be accommodated (Stoffberg *et al*. 2012: 262). Calcrete, naturally found under the sands of the site, was used to clad seating walls that define edges. The relevant Cultural and Regulating Services seem to be well addressed by the project, based on the brief and the context. The design increased surveillance and safety in the area. Supporting and Provisioning Services were not pertinently included as part of the design. This is most likely due to the harsh contextual realities that demand simplicity and robustness for a resilient design. Although there are good examples of Provisioning Service and food security projects in poor communities—see, for example, Abalimi: The People's Garden Centre (abalimi.org.za)—these

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initiatives are often not spontaneously included as part of landscape design, or linked to Cultural Services. Intangible Landscape Values that are therapeutic and spiritual in nature are typically not explicitly included as part of landscape interventions in informal and poor communities.

2) Projects that do address intangible spiritual and therapeutic values are often associated with commemoration and memorial design, which became an important trend in the built environment during the early days of the democratic government (Stoffberg *et al.* 2012). An example of such a project that focuses strongly on Indigenous Knowledge Systems (IKS) is Freedom Park (2005-2009). This cabinet-approved legacy project was one of the most lavish landscape design projects undertaken by the government in South Africa at the time. The design is symbolic of the struggle for freedom and has a strong symbolic narrative around the concepts of cleansing, healing and renewal. Besides the architects and landscape architects (*Newtown Landscape Architects and Green Inc. Landscape Architects*), a great variety of cultural experts and traditional healers were involved in elaborating on the narrative of the design (Stoffberg *et al.* 2012).

Located on a virgin quartzite ridge outside the capital city of Pretoria in the Tshwane municipal area, the design responded to the findings of environmental impact assessments and management plans to prevent harm to the environment as far as possible. “The primary design elements of the garden, and throughout the park, are stone, water and indigenous plants that often have spiritual and medicinal significance and represent the values manifest in the story telling” (Knoll 2007: 18). One of the many symbolic spaces is the *Isivivane* that represents a final resting place for those who fell in the fight for freedom (Stoffberg *et al.* 2012:175). The contemplative space is positioned with a splendid natural and cityscape backdrop. It consists of sculptural rocks collected from the nine provinces, artfully positioned in a circle. A mist spray of water—representing cleansing—is released to further augment the introspective mood created by the visual design composition and the symbolic elements.

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Figure 66: Freedom Park, the natural setting and symbolic design using natural materials creates the symbolic narrative of the site

Source: author 2012

Regretfully, the park is only open to the public through scheduled and paid visits and is mostly used for official gatherings and ceremonies. The park sets a precedent for the power of landscape design to aid therapeutic and spiritual well-being in symbols that are equally derived from the natural elements of the setting and powerful aesthetic design interventions that relate to cultural heritage. The narrative also allows for future generations to know and experience historic things of natural and human history.

3) An example of a project in an urban setting that promotes concepts of wilderness and Intrinsic Nature Value is at Royal Canin's Eco Industrial Park (2003-2005) in Kaya Sands, Johannesburg. Royal Canin purchased the 3 ha property, stripped of virtually all vegetation, and, due to the zoning of the site, there was no legal requirement to take the rehabilitation route. However, design-and-build landscape design company *Eco Scapes* undertook a sensitive habitat recreation of the Central Bankenveld grassland vegetation type, on a north facing slope. Regionally rescued plants and local nurseries were used as sources for the native vegetation which comprised a wide variety of pioneer and representative species of trees, herbs and grasses (Knoll 2006). A decade later, the site is unrecognisable from its former state—as if it has always been natural and wild.

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Figure 67: Royal Canin is an example of biodiversity restoration in a light industrial area

Source: author 2012

The second phase comprised the construction of wetlands along an existing drainage line to deal with the storm-water. After passing through a purification plant, the effluent from the factory also enters the wetland system for further cleansing by plants (Knoll 2006). The result of the intervention is a fully established regional plant community that also provides a wetland habitat and serves as a haven in the centre of an industrial area. The landscape additionally offers respite and recreation to the staff and management through pathways, seating and picnic areas. *Eco Scapes* has been monitoring the vegetation and wildlife in the area as well as the water quality. The design addresses Regulating, Supporting and Cultural Services with the main emphasis being on biodiversity and habitat creation. The design further articulates both Intrinsic and Fundamental Nature Values; it allows for scientific learning about the environment in order for future generations to experience and appreciate that which is wild.

11.7 Future areas for research

The study revealed specific questions of importance for ecosystem services and human values that have not been specifically researched in South Africa. The study propounds that value considerations in landscape design should be consciously deliberated. A broader study with participants from different age, gender and racial groups can potentially shed more light on the current findings. Although this study preferred a more phenomenological approach, a detailed structured enquiry with predetermined categories could confirm and refute some of the current findings. The literature review highlighted the popular use of surveys and questionnaires developed for value studies which will make larger participation and quantification possible and may be suitable for such investigations.

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On a more qualitative note, specific questions regarding identified value discrepancies in the study—such as Intrinsic, Fundamental Nature Values and intangible Landscape Values—could be explored through qualitative in depth interviews that could enable a greater understanding of these values in the South African context.

The concepts of aesthetics and Cultural Services, the opportunities they embody for social-ecological systems and to inspire landscape design, also merit exploration.

Several social practices were identified in the industry that hold potential for operationalisation of professional values. A combination of factors could be explored in greater depth and their potential to more directly influence incorporation of functional values within design projects.

Some new questions raised by the findings of the study are:

- *How can particular racial or cultural value preferences among landscape designers, as a consequence of the prominent influence of apartheid history in South Africa, aid approaches to greater social-ecological resilience?*
- *How can urban green spaces better dovetail with rural nature values and IKS to aid resilience in social ecological systems?*
- *In what ways can implemented project examples influence professionals/the public; and how can this be exploited for greater social-ecological resilience?*

The study also puts forth that ecosystem services should be deliberately provided by landscape projects. A potential quantitative avenue for research is the identification and development of local indicators specifically regarding vegetation and ecosystem services, as in the study by Yapp *et al.* (2010) in Australia. In the United States, Hunter (2011) provides lists of local vegetation showing plasticity, as well as functional and response diversity. The development of similar useful data for decision-making purposes regarding ecosystem service provision through facilitated landscapes in the South African environment could be meaningful and useful.

As described by Pauleit *et al.* (2011:275), there is need for a long-term vision approach that allows for new inputs and does not allow the short-term economic gains of some interest groups to override public best practice and to cause ecosystem service erosion. This study distinguishes between public perceptions, social norms and professional values in decision-making. It creates greater awareness of the influence of values inside a profession, which should be further

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investigated. The study proposes that social practices hold potential to operationalise professional values through internal processes and experiences.

These findings are also applicable to other built environment professions, as they highlight the significance of professional values for design and planning outcomes. This study consequently calls for the reorientation of values inside the different built environment professions. It recommends the development of socially inclusionary processes and communicative practices that allow decision-makers, designers and the public to weigh up the benefits and losses of various land use scenarios encompassing a greater scope of representative values and services for all citizens in design decisions.

Landscapes are important for all human values as they bring together intrinsic aspects of thought and emotion with physical experiences which are often loaded with emotional connotations. These experiences have potential for positive change.

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Appendices



moderation

ESS image by Jan Sasse (TEEB 2011)

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APPENDIX A: Ethics Committee Submission and Letter of Approval

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A1: Letter of approval from Faculty Committee for Research Ethics and Integrity

UNIVERSITEIT VAN PRETORIA
UNIVERSITY OF PRETORIA
YUNIBESITHI YA PRETORIA

Reference number: EBIT/69/2013

1 November 2013

Ms CA Breed
Department of Building Science
Room 46
University of Pretoria
Pretoria
0001

Dear Ms Breed,

FACULTY COMMITTEE FOR RESEARCH ETHICS AND INTEGRITY

Your recent application to the EBIT Ethics Committee refers.

1 I hereby wish to inform you that the research project titled "The social production of ecosystem services through landscape design practice in urban SA" has been approved by the Committee.

This approval does not imply that the researcher, student or lecturer is relieved of any accountability in terms of the Codes of Research Ethics of the University of Pretoria, if action is taken beyond the approved proposal.

2 According to the regulations, any relevant problem arising from the study or research methodology as well as any amendments or changes, must be brought to the attention of any member of the Faculty Committee who will deal with the matter.

3 The Committee must be notified on completion of the project.

The Committee wishes you every success with the research project.

Prof JJ Hanekom
Chair: Faculty Committee for Research Ethics and Integrity
FACULTY OF ENGINEERING, BUILT ENVIRONMENT AND INFORMATION TECHNOLOGY

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A2: Cover letter from researcher for ethical clearance submission

C A Breed
(PhD) Landscape Architecture candidate
Department of Architecture
University of Pretoria

14/10/2013

EBIT ETHICS COMMITTEE

Dear Prof Hanekom,

ETHICAL CLEARANCE: BREED C. A.

I am a lecturer and candidate PhD scholar and would like to apply for ethical clearance of my research proposal that was presented to the research committee at the Department of Architecture on 2 September. The thesis has the proposed title of: *The social production of ecosystem services by landscape design practice in urban South Africa.*

The research design is in the phenomenological school of thought and it is qualitative in nature. There are two main methods for data capturing of which one involves humans as informants. The first main method will be that of content analysis by which I am to review magazines distributed to those involved in landsape design industry. I have identified three magazines*: Landscape SA; Environmental Management* and *The Urban Green File*. I have by e-mail notified these magazines of my intentions to review the publications and have also spoken to all three editors by phone explaining the aims of the research. They did not raise any objection against the proposed research and rather welcomed it. Two of the three editors have provided me with hard copies of the magazines requested. I have included copies of emails in which each editor have given me permission to proceed with the content analysis.

My second method will be interviews with editors, experts and active people in the industry with whom I will discuss and debate some of the affirmations that came out of the content analysis. The themes are related to the type of landscapes that we find and value in the industry as part of the public domain and potential reasons behind it. I aim to interview and record (if permission is granted, see consent form) approximately ten experts throughout South Africa. I will ask whether they prefer to remain anonymous

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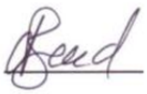
(as indicated in my proposed informed consent form) if anonymity is preferred I will refer to comments as coming from *'an expert in the South African landscape industry'*. I will refrain from including any geographical or other personal information (name, address, ID, occupation, age, income etc) that may reveal the identity of those who have asked to remain anonymous. I do not foresee to use many direct quotes but rather group the findings in terms of stating the combined opinions given by experts and indicating potential reasoning for the status quo as related to my data.

As the interviews will mainly depend on the findings, there may be small changes as to the exact wording but all questions will be related to the opinions and observations of interviewees about the practice of landscape design in South Africa versus elsewhere. I have compiled a set of questions for your review. I will refrain from asking sensitive question that include any personal information (name, address, ID, occupation, age, income etc) or that has any political or religious connotation. Please see Appendix B attached to this letter for the proposed questions.

I also have a set of short questions for the editors of the three magazines which I will email to each and that can be reviewed in the Appendix A attached to this letter. These questions aim to reveal any potential biases for the type of publications and advertisements that appear in the magazine, as well as the market focus. They have been slightly amended to exclude any sensitive questions.

I trust that the committee will be satisfied with the amendments and I thank you for your time and patience.

Yours faithfully



C A Breed

Lecturer
Department of Architecture
University of Pretoria

Building Science, Room 4-6
Tel +27 (0)12 420 4536
Email ida.breed@up.ac.za

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A3: Declaration by the researcher

RESEARCHER DECLARATION

APPLICATIONS MUST INCLUDE THE FOLLOWING STATEMENTS

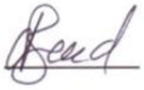
Hereby I, ...C A Breed..... in my capacity as..... doctoral candidate....., assure that

1 Research subjects will be informed, information will be handled confidentially, research subjects reserve the right to choose whether to participate and, where applicable, written permission will be obtained for the execution of the project (example of permission attached).

2 No conflict of interests or financial benefit, whether for the researcher, company or organisation, that could materially affect the outcome of the investigation or jeopardise the name of the university is foreseen.

3 Inspection of the experiments in loco may take place at any time by the committee or its proxy.

4 The information I furnish in the application is correct to the best of my knowledge and that I will abide by the stipulations of the committee as contained in the regulations.

5 Signed:  Date: 16/09/2013

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A4: Informed consent form signed by all interviewees

Informed consent form
(Form for research subject's permission)

(Must be signed by each research subject, and must be kept on record by the researcher)

1 Title of research project: *The social production of ecosystem services through landscape design practice in urban South Africa.*

2 I ..... hereby voluntarily grant my permission for participation in the project as explained to me by *Ms C. A. Breed*

3 The nature and objective of the research have been explained to me and I understand them.

4 I understand my right to choose whether to participate in the project and that the information furnished will be handled confidentially. I am aware that the results of the investigation may be used for the purposes of publication.

- I do not mind my name appearing with the information/ comments: Y / N
- I choose to remain anonymous: Y / N

[If I chose to remain anonymous my comments may be used and referenced as stated by: *'an expert in the South Africa landscape industry'* without giving any geographic or personal references (name, address, ID, occupation, age, income etc) that may accidentally imply my identity]

- I give permission for the interview to be recorded: Y / N
- I give permission for notes to be taken: Y / N

5 Upon signature of this form, you will be provided with a copy.

Signed: _____ Date: _____

Witness: _____ Date: _____

Researcher: _____ Date: _____

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A5: E-mails from three magazine editors proving consent on review

Ida Breed - Re: consent to proceed

From: Ida Breed
To: Carol Knoll
Subject: Re: consent to proceed

>>> "Carol Knoll" <carolk@global.co.za> 09/10/2013 10:59 >>>
Ida. Hope this is what you need. Carol

07/10/2013

To whom it may concern

Dear Sir/ Madam:

ENVIRONMENTAL MANAGEMENT: APPROVAL OF MAGAZINE REVIEW

I hereby confirm that Ms C A Breed has asked permission to review the magazine *Environmental Management* for her research in the South African green industry entitled: *The social production of ecosystem services through the articulation of values in landscape design practice in South Africa.*

I have provided her with copies of the magazines and she has permission from me as editor to review them for the purposes of her studies.

Yours faithfully

Carol Knoll	CKnoll	10/9/2013
Name in print	Signature	date

Environmental Management

>>> "Carol Knoll" <carolk@global.co.za> 08/03/2013 11:57 >>>
Ida

I can lend you a full set, Ida. I am at my busiest with the latest deadline right now and so would have to ask you to collect them from me. How about having a quick cup of coffee somewhere near me on Saturday – I will be working but can spare an hour or so?

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Ida Breed - RE: Permission to review Landscape SA

From: "Karyn Richards" <karyn@eaglepub.co.za>
To: "'Ida Breed'" <Ida.Breed@up.ac.za>
Date: 09/10/2013 08:45
Subject: RE: Permission to review Landscape SA

07/10/2013

To whom it may concern

Dear Sir/ Madam:

LANDSCAPE SA: APPROVAL OF MAGAZINE REVIEW

I hereby confirm that Ms C A Breed has asked permission to review the magazine *Landscape SA* for her research entitled: *The social production of ecosystem services through the articulation of values in landscape design practice in South Africa.*

I have provided her with copies of the magazines and she has permission from me as editor to review them for the purposes of her studies.

Yours faithfully

KARYN RICHARDS	8 OCTOBER 2013	
Name in print	signature	date

Landscape SA

From: Karyn Richards [mailto:karyn@eaglepub.co.za]
Sent: 08 October 2013 04:28 PM
To: 'Ida Breed'
Subject: Permission to review Landscape SA

Hi Ida

I have put my name on the form but don't have a scanned signature.
Permission granted to have used Landscape SA for your research.

Hope this will be acceptable.

Regards

Karyn Richards
Editor

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Ida Breed - RE: permission to review copies of Urban Green File

From: Ida Breed
To: Darren Smith; Terry Owen
Subject: RE: permission to review copies of Urban Green File

>>> Ida Breed 14/10/2013 11:38 >>>
Thank you Darren,

It is much appreciated. My research is regarding social value systems and how people's values affect what type of landscape design projects happen in South Africa. I am looking at urban ecology and how one may find ways of making the cause more important in the industry, my hypothesis is that one should utilize existing social practices and steer value systems through them.

The UGF review is to get a sense of what is currently valued and what kind of projects take currently place in landscape design. Once my research is complete I can perhaps write an article for Urban Green File on the findings (if that would interest you).

Thank you very much
Ida

>>> Darren Smith <DSmith@brookepattrick.co.za> 14/10/2013 08:03 >>>
Hi Terry, Ida

Hi Darren….would there be a problem with this? T

@Terry: Not at all. Feedback of this nature is always going to be valued.

@Ida: Please go ahead. If you could perhaps give me the context of the research and intent behind it (as well as how you see Landscape Architecture's role in Urban Development etc), I'd value that. We at UGF understand the social impact of Landscape Architecture as well as the difficulties that make urban development a challenge as municipalities and urban planners struggle to execute amidst a skills crisis.

Looking forward to your feedback.

Sincerely,

Darren

From: Ida Breed [mailto:Ida.Breed@up.ac.za]
Sent: Thursday, October 10, 2013 10:32 AM
To: Terry Owen
Subject: Re: permission to review copies of Urban Green File

Dear Terry,

I urgently need permission to review copies of urban green file for my research from our ethics committee at UP. I am a Landscape Architect undertaking a PhD and I am trying to establish what kind of landscape projects have been done in the last 10 years by reviewing three different green industry magazines, one of which is Urban Green File. I have been trying since June to make contact with you as editor and Tracey has been so kind as to sent

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me your rate cards. I have a set of UGF since 2004 that I would like to use in my survey, I only need your permission in writing to proceed with my work.

Would you please be so kind just to fill out a name and date at the bottom (space provided) and email it back to me at your earliest convenience.

much appreciated
Ida Breed
University of Pretoria

To whom it may concern

Dear Sir/ Madam:

URBAN GREEN FILE: APPROVAL OF MAGAZINE REVIEW

I hereby confirm that Ms C A Breed has asked permission to review the magazine The *Urban Green File* for her research in the South African green industry entitled: *The social production of ecosystem services through the articulation of values in landscape design practice in South Africa.*

She has permission from me as editor to review them for the purposes of her studies.

Yours faithfully

Terry Owen	T Owen
14/10/2013	
Name in print	Signature
date	

URBAN GREEN FILE

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APPENDIX B: Questionnaires to Experts

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B1: Questions to experts in landscape design practice in South Africa

Years in the industry:_____

City and province where most years of work were conducted:_____

1. What do you see as the main topics of concern in the industry in the past ten years?
2. Has there been a change of focus in these that you have noticed in your career/in the past ten years? If so please describe?
3. What would you see as the main reasons for this change of focus?
4. What elements do you think may change the focus of the industry? Why do you say so?
5. Which of these trends do you feel are geographically specific (to a specific province or city)? Please explain?
6. Are there different urban to rural trends in your opinion? Please explain
7. From your experience do you feel there is a concern for biodiversity in landscape design practice in SA? Please explain why you say so and the reasons for this.
8. In your opinion will this change in the near future? Why/why not?
9. What do you think will make such a change possible?
10. What do you think will hinder this change?
11. In the research I have completed so far the following came out as the main issues of concern in landscape design practice: community and social concerns, sustainability, concerns for design and aesthetics. Do you agree that these are prominent topics?
12. In the research I have completed so far designers seem to favour cultural and regulating ecosystem services in design practice, how do you see it? (for example, human well-being and climate & storm-water control etc.)
13. In the research I have completed so far designers seem to neglect provisioning and supporting ecosystem services, how do you see it? (food and medicinal plants & biodiversity and habitat etc.)
14. In the research I have completed so far designers seem to value and respect law, rating systems, and awards. How do you see it?
15. Any other social practices (like those in Q14) that you feel matter a lot and influence design practice in SA?
16. How do you see the future of urban nature and urban landscape design practice in SA? Explain why you say so.

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B2: Questionnaire added for magazine editors:

1. The editor (professional formation or other positions held; time period as editor):
2. The leaders (publishers):
3. Director and owner:
4. Cost of magazine:
5. Way of subscription/distribution:
6. Target market/types of consumers (if online data is available please provide a web address)
7. Orientation or industry focus (if applicable):
8. Value given to different topics (preference/avoidance):
9. Use of photography and images (preference/avoidance):
10. Type of publicity or advertisements that appear (preference/avoidance):
11. Any other preference or avoidance (front/back cover; special issues; inserts):

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B3: Questions to experts on the Awards

Years in the industry:_____

City and province where most years of work were conducted:_____

1. What do thou think influence most severely what a landscape designer decides to place in a project?
2. When and how long were you involved with the awards?
3. What part of the awards were you involved with?
4. What is the purpose of the awards?
5. Is this purpose achieved in your opinion?
6. What are the merits and benefits of the system?
7. What shortfalls have you encountered?
8. Why are those shortfalls there and how do you think they may be addressed?
9. Do you think the awards influence what landscape design practitioners perceive as important? Explain
10. Do you think the current judging forms reflect what should be regarded as important in landscape design practice? Explain
11. Does the judging touch on issues of human well-being (physical or social)?
12. Does the judging touch on concerns for regulating services (storm-water and climate control etc.)?
13. Does the judging touch on provision of food, medicinal plants and usable plant products in design practice?
14. Does the judging touch on concerns for biodiversity in terms of diversity of species, habitat creation etc.?
15. How do you see the future of the award system in SA? Explain

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APPENDIX C: Rate Cards of Profession Focused Magazines

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C1: Rate Card: Environmental Management



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SAMPLES OF AD SIZES



ADVERTISING RATES

Standard rates are exclusive of VAT and include agency commission

INSERTIONS	CASUAL	4	6	SIZE – TRIM (MM)	SIZE – TYPE (MM)	SIZE – BLEED (MM)
FP	R 9,700	R 9,200	R 8,800	297(h) x 210(w)	287(h) x 200(w)	307(h) x 220(w)
Half Vertical	R 5,900	R 5,600	R 5,400	297(h) x 105(w)	287(h) x 95(w)	307(h) x 115(w)
Half Horizontal	R 5,900	R 5,600	R 5,400	148(h) x 210(w)	138(h) x 200(w)	158(h) x 220(w)
Third Vertical	R 5,500	R 5,200	R 5,000	297(h) x 70(w)	287(h) x 60(w)	307(h) x 80(w)
Third Horizontal	R 5,500	R 5,200	R 5,000	90(h) x 210(w)	80(h) x 200(w)	100(h) x 220(w)
Quarter Block	R 5,200	R 4,900	R 4,700	148(h) x 105(w)	138(h) x 95(w)	148(h) x 105(w)
Quarter Strip (horisontal)	R 5,200	R 4,900	R 4,700	70(h) x 210(w)	60(h) x 200(w)	80(h) x 220(w)
40mm Strip (horisontal)	R 2,800	R 2,500	R 2,200	40(h) x 210(w)	42(h) x 190(w)	50(h) x 220(w)
Small classified	R 690 per issue per 6 insertion contract			84(h) x 62(w)	80(h) x 58(w)	no bleed
Large classified (horisontal or vertical)	R 900 per issue per 6 insertion contract			174(h) x 62(w)	170(h) x 58(w)	no bleed
Inserts	R 5,500 single page up to A4					

A loading charge of 15% are applicable to special sizes and positions

REPRODUCTION

Adverts (electronically): Adverts to be supplied as complete, composite, press-optimised PDF/X1-a files. It must contain all relevant elements such as fonts, hi-res scans, logo's, etc. Eps graphics to be embedded in the file. All material supplied must be CMYK, have crop marks and 5mm bleed all around. RGB files not accepted. The creator of the file assumes full responsibility for the validity of the transmitted PDF/X1-a file.

If the digital ad supplier neglects to supply us with a colour proof at 100% of the PDF/X1-a file, Media24 and the printer will not accept any responsibility for the colour validity of the printed result.

Uploading of files: Files uploaded online accepted. We are linked to Websend and Quickcut. Files may be uploaded onto our FTP server: ftp://ftp2.nasftp.com Username: bm24. Password: bm24. Drop the files in the Environmental Management folder and name it appropriately. Please contact us when the file has been uploaded.

Picture quality: Formats required: Tiff, Eps or Jpeg without compression. No Bitmap, Pict or giff files will be accepted. All images must be supplied at 300dpi with a canvas size of no less than 100mm x 100mm. Where possible, please supply a colour transparency or a glossy print (no colour lasers) for scanning.

Digital camera images: Please set to maximum pixilation; anything less than 300 dpi is not suitable for reproduction.

- Please refer to reverse side of order form for conditions.
- Special sizes and positions are negotiated seperately on request. Loading charges are applicable to special sizes and positions.
- Inserts, wrap-arounds and book marks: quotation available on request.

Cancellation deadline: Notification of cancellations should be sent in writing two weeks prior to the booking deadline.

See material and ad booking deadlines on next page.

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PROFESSIONAL, TRADE AND TECHNICAL JOURNAL

This magazine in the Business MAGS24 stable, a division of Media24 Magazines, is edited by Carol Knoll, who has been writing about environmental matters since 1984, whilst serving as editor of several well-known trade and technical environmental publications over the past 26 years.

Environmental Management deals with a number of important issues under the broad themes of Biodiversity and Ecosystems Management; Water and Energy Conservation; and Waste Management. The principles of sustainable development are the cornerstones of the journal. Protecting our fabulous floral and faunal biodiversity in this country and generally conserving our invaluable resources involves careful planning of projects at concept stage: this is governed by the Environmental Impact Assessment regulations. Further management, at both construction and operational phases of projects, is governed by Environmental Management Plans.

INDIVIDUAL PROJECTS PUBLISHED IN THE JOURNAL WILL COVER THE TECHNICAL ASPECTS OF:

- rehabilitation of grasslands, wetlands and forests;
- control of invasive plant species;
- conservation of pristine (unspoilt) areas – nature reserves, game parks and other protected areas;
- discovery and preservation of remnants of nature in urban areas;
- protecting rare and endangered plants and ecosystems;
- tree preservation;
- conservation of urban open space;
- ecological landscaping/gardening and habitat creation;
- propagation of indigenous plants;
- social dimensions of horticulture – community and traditional medicinal nurseries;
- recycling of wastewater;
- efficient use of water for irrigation – water wise principles;
- erosion control;
- soil remediation;
- air quality management – dust and pollution control;
- energy efficiency;
- alternative renewable sources of energy – solar, wind, wave and biofuels;
- climate change;
- waste minimisation and cleaner production;
- recycling and reuse of waste products;
- green buildings;
- ecological sanitation;
- mine dump rehabilitation and mine closure;
- environmental management of golf courses and other estates:
- principles of Integrated Pest Management;
- biological treatment;
- permaculture (sustainable agriculture); and
- ecotourism.

DISTRIBUTION LIST FOR *ENVIRONMENTAL MANAGEMENT*

A national journal distributed throughout Southern Africa (audited circulation of 3 120 copies 6 times a year)

- National and provincial government departments
- Municipalities
- Property owners and developers
- NGOs
- Managers of protected areas
- Golf course managers
- Environmental officers on mines
- Environmental consultants
- Environmental lawyers
- Architects
- Engineers
- Town planners
- Landscape architects
- Landscape contractors
- Wholesale nurseries and growers
- Irrigation contractors
- Suppliers of products, machinery and equipment
- Waste managers and recyclers
- Erosion control specialists
- Universities, technikons and schools

IMPORTANT INFORMATION FOR ADVERTISERS

- EM is a bimonthly journal distributed throughout SA
- Space booking deadline is 4 weeks prior to month of publication
- All rates are quoted in South African Rand
- Material is required on the 1st of the month prior to publication

CONTACT DETAILS

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Media24 TYDSKRIFTE MAGAZINES | Business MAGS24 | mpasa | ABC CERTIFIED | paarlmedia where printing is personal

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C2: Rate Card: Landscape SA

landscape sa

ADVERTISING RATES EFFECTIVE JANUARY 2013

Circulation 4 000

Landscape SA is an all-embracing publication and mouthpiece for the South African green industry. It provides relevant information on new landscaping projects (both from the design and installation aspects), interior plantscaping, horticulture, cut flowers, nurseries, turf management, irrigation, machinery, design and construction of new golf courses, environmental issues and all trades allied to these catagories.

Each of these sectors will be featured in 2013 as regular editorial sections and/or special features, which will be:

January	**Recreation**
March	**Exterior and interior Landscaping**
May	**Allied Trades and Water Features**
July	**Nurseries**
September	**Irrigation, Fertilisers & Green Houses**
November	**Machinery and Equipment**

The magazine is published alternate monthly.

INDUSTRY READERSHIP DISTRIBUTION

Readership throughout the green industry is made up as follows:

Horticultural societies, associations and cut flower sector	18%
Nurseries (wholesale, retail and growers)	18%
Landscape architects, contractors and professional consultants	17%
Golf courses and other sports/turf/ recreation clubs	14%
Municipalities, provincial administrators and government	9%
Hotels	8%
Allied trades, machinery and equipment	5%
Irrigation sector	5%
Property developers	4%
Educational institutions	2%

Landscape SA is a national publication with the following geographic distribution:

Gauteng	40%	North West Province	6%
Western Cape	20%	Mpumalanga	5%
Kwazulu Natal	14%	Limpopo Province	4%
Free State	4%	Free State	4%
Eastern Cape	3%		

RATES: PRICES QUOTED EXCLUDE VAT

SIZE	Single Insertion	3 Insertions	6 Insertions
Double Page Spread	R21 500	R20 500	R19 200
Full Page	R11 750	R10 800	R9 950
Half Page	R8 000	R6 950	R6 400
Quarter Page	R4 950	R4 750	R4 350
Classified	-	-	R5 500 (R916/insertion)

SPECIAL POSITIONS

Outside Back Cover	Space + 50%
Inside Front Cover	Space + 30%
Inside Back Cover	Space + 25%
Right Hand Page	Space + 20%

DIMENSIONS

SIZE	TRIM (W x H)	BLEED (5mm)
Double Page Spread	420 x 297mm	430 x 307mm
Full Page	210 x 297mm	215 x 307mm
Half Page Vertical	90 x 270mm	Float
Half Page Horizontal	185 x 130mm	Float
Quarter Page Vertical	90 x 130mm	Float
Quarter Page Horizontal	185 x 65mm	Float
Classified Vertical	62 x 174mm	Float
Classified Horizontal	128 x 84mm	Float

Published by The Eagle Publishing Company
Second Floor, Valley Centre,
Jan Smuts Ave, Craighall
Tel: 011 326 0303
Fax: 011 501 2878
E-mail: cecile@eaglepub.co.za
Website: www.eaglepub.co.za

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C3: Rate Card: Urban Green File



urban green FILE

January – December 2013

Facts & Rates 2013

Philosophy

To serve our readers with credible information and thus create trusting relationships which introduce our advertisers to receptive audiences.

Mission statement

To provide readers with knowledge which empowers them to successfully develop and manage sustainable cities and towns. To promote integrated urban environmental planning and management where multidisciplinary teams of experts work together for the greater good of our cities.

Publisher of Websites, e-mail bulletins, yearbooks and magazines

- The Civil Engineering Contractor
- Mining Mirror
- Plant Equipment & Hire
- Building Africa
- Urban Green File
- Journal of Facilities Management
- African Mining
- African Energy Journal
- Water Sewage & Effluent (WASE Africa)
- Quarry Southern Africa
- African Mines Handbook
- African Mines Online
- Sustain Yearbook
- Equipment Specifications Yearbook

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With the push to provide municipal services and infrastructure to South Africa's urban population, ***Urban Green File*** offers the ideal advertising platform. Any company wanting to promote its products, technologies or services to those responsible for the planning, development and management of our cities, should make use of this magazine.

Termed "the journal for the planning professions", ***Urban Green File*** is the publication of choice for the custodians, planners, designers and managers of the urban environment. Who are these people? As can be seen from the circulation breakdown (overleaf), this ranges from municipal managers to consultants (town planners, architects, consulting engineers, landscape architects and environmental consultants). Together they form a group of people who specify all the products and technologies used in the development of infrastructure in our cities.

Urban Green File has an extremely loyal readership of approximately 3 250 people – almost 20% are paying subscribers. This provides an advertiser with an independent measurable indicating that subscribers have chosen to read ***Urban Green File***. This, in turn, greatly enhances the chances of a reader noticing an advertiser's message.

Its success could be ascribed to its independent and critical voice. The magazine is not afraid to comment on urban-development issues and its regular "inspiration" and "insult" columns draw significant reader response.

Its innovative editorial mix is successful in attracting readers of value to advertisers with infrastructure products and technologies which can aid urban development – be it waste-management technology, infrastructure products for roads, stormwater and hard surfaces, or products which contain seepage into groundwater, ***Urban Green File*** should be the advertiser's first choice.

Municipal officials and planning professionals prefer to read ***Urban Green File***. Wouldn't you, the advertiser, like to follow suit and ensure that your message is read by your target market?

Writing worth reading

Brooke Pattrick Publications (Pty) Ltd
Building 13, Pinewood Office Park,
33 Riley Road, Woodmead
Private Bag X40, Rivonia, 2128, South Africa

BROOKEPATTRICK PUBLICATIONS

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urban green FILE

January – December 2013

Facts & Rates 2013

Terms and conditions

Booking deadline: First day of the month prior to the month of publication (NB: no cancellations will be accepted after this date). A surcharge will be levied for cancellations of contract bookings.

Material deadline: 5th day of the month prior to month of publication.

Deposits:
- An upfront deposit is levied on all new clients.
- R0 – R60 000.00 (excl VAT) per 12 month cycle – 30% of total value
- R60 001.00 – R120 000.00 (excl VAT) per 12 month cycle – 15% of total value
- R120 001 + (excl VAT) per 12 month cycle – 10% of total value.

Payment is strictly 30 days for direct bookings and 45 days for advertisement-agency bookings from the date of statement. Interest will be charged at a rate of prime plus 3% per annum on outstanding accounts.

Cancellations will only be accepted in writing (with the onus of proof resting with the advertiser) and received by no later than the 1st day of the month prior to the month of publication. If any advertisements are cancelled and not replaced during the course of the contract, a surcharge must be made in accordance with our rate card.

In the event that **material does not reach us on time**, as instructed in the advertisement-confirmation letter, Brooke Pattrick Publications reserves the right to repeat old material, to charge the client for the advertisement without it appearing or to place the advertisement in a future edition of the same magazine.

Special positions cannot be cancelled once confirmed. No "right hand side" position can be guaranteed unless the advertiser has paid a surcharge.

Brooke Pattrick Publications does not accept responsibility for slight **variations in colour** in advertisements.

Brooke Pattrick Publications does not accept responsibility for advertisements supplied without a **colour proof**.

Advertisement material must be supplied in **digital format**, as stipulated, and will be kept in the advertisement material archive for a period of no longer than six months from the date of that material's final insertion.

Standard production rates apply for any additional work required to make digital work press-ready, including converting open files or resizing advertisements. **Alterations will incur a fee**.

Should an **advertising agency** be contracted to manage direct bookings, the value of the initial booking may not be diminished.

Agency commission – Agencies forfeit ALL commission if payment is not received within 45 days from the invoice date.

Urban Green File

(published alternate monthly in February, April, June, August, October and December)

• All rates in South African rand (excluding VAT)

Size	1-3 (per insertion)	4-6 (per insertion)
Double-page spread	R 20 100	R 18 100
Full page	R 13 400	R 12 100
Half page	R 9 400	R 8 500
Third page	R 8 100	R 7 300
Quarter page	R 6 700	R 6 100
Strip	R 5 400	R 4 900
Outside back cover	R 18 100	R 16 300
Inside back cover	R 15 100	R 13 900
Inside front cover	R 16 800	R 15 100
Loose insert	R 23 450	
Belly Bands	R 14 250	

E-mail bulletin	6 (per insertion)	12 (per insertion)	25 (per insertion)
Banner advertisement	R 3700	R 3100	R 2450

The e-mail bulletin is distributed fortnightly.

Circulation: January - March 2013

Readership breakdown by occupation/sector

• Professionals who are advising municipalities and private developers on urban development and infrastructure delivery. These range from town planners and landscape architects to consulting engineers, architects and environmental consultants. 61%

• Municipal managers and managers of the following municipal departments: town planning/urban development, roads and infrastructure, environment, waste management, water, sanitation and parks. 18%

• Property developers and owners of large facilities or land (ranging from office parks and buildings to golf courses and major factories).....8%

• Companies responsible for the construction of urban development/infrastructure projects (civil contractors, landscape contractors, building contractors and subcontractors).....8%

• Technology and product companies:.....5%

Urban Green File is mailed independently and addressed personally by name, title and company to a carefully researched audience.

Total circulation: 3 365

Net copy sales (above 50%): 662
Net copy sales (below 50%): 0
Controlled free distribution: 2 703

abc

For advertisement-material requirements, contact:
Michelle Muller
Advertisement Sales Administrator
Tel: (+27 11) 603-3960
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Website: www.brookepattrick.com

We sell on value rather than price

BROOKE PATTRICK PUBLICATIONS

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Directory advertisements 2013

Terms and Conditions

Booking deadline: First day of the month prior to the month of publication (NB: no cancellations will be accepted after this date). A surcharge will be levied for cancellations of contract bookings.

Material deadline: 5th day of the month prior to month of publication.

Deposits:

- An upfront deposit is levied on all new clients.
- R0 – R60 000.00 (excl VAT) per 12 month cycle – 30% of total value
- R60 001.00 – R120 000.00 (excl VAT) per 12 month cycle – 15% of total value
- R120 001 + (excl VAT) per 12 month cycle – 10% of total value.

Payment is strictly 30 days for direct bookings and 45 days for advertisement-agency bookings from the date of statement. Interest will be charged at a rate of prime plus 3% per annum on outstanding accounts.

Cancellations will only be accepted in writing (with the onus of proof resting with the advertiser) and received by no later than the 1st day of the month prior to the month of publication. If any advertisements are cancelled and not replaced during the course of the contract, a surcharge must be made in accordance with our rate card.

In the event that **material does not reach us on time**, as instructed in the advertisement-confirmation letter, Brooke Pattrick Publications reserves the right to repeat old material, to charge the client for the advertisement without it appearing or to place the advertisement in a future edition of the same magazine.

Special positions and cover alternatives cannot be cancelled once confirmed. No position can be guaranteed unless the advertiser has paid a surcharge or if it is a cover booking.

Brooke Pattrick Publications does not accept responsibility for slight **variations in colour** in advertisements.

Brooke Pattrick Publications does not accept responsibility for advertisements supplied without a **colour proof**.

Advertisement material must be supplied in **digital format**, as stipulated, and will be kept in the advertisement material archive for a period of no longer than six months from the date of that material's final insertion.

Standard production rates apply for any additional work required to make digital work press-ready, including converting open files or resizing advertisements.

Alterations will incur a fee.

Should an **advertising agency** be contracted to manage direct bookings, the value of the initial booking may not be diminished.

Agency commission – Agencies forfeit ALL commission if payment is not received within 45 days from the invoice date.

urban green FILE

Sizes and prices

Size A
56 mm x 48 mm
R6 620 per annum (6 editions)
The quoted rates exclude VAT

Size B
56 mm x 96 mm
R10250 per annum (6 editions)
The quoted rates exclude VAT

Size C
56 mm x 144 mm
R17 100 per annum (6 editions)
The quoted rates exclude VAT

Size D
56 mm x 192 mm
R22 100 per annum (6 editions)
The quoted rates exclude VAT

Publisher of:

- The Civil Engineering Contractor
- Mining Mirror
- Plant Equipment & Hire
- Building Africa
- Urban Green File
- Journal of Facilities Management
- African Mining
- African Energy Journal
- Water Sewage & Effluent (WASE Africa)
- Quarry Southern Africa
- African Mines Handbook
- African Mines Online
- Sustain Yearbook
- Equipment Specifications Yearbook

Reproduction material

- **Digital files required** - **PDF** (Closed, all fonts included, press-optimised PDF file, PDF/X-1a:2001)
  - **Tiff** (300 dpi Tiff (CMYK, real advertisement size)
  - **JPG** (300 dpi JPG, highest quality (CMYK, real advertisement size)

  Brooke Pattrick Publications can ONLY accept these three file types.
- **Crop marks**
  All digital files must be supplied with crop marks. Crop marks must show the trim size.
  A conversion rate of R350 will be applicable if the advertisements must be re-sized or are supplied without crop marks.
- **Colour proof**
  A colour proof of the advertisment must be submitted. Brooke Pattrick Publications accepts no responsibility for colour variations in advertisements that are supplied without a colour correct proof.

Brooke Pattrick Publications (Pty) Ltd
Building 13, Pinewood Office Park,
33 Riley Road, Woodmead
Private Bag X40, Rivonia, 2128, South Africa

BROOKE PATTRICK PUBLICATIONS

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APPENDIX D: Spread Sheets for Content Analysis Quantification

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D1: Spread sheets to record data from magazine articles: example of one magazine issue analysis

Item	Magazine	Year	Month	vol/ numb	FC image	Front cover	Editorial/ letters	News awards	News news	Conferences courses and competitions	Books	Making the indigenous choice Controlling invaders	Short articles: themes Environmental law matters	Short articles: themes Golf course management	Industry news
	Environmental Management	2006	Jan/ Feb	(2) 1	Plant: tree: road (infrastructure)	Relocating Baobabs for road construction in Limpopo	Bass under the spotlight and a call for sustainable agricultural methods	awards: sustainable building;	Awards for sustainable building and for landscape architecture;		Trade directory of Indigenous Natural Products;	indigenous: water plants, SA	Waste legislation a paradigm shift	Constructed Wetlands: Royal JHB and Kensington Gold Course	PPC protects Renosterveld
						Biodiversity.water.energy.waste		ILASA awards	Zimbabwean sculpture		SA Wildflower Guide: Stellenbosch to Hermanus	Invaders: Lantana camera			Bio monitoring benchmarks needed
									Sustainable energy society		Field guide to butterflies of SA				Utilising grey water
									Threat to RAMSAR site						Fuel cells to be installed in remote locations
									Green building: Adaptive reuse of potting shed						Former asbestos user welcomes asbestos ban

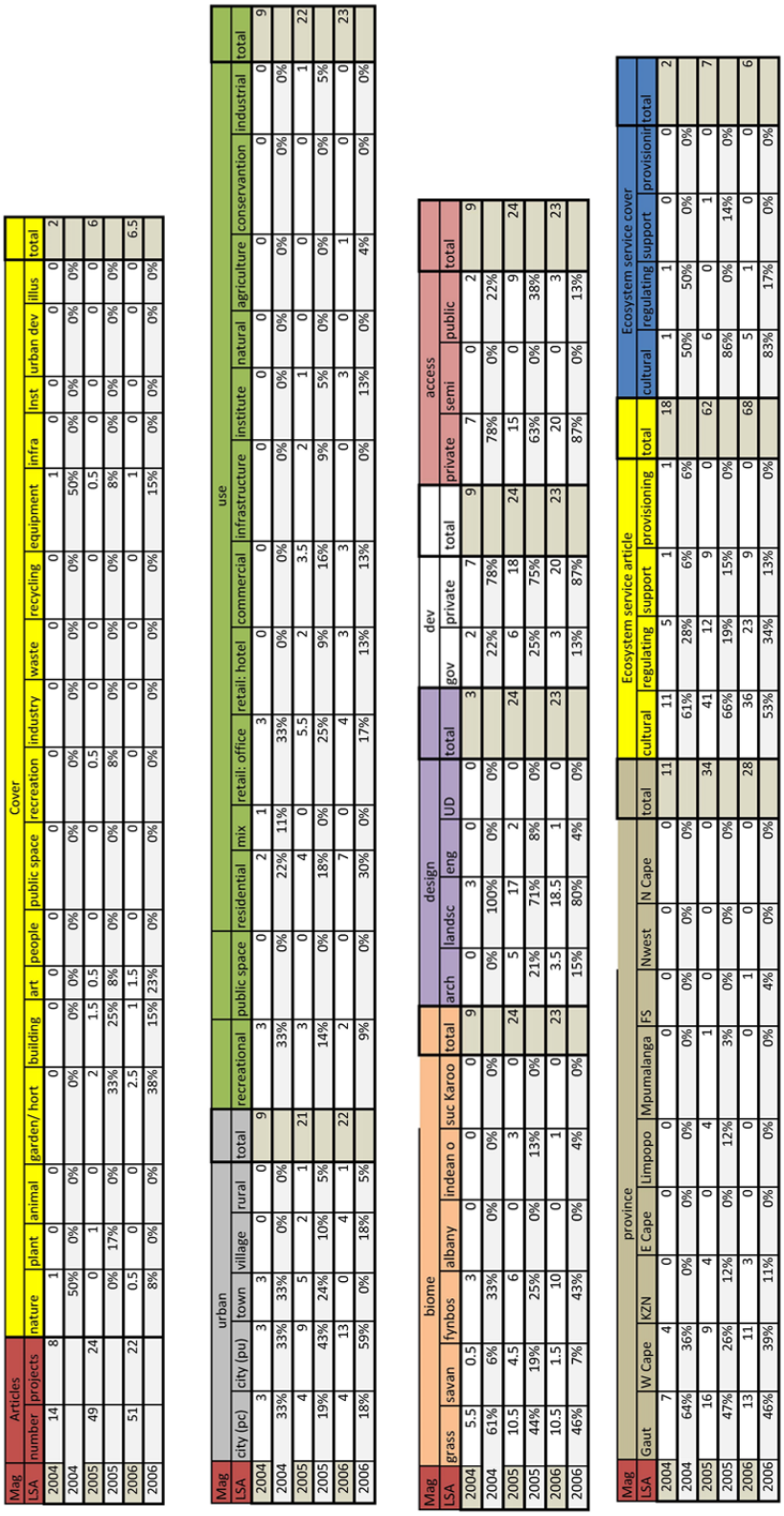
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ANALYSIS								
Location (urban level)	Site character (% built up)	human use (res/ com/ ind)	land cover (biome/ site disturbed)	scale (patch/ matrix/ landscape)	Design (green. blue, grey, brown)	Developer (gov/ private)	Access: Public/ private	Main ecosystem service objective
rural	low	infrastructure	savannah, medium	landscape	engineering: blue	government	public	cultural, regulating
rural	medium	infrastructure	savannah, medium	landscape	engineering: grey	government	public	support
peri-centre (city)	medium	recreational: sport	grassland; medium	patch; land use type	landscape: grey	private	private	regulating
	low	recreational: sport	fynbos; low	patch; land use type	landscape: green	private	private	regulating
peri-centre (city)	low	recreational: sport	grassland; medium	patch; land use type	landscape: green	private	private	regulating; support

Feature Articles							Advertisements			
title	topic	infrastructure	location	placement	pages	photos	Placement (front, back, size, index)	Event	Services	Products
2005 IAIAsa Premium award: Nandoni Dam Relocation Action Plan	Environmental Management; Social/ community; Heritage; impact of development mitigated	blue	Rural; Limpopo	1st	3.5	8	front, full page			African Gaboins
Thousand year old Baobabs relocated: road widening project	Environmental sensitivity; Relocation	grey	Rural; Limpopo	2nd (cover)	4.5	11	back, full page			Netafim: drip irrigation
Water Conservation Award: St Andrews astro hockey field	Resource conservation: Water; Sustainability	blue	JHB, Gauteng	3rd	1.5	3	back flip		Hydromulch; hydroseeding	
Paspalum to replace Kikuyu on golf courses in the southern Cape: growing Paspalum vaginatum near Harold's Bay - Arbela's Seashore Paspalum trial	Resource conservation: drought resistant turf grass; Sustainability	green	Cape	4th	2	3	full page			Mayford: seeds
Golf course management: Constructed Wetlands: Royal JHB and Kensington Gold Course	Environmental conservation/ rehabilitation; Golf course management; Green technology: constructed wetlands	blue/ green	JHB< Gauteng	5th	4	8	1/4 page		Vula: environmental; consultants	

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D2: Spread sheets to quantify data from magazine articles: example of three year period analysis of one magazine



Mag	Articles	Cover																			
LSA	number	projects	nature	plant	animal	garden/ hort	building	art	people	public space	recreation	industry	waste	recycling	equipment	infra	Inst	urban dev	illus	total
2004	14	8	1	0	0	0	0	0	0	0	0	0	0	0	1	0	0	0	0	2
2004			50%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	50%	0%	0%	0%	0%	
2005	49	24	0	1	0	2	1.5	0.5	0	0	0.5	0	0	0	0.5	0	0	0	0	6
2005			0%	17%	0%	33%	25%	8%	0%	0%	8%	0%	0%	0%	8%	0%	0%	0%	0%	
2006	51	22	0.5	0	0	2.5	1	1.5	0	0	0	0	0	0	1	0	0	0	0	6.5
2006			8%	0%	0%	38%	15%	23%	0%	0%	0%	0%	0%	0%	15%	0%	0%	0%	0%	

Mag	urban					use														
LSA	city (pc)	city (pu)	town	village	rural	total	recreational	public space	residential	mix	retail: office	retail: hotel	commercial	infrastructure	institute	natural	agriculture	conservantion	industrial	total
2004	3	3	3	0	0	9	3	0	2	1	3	0	0	0	0	0	0	0	0	9
2004	33%	33%	33%	0%	0%		33%	0%	22%	11%	33%	0%	0%	0%	0%	0%	0%	0%	0%	
2005	4	9	5	2	1	21	3	0	4	0	5.5	2	3.5	2	1	0	0	0	1	22
2005	19%	43%	24%	10%	5%		14%	0%	18%	0%	25%	9%	16%	9%	5%	0%	0%	0%	5%	
2006	4	13	0	4	1	22	2	0	7	0	4	3	3	0	3	0	1	0	0	23
2006	18%	59%	0%	18%	5%		9%	0%	30%	0%	17%	13%	13%	0%	13%	0%	4%	0%	0%	

Mag	biome							design					dev			access			
LSA	grass	savan	fynbos	albany	indean o	suc Karoo	total	arch	landsc	eng	UD	total	gov	private	total	private	semi	public	total
2004	5.5	0.5	3	0	0	0	9	0	3	0	0	3	2	7	9	7	0	2	9
2004	61%	6%	33%	0%	0%	0%		0%	100%	0%	0%		22%	78%		78%	0%	22%	
2005	10.5	4.5	6	0	3	0	24	5	17	2	0	24	6	18	24	15	0	9	24
2005	44%	19%	25%	0%	13%	0%		21%	71%	8%	0%		25%	75%		63%	0%	38%	
2006	10.5	1.5	10	0	1	0	23	3.5	18.5	1	0	23	3	20	23	20	0	3	23
2006	46%	7%	43%	0%	4%	0%		15%	80%	4%	0%		13%	87%		87%	0%	13%	

Mag	province										Ecosystem service article				Ecosystem service cover				
LSA	Gaut	W Cape	KZN	E Cape	Limpopo	Mpumalanga	FS	Nwest	N Cape	total	cultural	regulating	support	provisioning	total	cultural	regulating	support	provisionin	total
2004	7	4	0	0	0	0	0	0	0	0	11	5	1	1	18	1	1	0	0	2
2004	64%	36%	0%	0%	0%	0%	0%	0%	0%	0%	61%	28%	6%	6%		50%	50%	0%	0%	
2005	16	9	4	0	4	1	0	0	0	0	34	41	12	9	62	6	0	1	0	7
2005	47%	26%	12%	0%	12%	3%	0%	0%	0%	0%	66%	19%	15%	0%		86%	0%	14%	0%	
2006	13	11	3	0	0	0	1	0	0	0	28	36	23	9	68	5	1	0	0	6
2006	46%	39%	11%	0%	0%	0%	4%	0%	0%	0%		53%	34%	13%		83%	17%	0%	0%	

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APPENDIX E: Narrative from Semi-Structured Interviews

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E1: What influences landscape designers most severely in their choices of what to place in the landscape?

The first aim of the interviews was to get an understanding from experts' opinion of the factors that they felt influence most severely the decisions of landscape designers in terms of projects, this would reflect held and assigned values. Experts mentioned several factors and some were given more attention than others, the aim was to go beyond the standard considerations into ideas of what makes the difference, yet inevitably standard project determinants were also mentioned.

The three factors mentioned to be most influential were respectively the budget of the projects or financial considerations; the brief and attitude of the client and the attitude, creativity and knowledge of the designer. Within these discussions social norms of prestige, taste, trends and also ethics and values surfaced – mostly that of the designer. Experts raised two important points related to this: first that of the "enlightened client" that is not purely profit driven but has an understanding of systems and a vision, this is however not the norm and clients are often not aware of possibilities or merely profit driven. In the case of the role of government as a client there was specific concern for the lack of appointment of landscape architects at any government level, to assist with decision making. In second place there was the idea of designers as an "opportunists" that make the most of things and add knowledge and thereby fulfil and educative role, but also as an artist with a vision and passion for his work regardless of public opinion. The idea is that designers should convince clients through successful examples of innovative work that save clients cost in the long run.

Interviewees saw lack of creativity as related to budget constraints and profit driven, time versus cost concerns which lead to standard tried and tested recipes used. There seems to be slight tension between designers and contractors; interviewees felt that designers are arrogant in terms of disregarding the plant knowledge that contractors can add, while contractors are often blamed for designing "out of their own nurseries". Efforts to optimise solutions through combined knowledge are not the norm and contractor input is mostly an afterthought in the spur of a project as problem solving. The factor that was mentioned most consistently by experts, though never as the most significant, was that of environmental considerations and sustainability. This manifested mostly in the form of "water wise" actions and a recent thrust towards "endemic" (regionally indigenous) plant choice. Other important factors that experts mentioned include the site, the context (and history), the users and functional considerations which all play a role in decision making.

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E2: What were the main topics of concern in the industry the past ten years?

Experts pointed out two major changes that swayed the industry in the past ten to twenty years. The first was the new constitution's influence (1994) on the industry. This entailed increased attention to social rights with concern for health and well-being; it initiated "distribution of municipal wealth" to embrace previously disadvantaged areas and included the development of many public open space projects in these areas. The second change was related to worldwide economy: the economic boom time (2000-2008) had two consequences: firstly it resulted in many large scale projects that had large budgets and gave landscape designers the opportunity to create "world class" projects. Secondly, the housing boom produced many "walled communities", security estates where people are socially isolated and less exposed to sustainable living.

The large mostly public projects with big budgets in the economic boom resulted in a greater awareness of landscape design as a profession. Conversely, the post 2008 economic crisis has led to tightened budgets and a drop in importance of landscape design. An additional financial concern for the industry is the recent minimum wage increase, though long overdue, affected those involved in landscape implementation and result in increased prices nationwide.

There is a general concern for a lack of appreciation of the cost of landscaping in comparison with other services and infrastructure. This is partially blamed on the cheapest tender system that is accepted in South African public and private tender processes. It is seen as a reflection of the general mentality towards landscape projects as being cost driven and not quality driven. There is a parallel concern among designers for more creativity in projects and a lack of marketing of "good design". These factors, along with the lack of promotion of the profession, influence public perceptions negatively and lead to a shortage of professionals.

In terms of public values interviewees saw the economy as something that has eroded values on sustainability in good times and now places landscape at the bottom of the budget and priority list due to financial constraints. Landscape designers are challenged to deliver best value, sustainable landscapes at a low price. On the positive side there is an increased concern and consciousness for the environment, which results in greater assigned values to the environment also within other professions. Many felt this was influenced by worldwide trends and climate change. This has led to work being classified as either ornamental or ecological, with a different "style" and more "wild" elements creeping into formal design. It has also led to more rare indigenous plants being commercially available.

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E3: Have you noticed a change of focus in these concerns in your career/the past ten years? If so, please describe

Interviewees described general changes in focus in the industry as follows: There has been a change from purely ornamental projects to those that address ecological concerns; this includes the use of new products like green walls and roofs, and a greater focus on rehabilitation and natural imitation. There is a move away from annual and exotic plants to indigenous, with a demand for regionally indigenous planting and an "acceptance" of more natural and organic ways of doing – also termed the "sustainable approach".

There seems to be a greater value for systems thinking and a demand to work with people. There is an idea that we are moving away from historic ornamentally towards utility gardens that can add financial value. This is also a reflection of local socio-economic realities and a need for job creation. There is mention of a general recognition of the profession and also municipal appreciation of landscape design with bigger budgets for projects and more hardscape included, yet an increased need to define the role of the different professions. At the same time many people still do not know what a landscape architect is, while many do not see the value of the environment. The bad examples of landscape work out there do not help to make a difference in this respect.

Other trends include the requirement for low maintenance and maintenance free projects and minimalistic design that point towards urban nature regarded as a utility. At the same time environmental, heritage and social considerations do enjoy more general awareness.

E4: Why do you think these changes occurred?

Interviewees explained reasons for these changes to entail a greater awareness of the public, but also personal values and vision of designers, and clients' attitudes. These "clients" include municipalities that are convinced through good examples and sound reasons. The social media's role in spreading awareness of worldwide problems such as urbanization and putting the sustainability agenda on the table was also acknowledged, but in terms of "marketing" specific and often opposing values. Experts mentioned awards and rating systems as influential in terms of articulating values along with legislation and exemplary work from government departments such as the Working for Water programme. Getting professionals involved earlier in projects, improved technologies and the ability to work with (not dominate) nature, were mentioned as reasons for improvement.

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Experts saw the political change in the country as the reason for greater social agenda's and larger scale social projects. Local government's role in terms of planning and decision making regarding green open space was shown to be an important factor in terms of comparing scenarios in different municipalities and how this led to specific actions.

Experts explained negative trends in the industry as a result of the economic crisis that placed demand for affordability and less labour. There is a however also a general lack of concern about the environment that is connected to cultural norms. Education is seen as a factor that can improve the situation. A deemed negative racial perception of the profession was identified, stemming from apartheid times, as the landscaping is associated with low paid and unskilled labour.

E5: What elements do you think can instigate change? Why do you say so?

Experts were asked about how they deem required change may be brought about in the profession. Overall greater public awareness and education were felt to be most important that could be achieved through the media and through primary school environmental education. Horticulture should be taught at school to alleviate food scarcity. The role of the media to instigate awareness and fear connected to extreme climatic events were seen as a determining factor to cause public mind shift.

Another important topic was the need to raise the profile of the profession through marketing and media that explain the benefits of "good design" that is more useful, improve life quality and saves cost. Purely ornamental landscapes are seen as something of the past. Solutions should be quality driven and enable a better life for all, not just "liveable" or financial driven options. More books, research, experience, publications and improved student education inside the profession are required.

Rating systems for promotion and prestige, and high standards imposed by institutes can improve professional image. Good terms of reference written by government, participation processes and penalisation through the law were seen as ways to enforce clients to comply with good practice. Positive suggestions to instigate change include examples of good design that will demonstrate what is possible and motivate clients and other designers; a need for contractors and designers to share knowledge and work more closely together, and public participation and involvement in projects as part of the political process. Everyone and especially the wealthy are felt to have a social responsibility towards the environment.

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E6: Do you feel any of these trends are geographically specific (to a specific province or city)? Why do you say so?

Most experts felt that there were geographic specific trends. However a few people felt that these trends depended on specific firms mostly and, that landscape architects had similar considerations in projects everywhere. The media was perceived as a homogenising factor. What were agreed on as generating difference were two main factors: the unique climatic difference and the business trends. The three major urban centres that have greater quantities of landscape designers came into discussion in terms of comparisons: Durban in KZN has subtropical weather and plants grow faster, Cape Town is in the world renowned fynbos region and Johannesburg is the centre of business in the grassland area.

Experts have a general perception that due to the ease of plant growth and availability of water in the Durban area, plants were cheaper and people were not willing to spend lots of money on landscaping. There was also a feeling that projects were less innovative and professionals appreciated less. Wildlife was a greater challenge in terms of competition with humans in food gardens and conflict arising from their presence in urban areas if they were drawn through biodiversity gardens. Though the municipality has played an important role in pushing the sustainable agenda in Durban and several eco-estates focus on biodiversity, there is perceived to be fewer design firms and less public awareness than in Gauteng. This was also tied to people's life styles due to the natural scenic beauty that is taken for granted and beach rather than a nature attraction in the region.

Interviewees saw Cape Town as the most aware in terms of biodiversity and conservation due to their unique biome that gets world-wide attention and the general good education and awareness of the public in the Western Cape. The historic aspects and a need for cultural conservation are seen to go hand in hand with a similar raised concern and awareness of natural conservation. This concern is further enhanced through the media; Cape Town is being featured as World Design City of the year 2014 and this increases municipal action towards public projects and spaces in the city.

Interviewees saw Johannesburg as the main business centre in the country where developers have reason to invest in infrastructure and push innovative design. This leads to greater specialization in the industry. However, the Gauteng grasslands are less ornamental than the Cape fynbos and do not attract public attention and appreciation to the same degree. The role of local government in

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managing budgets and steering development in the right direction was pointed out as crucial, as well as different needs of different communities within each centre.

E7: Are there different urban to rural trends in your opinion? Please explain

A few experts felt that there are little difference between the projects in rural areas and that design principles were similar but led to different solution bound to place. In general experts felt that there are fewer professionals and less education and awareness on green issues in rural areas. Two main differences were highlighted between typical urban versus rural projects, the first was the fact that there was less incentive for investment in public green space by developers due to financial reasons leading to smaller budgets and less maintenance. The second difference was a greater requirement for utility gardens that meet people's functional needs and less ornamentally. This points towards different user needs in rural as opposed to urban areas.

Experts argued that there is a greater need for basic infrastructure and social development projects in rural areas. Most large scale rural projects are either tied to mining or large scale infrastructure where rehabilitation works or cutting back of vegetation around utility lines is required. Biodiversity programs do however also exist in rural areas.

E8: In your experience is there a concern for biodiversity in SA? Do you think this will change? Please explain

The majority of experts felt that there has been a greater concern for biodiversity within their career while a few felt that there is still little or not enough attention. Reasons why experts felt there was a greater concern include the release of laws such as the NEMA Act that raises awareness on alien invasive species and the Biodiversity Act that enforces environmental impact assessments process compliance for developers. These acts "insure" a greater environmental consideration and a degree of application.

Experts noted an expansion of rehabilitation projects and higher requirements in terms of the scope of works in comparison with standard practice of bare minimum requirements at lowest cost. However, in general experts felt that it is still not enough; biodiversity conservation in projects is happening at a small scale and consists of isolated examples. Rehabilitation and restoration often happen in the worst case scenarios only such as sugar cane fields or mining operations. It is not a general concern to many and needs to be spread in the industry. There was a feeling among interviewees that the concept is still not really understood, that words are often used without proper understanding but that individuals are however making a difference, even in terms of the

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greater public. Although there is increased awareness and good examples that are awarded, information and plant species are still not readily available. The current economic condition, tight budgets and profit driven focuses seem to be competing heavily with this priority and a team vision on a project can make a significant difference. Sustainability cannot be met in terms of economics alone; it also needs to include the environment. Whether this will change in future was seen as unsure by some due to poverty and socio-economic challenges that is directly in competition with green issues in terms of resources. Biodiversity and green space need to be combined with utility and have social value. Some experts felt that cultural norms in South Africa are in majority apathetic towards the environment. This includes lack of expertise and resultant lack of concern from government towards environmental pollution. It is felt that government needs to push the "green agenda" through environmental education but also by enforcing laws. This can increase understanding and make people more aware. The example of the Department of Water Affairs in terms of alien invasion removal programmes was noted. Government is challenged in cost and expertise to meet expectations. Pressure result from the public and compliance requested by international organizations due to climate change.

The public often sees wildlife and wilderness as a menace and a danger, the profession is seen to be spreading awareness and can do so by including biodiversity display gardens to improve understanding. But this responsibility does not lie only within the landscape profession, but also with each profession and each person.

E9: What will make change possible towards greater biodiversity?

Things that will positively contribute to this change are: increased education and research that will lead to better understanding of benefits for all. This understanding can be achieved through publications, media exposure and information availability. While in terms of education, greater expertise should be incorporated in government and professional training through the bank.

The media make people aware of environmental crisis at different levels but also of trends to follow. International organizations demanding compliance also play a role. Other aspects that can make a difference are environmental legislation, penalties enforced by government and the role of rating systems in projects. In general existing good examples and the innovativeness of people along with the ethics of professionals are seen to be factors beyond government that can largely drive trends (media exposure, education, government, individuals).

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The goal is to change people's moral values to accept all forms of biodiversity. This can be achieved through increased knowledge and understanding. Several experts felt that good example projects are self-evident and that people naturally will enjoy these places which will raise awareness.

E10: What will hinder change towards greater biodiversity?

There are three major factors that experts see as potential hindrances to positive change: the first is the market that is self-focussed and leads to economic short term performance measures that is based on profit which leads to resource abuse and green issues being valued less than other infrastructure; In second place existing cultural perceptions that is apathetic towards the environment, people stuck in unsustainable habits, fear of change and lack of understanding and knowledge; in third place government is not only challenged by poverty and infrastructure demands but also lacks commitment to the environment. According to interviewees there is a perceived failure to employ required experts at all government levels along with a lack of enforcement of law and policy that can address the source of the problem.

There is in fourth place a perceived deficiency of professional knowledge and initiative on the subject; people should understand why it is good to follow laws and rules and the profession can play a valuable role in this aspect. However the institution does not exercise power in terms of government and the public which limits the profession in terms of influencing through professional advice that can be supplied to government and the public.

E11: In the research I have completed so far the four topics that surfaced most were: community and social concerns, sustainability, concerns for design and aesthetics. In your experience, do you agree that these are prominent topics?

When queried on the findings from the content analysis—i.e., reoccurring topics of concern in the industry being linked to social and community concerns, sustainability, design and aesthetics—the majority of the experts agreed that these topics were the most prominent and in that order. Two experts felt that these concerns should be addressed in every project as a minimum requirement.

Experts felt that the three profession focussed magazines covered the full scope of landscape design projects within their different foci, and held a bias towards what readers (in this case professionals) would like to see and read. Interviewees mentioned that projects may include far more "hidden" aspects as what were featured in the magazine.

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Interviewees were concerned with globalization that homogenises projects from everywhere and erode uniqueness of place; yet brings new knowledge and improve outcomes. Three people argued that the context (or where the project was occurring) would influence the nature of the concerns and distinguished between "smaller" (garden) and "larger" (corporate) projects. Larger projects were seen as often connected to the social or environmental "image" of a corporation and influenced by the client's agenda. Some felt that social projects were done due to a "guilty conscience" of companies and that it should be enforced and incentivised by government as n minimum requirement.

Experts agreed that design is for people and that it was a prime consideration in South Africa. However some experts felt that the "quality" of environments was neglected while functional aspects and job creation received more attention. Similarly aesthetics were seen as tightly connected to design and that these visual aspects distinguished landscape design from engineering. Landscapes should be pleasant, attractive and conducive of productivity.

Experts mentioned that the "new aesthetics of biodiverse gardens" were not yet readily accepted by the public and that people prefer "neater" manicured and maintained gardens. Yet the "indigenous aesthetic" was becoming more accepted in municipal work. Although places that please people are determined by subjective aspects there is also commonality. Experts felt that projects cannot only look good but also need to perform functions that include liveability, sustainability and encourage ownership. Social issues and upliftment were seen to be more important than aesthetics in the South African (developing world) environment.

> *E12: In the research I have completed so far it will appear that designers regard cultural and regulating ecosystem services more than provisioning and supporting. In your experience, would you say this is so?*

In terms of the appreciation of nature's services experts felt that this was dependant on location and the different demands from the client. There was also a feeling that geographically certain areas (Western Cape) due to better education and employment, would differ in appreciation. Cape Town also has an "aesthetics committee" that deals with social issues in the city.

Interviewees reiterated that knowledge is required in the public and the profession; and the fact that certain aspects were harder to achieve in urban areas, such as biodiversity or utility gardens. Experts felt that though there were links between aesthetics and sustainability, the link between biodiversity and sustainability has not been made. However there is growing interest and concern

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for utility gardens (such as food and medicinal gardens) as well as vertical and roof gardens. Home food garden interest has been resurging (similar to the 70's) and this phenomenon is also health related. However people do not always have the knowledge to overcome challenges of growing food and often give up.

Interviewees saw socio-economics as an opponent for biodiversity concern. While the question of ownership made utility gardens difficult to manage. It was felt that the psychological value of green space did effect people's choices but not on a conscious or evident economic level. People need public space as an "escape" in the city. Interviewees argued that in professional magazines design and aesthetics may receive more attention due to appeal for readers; the popular press was seen as a way to create needed awareness in the general public on neglected matters. New environments should incorporate vegetation that accommodates processes and biodiversity to enable public perceptions towards this to change.

E13: There seem to be value and respect in the industry for the law, rating systems and institutional awards. Do you agree? What other social practices do you think have a large influence on design practice in South Africa?

Experts felt that people do things for different reasons: the majority will follow trends set by others or at least talk along (even if they do not walk their talk), followers tend to follow what magazines highlight. Advertising and financial benefits certainly play a role in market logic, but marketing needs to be pitched at the right level and to the right audience to be effective. Competition is seen as healthy for keeping high standards in the profession, and knowledge and quality have come a long way in landscape design.

Experts saw the benefits of the awards to be their perceived reflection of quality and credibility of projects, which can be used for marketing and advertising. Award systems not only motivate staff members inside companies but were also seen as a means to teach within the profession. In terms of applying sustainable initiatives, they should be instigated in the design phase; otherwise they cannot form part of implementation (in the current system).There is thus a need to measure the contribution of the contractor to the quality of projects in a different way since it is largely dependent on the design component.

The judges play an important role in the criteria of the awards and their application. Interviewees felt that it should not be too easy to win an award and different kinds of focuses in awards are required. The judging process is often also educational, where there is contact between the judges

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and the participants, issues are discussed on site. Unfortunately not everyone belongs to an institute as the interaction can be positive, additionally more incentives are needed to encourage participation in awards. The awards give designers a perspective of what is happening in the industry and where they are in relation to it. Unfortunately the publications on the awards stay inside the profession and are not used for marketing to the wider public.

The interviewees saw the law and rating systems as influencing larger corporations more than individual landowners. Rating systems can give importance and credibility but it comes at a high cost and if not financially viable it is not employed. Corporates do not participate for ethical reasons but rather for image and financial benefit. Development is short term profit driven and therefore the wealthy should have greater social responsibility. Rating systems were seen to push high technology that is not always the answer to greater sustainability and can also be solved in low tech ways.

The feeling interviewees expressed was that environmental laws do influence decisions and can be a good thing, yet the law does not rectify the problem and is often not enforced; it is seen as a negative way to motivate people through punishment. Instead government should rather be seen as supportive of green initiatives. The new professional categories are seen as something that will largely influence future involvement and rationale in the profession. Current awards are seen as positive in the way some influence innovation, while it is felt that environmental considerations do not play an important enough part in certain awards.

Experts feel educational courses inside the profession are needed and is a way to push the profession positively. Plant knowledge, sustainability and technology were three required areas identified in need of more knowledge. People inside the profession want to know more. Having more students that study the profession and get employed by government will also play a dynamic part in the profession. A joint conference that pulls designers and contractors closer together (like in the past) can lead to knowledge sharing.

E14: What does the future hold for landscape design practice in South Africa?

Experts saw the largest determining factor for the future to be the economy and issues (like wages) related to this. There is some expectation for even greater social focus in projects. Cost, maintenance and longevity in projects were seen as major concern in South Africa, while overseas trends of environmental concern were expected to continue influencing the local agenda to be more “green” and biodiverse. There are prospects for a unique South African style of work with adaption of ideas to local conditions.

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Socio-economic issues will remain competitive to green space but the positive social impact of sports and food security are examples of good marriages. Inner city requirements for increased urban living and conversion of built space to open space are foreseen to become a major issue along with security considerations. Experts foresee that government will also demand more specialist input into projects. The profession is expected to grow, with competition from other professions and more teamwork required in projects. Landscape can become the driving force of projects (landscape urbanism).

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APPENDIX F: Variables Identified in Semi-Structured Interviews

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The researcher used narrative, notes and recordings to identify variables and relationships between variables. The analysis made use of previously identified variables in a variety of different social-ecological systems models as cues for consideration (e.g., De Groot 2006; MEA 2005). The variables were then grouped and quantified. A discussion on each set of variables follows in conversation with existing systems models.

F1: Role players

The MEA (2005) recognises the role of decision makers who affect ecosystem services in terms of their control and effect on direct and indirect drivers of change at different scales (refer to 2.3.6). These decision makers, role players or actors operate directly or indirectly in terms of design, planning and management in the built environment. Decisions are made at three organizational levels: individuals or small groups at the local level who directly alter some part of the ecosystem; public or private decision makers at municipal, provincial and national level; and public or private decision makers at an international level (e.g. international conventions) (MEA 2005). In systems models role players as decision makers are mostly identified in "planning and management" (De Groot 2006) or "managers, actors and organizations" (MEA 2005) that can be private sector or state employed. Some models also allow for "stakeholder involvement" (De Groot 2006), which may also refer to the public in general.

In the interviews with experts different role players surfaced in the discussions surrounded by different contexts. Seven main role player groups were identified: the profession (landscape design); the client; the state; the public; individuals, communities and the media (see Table 21).

Table 32: Different role players in landscape design practice as identified in conversations with experts

The profession 23	The state 10	The client 9	The public 9	Individuals 4	Communities 3	The media 3
Built environment professionals 8 Designers 6 The profession 5 Employees 2 Plant growers 1 Institutes 1	Government 7 Municipalities 3	The client 6 Developers 3	The public 9	Individuals 2 User 1 Judges 1	Communities 2 Social groups 1	The media 3

The role player that was articulated most in discussions was the professional. Since the discussions with experts in the industry were related to the profession the conversation was mainly around built environment professionals. Arguably for this reason the role of the profession surfaced most in the dialogue. However, the importance of built environment professionals in decision making has been acknowledged by Hansen and Pauleit (2014) and Young (2011). The frequent reference to the profession or built environment professionals is comfortably vague. However, the crucial role of the

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designer as main decision maker and problem solver was highlighted in conversations and his/her dependence on plant growers—an explicit related profession identified—when it comes to diversity. This strong discourse of the designer as powerful creative and responsible force is similar to the prominent articulation of design that surfaced in the content analysis of the magazines. The profession was also frequently mentioned and indicates a definite identity for landscape design. In relation to this, the role of the institutes—voluntary associations and professional council—was highlighted since they maintain the identity, profile and standards of the profession through design decision priorities. The inevitable crucial factor of economic performance of companies based on labourer wages and staff motivation also came to the fore, as a typical business concern.

The client, the state and the public were discussed with equal prominence as role players potentially due to their power in terms of control over land (Swan *et al.* 2011). The state was highlighted in some instances as the client and in others as the managing statutory agency, specifically at municipal level where most engagement around decisions occur. The municipality manages the terms of reference of local government projects and need to weigh up socio-political questions regarding quantity and quality in the urban environment. When community consultation forms part of the municipal brief, public needs and expectations that are often generalised can be quite directly interpreted. Public engagements are primarily labour related and focused on job creation for the community during the project implementation as enforced through the National Department of Public Works in terms of national goals of transformation, skills development and poverty relief.

Experts highlighted the inability of government and the public to articulate quality of environments in meaningful ways to influence decisions and design. This is an important concern that was raised which may also reflect on the ability of designers to distinguish public preferences from norms, values and needs, a distinction highlighted by Ives and Kendal (2014). In contrast with this is mentioned role of the “enlightened” client that can push for innovation. In both government and private projects the lowest tender system is accepted which was argued to reflect a higher consideration for cost than quality when it comes to the landscape design in South Africa. As emphasised by Dominelli (2012:135), at a global scale market-driven actions favour the lowest overall cost as the primary deciding factor, irrespective of the needs of people or the environment. Figure 60 graphically summarises the state, client and the public indicating the weight of their influence on landscape design.

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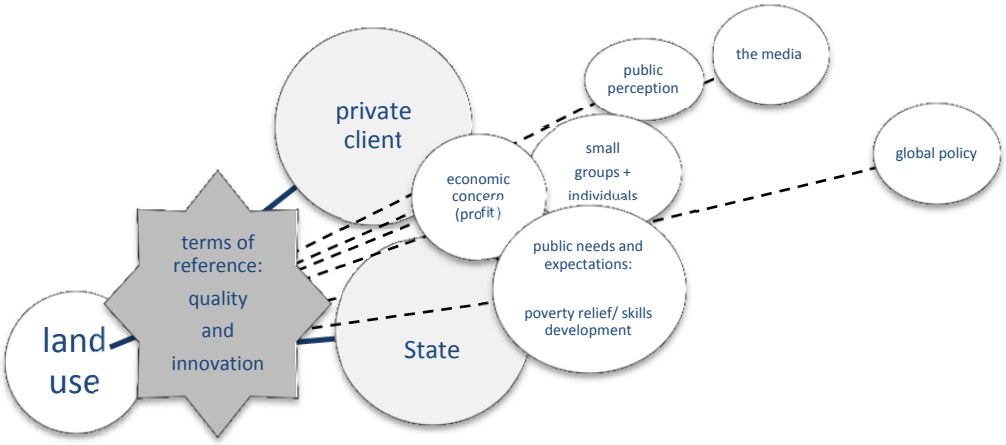


Figure 68: Graphic illustration of the importance of private client, state and public as role players in terms of land use decisions in landscape design practice in South Africa

The role of the designer and client relates to the decision making at the individual level (MEA 2005). The power and influence of individuals also includes the user, the judge of awards and unspecified role players (see Table 33). Folke (2006) emphasises the role and potential of individuals in environmental management. However, as highlighted by Redman (2011:206), the processes and feedback produced through the decisions of individuals and groups also introduce vulnerabilities. Part of these weaknesses are the contextual influence of perceptions and values in decision making as part of social complexity that entails explicit attention to normative values of those involved (Redman 2011:211).

Communities, social groups and the media seemed to feature less at socio-political level decision making than individuals. This lack of prominence may reflect a lack of implementation of participatory procedures prescribed by the national constitution. It may also relate to a lack of coherence and subsequent power from the community's side and a failure to harness the media as a constructive role player in this respect. The importance of small groups and civic involvement—as opposed to government initiative—in terms of resilience has become an important theme in European research (Barthel *et al.* 2010; Colding & Barthel 2013). Although featured in the work of Avlonitis (2011) civic involvement is strongly subject to government initiative (Schäffler & Swilling 2013) and in general, government leading city greening or environmental management efforts still

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receive more attention in South Africa (e.g., McConnachie *et al.* 2013; Roberts *et al.* 2012; Schäffler & Swilling 2013).

Although the policy agenda at international level was mentioned as part of the media, it was related to government as a role player without identifying a global level role player explicitly or local importance. This indirectness keeps global environmental problems at a distance, removed from local issues and decision making. Furthermore government goals of poverty relief and skills development are perceived to be far higher on the local agenda than environmental issues when it comes to the built environment. As explained by Dominelli (2012:151), the State may want to link development to livelihood and biodiversity protection, even though national and local policies do not always reflect this objective.

F2: Scale

Role players operate at different spatial scales at local, national and international level but within certain socio-spatial frameworks (see Figure 19, holistic practice Dominelli 2012). The physical environment is responsible for the provision of these resources (including infrastructure) in a direct or indirect way, and global consumption patterns directed by values influence the availability of these resources (MEA 2005).

In the interviews these spatial scales were indirectly acknowledged in conversations with experts as either local (n=12/20) or global (n=8/20), with definite prominence of local issues. Local references were mainly related to socio-economics—political and economic forces influencing social realities—and social and cultural relations—group agendas and dynamics (see Figure 62). At a national management level, this was associated with law and law enforcement. Global references were mainly in terms of environmental and economic crises, with global management related to international policy compliance. From these articulations, it is interesting to note that environmental crises were only referred to at a global level and played off against local socio-economic realities. Although the economic crisis worldwide had a direct influence on the local market, the global environmental crisis did not have a similar perceived direct and noticeable effect. Socio-economic crises were seen as here-and-now placing political demands in terms of infrastructure, while environmental problems were experienced as a distant concern. These findings are congruent with Gobster *et al.* (2007:963) that argue that phenomena that are outside of the ‘‘human scale’’ are less likely to evoke our concern and action in spite of the fact that ecological integrity and human well-being depend on the full spectrum of scales. Figure 62 is a graphic illustration of the different concerns that featured in conversations with experts and their perceive proximity and importance.

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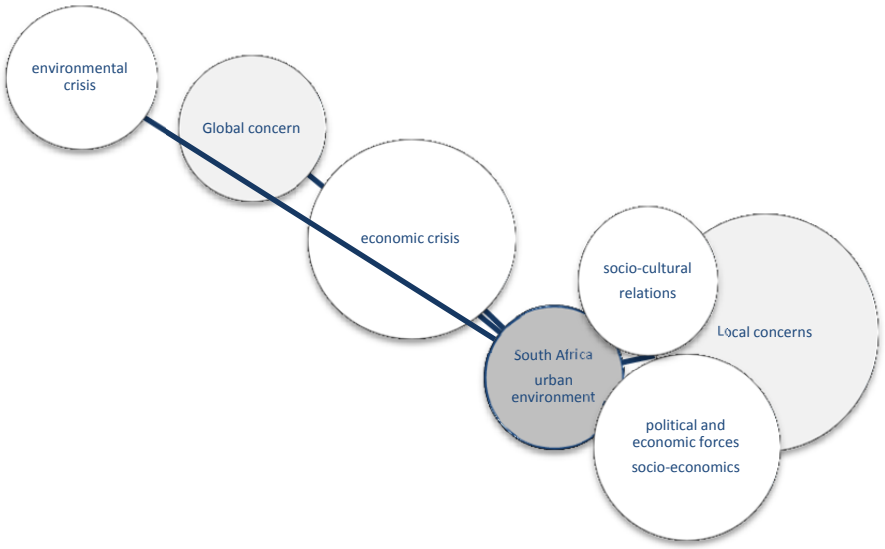


Figure 69: Graphic illustration of local versus global considerations in landscape design

There was also a further opposition between these two scales where global issues were associated with the discourse on globalization and homogenisation that erode uniqueness as argued in the literature by Ernstson and Sörlin (2012), but simultaneously advance knowledge that bring about "improvement". There is a concern with globalization that homogenises projects from everywhere and erode uniqueness of place, yet brings new knowledge and improve design outcomes, e.g. the international economic boom at the turn of the century was related to large budgets and "world class" projects in the industry. There are thus different sentiments with regards global influences on landscape design and the importance they bear, with a definite prominence of immediate local concerns.

Scale was also used in terms of project level: small referring to gardens and large referring to corporate projects. These scales reiterate explicit role players in terms of input and control over land use decisions (Swan *et al.* 2011) in landscape design. Large projects are associated with larger budgets, greater exposure and potential (public) impact. Still unacknowledged in the industry are ecological consequences for patch dynamics and connectivity in terms of patch size and scale (Werner & Zahner 2010).

F3: Indirect drivers of change

The discussion held with experts were mainly focussed on the drivers of decisions inside the industry to reveal factors that play a role in the decisions that landscape designers make. These would

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typically fall mainly among the indirect drivers of change as identified by the (MEA 2005). The MEA (2005) recognizes five indirect drivers of change in terms of ecosystems and their services (see Figure 10, direct and indirect drivers MEA 2005). These are demographics, economics, socio-political factors, science and technology and cultural and religious aspects that influence values and consumption choices. All five these drivers featured in the conversations with experts but they were articulated at different levels. The three most articulated were economics, socio-political factors and cultural norms. Science and technology as a driver, was far less articulated and demographics only once. As discussed in Chapter 3, there is an opportunity to link ecosystem services directly to human values, beliefs and consumption choices by making them more apparent in terms of human sensory experiences through landscape patters (Gobster *et al.* 2007).

Economic drivers referred mostly to global financial tendencies and the crisis since 2008 influencing consumption patterns. This crisis was seen as the reason for less development and investment and a tendency towards functional utility and low maintenance green space requirements. At a local scale the socio-economic reality of a large section of the population was also seen as opposing biodiversity initiatives, since infrastructure and poverty relief is perceived to receive priority from the state, and even more so in rural areas. This has been confirmed by research of McConnachie and Shackleton (2010) that indicate recent state housing developments to be lacking in green areas. The decisions of the state here may not be reflective of poor citizens since Steg *et al.* (2014) propose that in developed and developing countries people value the environment and further suggest that biospheric values are not subject to material needs being fulfilled. Direct reliance on environmental systems may further increase people's concern for the environment (Steg *et al.* 2014) in rural settings, but decrease as people move to urban areas where direct harvesting from nature reduces (Molebatsi *et al.* 2010). Employment opportunities created through development as financial benefits for communities were perceived to be the most important targets behind projects from the state. McEwan *et al.* (2012), explains that neoliberal paradigm enforces economic rationalism in terms of national policy.

Equally important and closely related to economic drivers was the recognition of socio-political factors that gained much attention through the democratic constitution since 1994. This includes attention to provision of basic infrastructure, the social focus of projects, inclusionary processes of engagement at a local level and social upliftment through job creation. Specific concerns for the industry in terms of socio-politics were raised as a lack of experts at the "right levels" (Interview, November 2013). This manifested as a lack of power for the profession to influence government or

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public decisions. A lack of environmental law and policy enforcement also diminishes the perceived importance and associated power of the profession. The perceived importance of the law by professionals is confirmed by Swaffield (2013) who argues that the law is regarded as important as science when it comes to professional value shaping. However, in this scenario the lack of enforcement of the law inhibits the power of professionals to bring about required change, which also shows the inability of legislation to influence social norms.

Cultural norms were next in line in terms of articulation by professionals; and include social perceptions, consumption patterns and values (MEA 2005). According to experts, the social isolation of people as a result of them living in housing estate environments causes unsustainable habits, a general lack of knowledge and understanding of the environment and the importance of pro-environmental practices. Developments are largely profit driven from a private perspective. However, there is a perceived improvement towards more pro-environment attitudes in the industry including a greater inclusion of heritage and social considerations since democracy. This is seen as a result of new heritage and environmental laws imposed at national level that influence professional practice, coinciding with Swaffield's (2013) explanation. Another cultural consideration is the visual appeal and performance of plant species that favour their selection in design, similar to observations by Quigley 2011 in the US. Cultural consumption patterns were seen as influenced by the popular media (confirmed as driver by Swan *et al.* 2011). Although indigenous plants were becoming more acceptable to the public, "non-wild" was still the preference in urban areas.

The importance of science and technology was far less articulated in terms of driver for current decisions. Yet experts mentioned a need for information, knowledge and education and the importance of products and availability of plants. Demographics as an indirect driver was only mentioned once, and the general reality of increased urbanization and potential consequences (UN-Habitat 2010) does not seem to receive the awareness and weight it deserves in the industry. It seems interviewees consider this as a socio-political matter to be resolved by state initiative. Figure 50 indicates the effects of indirect drivers on direct drivers of change and ecosystems services in South Africa. In the next section direct drivers is considered specifically.

F4: Direct drivers of change

Five direct drivers of change did feature in conversations with experts; ironically the very important concept of change of land use or land cover (MEA 2005; Zipperer *et al*. 2011) was not raised. The importance of this direct driver does not seem to carry weight in decision making in the industry. The driver mentioned most was in terms of specie introduction and removal. In the industry species

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used rests largely on visual appeal and plant performance but the use of regionally indigenous species, including rare and "wild" species that follow natural imitations are increasing. Alien invasive removal and control are also perceived as important, which correlates with scientific literature as a central consideration for biodiversity protection (Haines-Young & Potschin 2010). This corresponds with the findings of the content analysis where horticultural plant choice was highly articulated. External inputs in projects like fertilizer and pest control are leaning to more natural and organic products, but are also project context and brief related.

New technologies are gaining popularity such as green roofs and walls; experts felt this indicated a need for more research and publications in the profession, since new knowledge is lacking. Resource consumption (and abuse) is often regarded as a result of the market that is self-focussed and profit driven, resting on short term economic performance (Mertz *et al.* 2007). An opposing force can be the media that spread awareness of extreme climatic events and climate change along with a lack of natural resource availability. Interviewees felt that the long term and future effects of the environmental awareness of the general public can become an important future driver of pro-environmental action.

F5: Resilience in social-ecological systems

As discussed in section 2.3.4, Figure 7 indicates the basic components of a social-ecological system that can identify vulnerability in terms of resilience: social norms and values, management actors and organizations, ecosystem functions and dynamics, and knowledge systems (MEA 2005:2010). When considering these variables featuring in conversations with experts, knowledge systems were articulated most for improving vulnerability. Experts saw knowledge—expertise and management—as important for the public, the profession and government. Interviewees identified the following avenues: environmental education at school level for the public; improved university and practice education for the profession; the social media as a corrective force for the general public; research and publications; marketing; and designers spreading awareness to client and the public by means of good example projects. However findings by Bolderdijk *et al.* (2014) suggest that increase in environmental knowledge will only gain motivational power to people who consider caring for the environment to be a central personal value. This suggests the greater influence of childhood education on norms as confirmed by Aaron *et al.* (1994).

A second factor identified by experts for resilience was management, they made reference to several strategies that are also considered in the literature: terms of reference written for projects in government (Box 2011); law enforcement (Box 2011); inclusionary processes (Wilson & Howarth

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2002); policy compliance (Box 2011); standards imposed by institutes (Box 2011); penalties; systems thinking and rating systems (Box 2011). Most of these options are top down and punitive measure that motivate extrinsically only, which have been shown to not have long term positive effects on human norms (Mansbridge 1994). This reductionist way of thinking may stem from former political times. However, two factors may hold potential, inclusionary processes combined with institutional standards or rating systems.

Experts acknowledged values at various levels: the client, the designer, the public and government. They considered moral values of the public and professional ethics as powerful influences; moral values and professional ethics have been pointed out in the literature by Steg *et al.* (2014) and Dominelli (2012). Different role players also have perceived opposing values, e.g., aesthetics of green spaces that compete with ecological agendas. The developer's or client's cost concerns entailed affordability and less or no maintenance requirements, coinciding with Quigley (2011) in the US. Experts felt this attitude narrows design possibilities and hampers new and creative solutions. On a positive note, interviewees reflected greater municipal support of green initiatives and an increased environmental consciousness of other professions such as architecture. As pointed out by Swaffield (2013), similar professional interests may equally result in a quest for legitimacy.

Interviewees reflected a perceived negative connotation to the profession as black unskilled manual labour. Interviewees perceived this negative perception to relate to a past political and historic context. There is a perceived stigma on gardeners that stem back from apartheid times. Interviewees also reflected a general historic social perception that landscaping was something anyone can do and an option for those with no other economic choice.

Interviewees did not mention ecosystem functions and processes in any direct way, yet the presence of urban nature and the psychological influence it does have in terms of human decisions were acknowledged. Experts regard examples of good work as a powerful way to spread awareness. This idea coincides with that of Box (2011:309) that argues for targets of tangible achievements to encourage people and organizations to pioneer change. Interviewees regarded socio-cultural relations in terms of professional knowledge sharing and cooperation as important; this concept is also identified in the literature and has been captured in other models (e.g., Figure 9). The concept of knowledge sharing ties in with the work of Haas (1989) and Mansbridge (1994) that discuss "epistemic communities" as powerful means to fostering knowledge creation and social change.

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The complex process of knowledge formation is argued to be largely socially conceived and to a lesser degree attached to the material environment. Social scientists argue along with Talis (1989:13 in Terre Blanche *et al.* 1999:278) that "[t]he reality that any individual inhabits is a vast inverted pyramid of discourse poised on a tiny apex of experience". Dominelli (2012) illustrates knowledge as having social and material components (see Figure 18). However, there are also those that see the material environment as having great impact on our perceptions (Stedman 2003), which is a door towards human values and environmental management decisions and actions (Gobster *et al.* 2007).

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APPENDIX G: SALI Award Criteria for Categories

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SALI AWARDS OF EXCELLENCE

Evaluation Sheet for Judges Use

Project: _____

Contractor: _____

Category (a) LANDSCAPE CONSTRUCTION WITH IN-HOUSE DESIGN

To be judged on a scale of 1-11 ***(no decimal points)***

Criteria	Maximum Points	Points Awarded	Remarks
Compliance with Brief/Design	11		
Relationship to Site & Structures	11		
Innovation of Design	11		
Design Details	11		
Sustainability of Design	11		
Innovative use of Materials	11		
Earthworks, Shaping & Drainage	11		
Quality of Plant Material	11		
Choice of Plant Material	11		
General Soil Preparation	11		
Quality of Finishes	11		
Maturation Success	11		
Irrigation/Water Conservation	11		
Value for Money	11		
General Impression	11		
Comprehensive Portfolio	11		
TOTAL	176	0	
Percentage			

Comments:

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Tick the appropriate box if the project deserves consideration for any of the following trophies:

☐ "Best use of colour in the landscape"

☐ "Most innovative use of plant material"

Judge's Name: _____ Signature: _____

Date: _____ 2014

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SALI AWARDS OF EXCELLENCE

Evaluation Sheet for Judges Use

Project: _____

Contractor:_____

Category (b) LANDSCAPE CONSTRUCTION WITH DESIGN BY OTHERS

To be judged on a scale of 1-11 ***(no decimal points)***

Criteria	Maximum Points	Points Awarded	Remarks
Compliance with Brief	11		
Design Interpretation	11		
Installation Constraints	11		
Empathy & Recognition of Existing Elements	11		
Attention to Detail	11		
Earthworks, Earthshaping, Drainage	11		
Soil Preparation	11		
Quality of Plant Material	11		
Spacing of Plant Material	11		
Quality of Construction	11		
Maturation Success	11		
Irrigation	11		
General Impression	11		
Comprehensive Portfolio	11		
TOTAL	154		
Percentage			

Comments:

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Judge's Name: _____ Signature: _____

Date: _____2014

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SALI AWARDS OF EXCELLENCE

Evaluation Sheet for Judges Use

Project: _____

Contractor:_____

Category (c) ENVIRONMENTAL LANDSCAPE WORK

To be judged on a scale of 1-11 ***(no decimal points)***

Criteria	Maximum Points	Points Awarded	Remarks
Compliance with Brief	11		
Innovation in approach	11		
Protection of Existing Elements	11		
Sustainability	11		
Rehabilitation of Natural Elements	11		
Water Conservation	11		
Construction: Suitability of Materials	11		
Construction: Quality	11		
Plant Selection & Suitability	11		
Comprehensive Portfolio	11		
TOTAL	110		
Percentage			

Comments:

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Judge's Name: _____ Signature: _____

Date: _____2014

SALI Awards 2014 - Revised 06/09/13

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SALI AWARDS OF EXCELLENCE

Evaluation Sheet for Judges Use

Project: _____

Contractor:_____

Category (d) SPECIALISED TURF CONSTRUCTION

To be judged on a scale of 1-11 ***(no decimal points)***

Criteria	Maximum Points	Points Awarded	Remarks
Compliance with Brief	11		
Innovation	11		
Installation Constraints	11		
Sustainability	11		
Earthworks, shaping & drainage	11		
Soil Preparation	11		
Selection of Turf Varieties	11		
Condition & Coverage of Turf	11		
Irrigation/Water Conservation	11		
Freedom from Pests & Diseases	11		
General Impression	11		
Comprehensive Portfolio	11		
TOTAL	132		
Percentage			

Comments:

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Judge's Name: _____ Signature: _____

Date: _____2014

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SALI AWARDS OF EXCELLENCE

Evaluation Sheet for Judges Use

Project: _____

Contractor: _____

Category (e) LANDSCAPE AND TURF MAINTENANCE

To be judged on a scale of 1-11 ***(no decimal points)***

Criteria	Maximum Points	Points Awarded	Remarks
Compliance with Brief	11		
Compliance with Original Intent	11		
General Appearance & Impact	11		
Feeding Programme	11		
Pruning Programme	11		
Quality & Condition of Planting	11		
Quality & Condition of Lawn	11		
Free of Pests & Diseases	11		
Attention to Detail	11		
Water Conservation & Drainage	11		
Maturation Success	11		
Value for Money	11		
Comprehensive Portfolio	11		
TOTAL	143		
Minus: Weeds/Invasive (up to 5 points)			
Percentage			

Comments:

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Judge's Name: _____ Signature: _____

Date: _____2014

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SALI AWARDS OF EXCELLENCE

Evaluation Sheet for Judges Use

Project: _____

Contractor:_____

Category (f) SPECIALISED LANDSCAPE CONSTRUCTION

To be judged on a scale of 1-11 ***(no decimal points)***

Criteria	Maximum Points	Points Awarded	Remarks
Compliance with Brief	11		
Installation Constraints	11		
Design Innovation	11		
Design Technology	11		
Interpretation of Design	11		
Choice & Appropriateness of Material	11		
Finishes & Detailing	11		
Match to Existing (if applicable)	11		
General Impression	11		
Comprehensive Portfolio	11		
TOTAL	110		
Percentage			

Comments:

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Judge's Name: _____ Signature: _____

Date: _____2014

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Evaluation Sheet for Judges Use

Project: _____

Contractor:_____

Category (g) WATERWISE ***(only 'In-House Design' entries and projects with major member design input regarding water conservation initiatives qualify for this category)***

To be judged on a scale of 1-11 ***(no decimal points)***

Criteria	Maximum Points	Points Awarded	Remarks
Mulching	11		
Irrigation	11		
Irrigation Water Meter	11		
Rain Sensor	11		
Recycling/Water Harvesting	11		
Selection of Plants	11		
Correct Placement of Plants	11		
Sustainability	11		
Water Storage	11		
Other Initiatives	11		
Comprehensive Portfolio	11		
TOTAL	121		
Percentage			

Comments:

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Judge's Name: _____ Signature: _____

Date: _____2014

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APPENDIX H: SITES Score Cards

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Project Name: _____ Project ID#:_____ Date: _____

SITES v2 Scorecard Summary

YES	?	NO			
0	0	0	**1: SITE CONTEXT**	**Possible Points:**	**13**
Y			**CONTEXT P1.1**	Limit development on farmland	
Y			**CONTEXT P1.2**	Protect floodplain functions	
Y			**CONTEXT P1.3**	Conserve aquatic ecosystems	
Y			**CONTEXT P1.4**	Conserve habitats for threatened and endangered species	
			CONTEXT C1.5	Redevelop degraded sites	3 to 6
			CONTEXT C1.6	Locate projects within existing developed areas	4
			CONTEXT C1.7	Connect to multi-modal transit networks	2 to 3

YES	?	NO			
0	0	0	**2: PRE-DESIGN ASSESSMENT + PLANNING**	**Possible Points:**	**3**
Y			**PRE-DESIGN P2.1**	Use an integrative design process	
Y			**PRE-DESIGN P2.2**	Conduct a pre-design site assessment	
Y			**PRE-DESIGN P2.3**	Designate and communicate VSPZs	
			PRE-DESIGN C2.4	Engage users and stakeholders	3

YES	?	NO			
0	0	0	**3: SITE DESIGN - WATER**	**Possible Points:**	**23**
Y			**WATER P3.1**	Manage precipitation on site	
Y			**WATER P3.2**	Reduce water use for landscape irrigation	
			WATER C3.3	Manage precipitation beyond baseline	4 to 6
			WATER C3.4	Reduce outdoor water use	4 to 6
			WATER C3.5	Design functional stormwater features as amenities	4 to 5
			WATER C3.6	Restore aquatic ecosystems	4 to 6

YES	?	NO			
0	0	0	**4: SITE DESIGN - SOIL + VEGETATION**	**Possible Points:**	**40**
Y			**SOIL+VEG P4.1**	Create and communicate a soil management plan	
Y			**SOIL+VEG P4.2**	Control and manage invasive plants	
Y			**SOIL+VEG P4.3**	Use appropriate plants	
			SOIL+VEG C4.4	Conserve healthy soils and appropriate vegetation	4 to 6
			SOIL+VEG C4.5	Conserve special status vegetation	4
			SOIL+VEG C4.6	Conserve and use native plants	3 to 6
			SOIL+VEG C4.7	Conserve and restore native plant communities	4 to 6
			SOIL+VEG C4.8	Optimize biomass	1 to 6
			SOIL+VEG C4.9	Reduce urban heat island effects	4
			SOIL+VEG C4.10	Use vegetation to minimize building energy use	1 to 4
			SOIL+VEG C4.11	Reduce the risk of catastrophic wildfire	4

YES	?	NO			
0	0	0	**5: SITE DESIGN - MATERIALS SELECTION**	**Possible Points:**	**41**
Y			**MATERIALS P5.1**	Eliminate the use of wood from threatened tree species	
			MATERIALS C5.2	Maintain on-site structures and paving	2 to 4
			MATERIALS C5.3	Design for adaptability and disassembly	3 to 4
			MATERIALS C5.4	Use salvaged materials and plants	3 to 4
			MATERIALS C5.5	Use recycled content materials	3 to 4
			MATERIALS C5.6	Use regional materials	3 to 5

YES	?	NO			
0	0	0	**6: SITE DESIGN - HUMAN HEALTH + WELL-BEING**	**Possible Points:**	**30**
			HHWB C6.1	Protect and maintain cultural and historic places	2 to 3
			HHWB C6.2	Provide optimum site accessibility, safety, and wayfinding	2
			HHWB C6.3	Promote equitable site use	2
			HHWB C6.4	Support mental restoration	2
			HHWB C6.5	Support physical activity	2
			HHWB C6.6	Support social connection	2
			HHWB C6.7	Provide on-site food production	3 to 4
			HHWB C6.8	Reduce light pollution	4
			HHWB C6.9	Encourage fuel efficient and multi-modal transportation	4
			HHWB C6.10	Minimize exposure to environmental tobacco smoke	1 to 2
			HHWB C6.11	Support local economy	3

YES	?	NO			
0	0	0	**7: CONSTRUCTION**	**Possible Points:**	**17**
Y			**CONSTRUCTION P7.1**	Communicate and verify sustainable construction practices	
Y			**CONSTRUCTION P7.2**	Control and retain construction pollutants	
Y			**CONSTRUCTION P7.3**	Restore soils disturbed during construction	
			CONSTRUCTION C7.4	Restore soils disturbed by previous development	3 to 5
			CONSTRUCTION C7.5	Divert construction and demolition materials from disposal	3 to 4
			CONSTRUCTION C7.6	Divert reusable vegetation, rocks, and soil from disposal	3 to 4
			CONSTRUCTION C7.7	Protect air quality during construction	2 to 4

YES	?	NO			
0	0	0	**8. OPERATIONS + MAINTENANCE**	**Possible Points:**	**22**
Y			**O+M P8.1**	Plan for sustainable site maintenance	
Y			**O+M P8.2**	Provide for storage and collection of recyclables	
			O+M C8.3	Recycle organic matter	3 to 5
			O+M C8.4	Minimize pesticide and fertilizer use	4 to 5
			O+M C8.5	Reduce outdoor energy consumption	2 to 4
			O+M C8.6	Use renewable sources for landscape electricity needs	3 to 4
			O+M C8.7	Protect air quality during landscape maintenance	2 to 4

YES	?	NO			
0	0	0	**9. EDUCATION + PERFORMANCE MONITORING**	**Possible Points:**	**11**
			EDUCATION C9.1	Promote sustainability awareness and education	3 to 4
			EDUCATION C9.2	Develop and communicate a case study	3
			EDUCATION C9.3	Plan to monitor and report site performance	4

YES	?	NO			
0	0	0	**10. INNOVATION OR EXEMPLARY PERFORMANCE**	**Bonus Points:**	**9**
			INNOVATION C10.1	Innovation or exemplary performance	3 to 9

YES	?	NO			
0	0	0	**TOTAL ESTIMATED POINTS**	**Total Possible Points:**	**200**

KEY	SITES Certification levels	Points

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Project Name: _____ Project ID#:_____ Date: _____

SITES v2 Scorecard Summary

			MATERIALS C5.7	Support responsible extraction of raw materials	1 to 5
			MATERIALS C5.8	Support transparency and safer chemistry	1 to 5
			MATERIALS C5.9	Support sustainability in materials manufacturing	5
			MATERIALS C5.10	Support sustainability in plant production	1 to 5

YES	Project confident points are achievable	CERTIFIED	70
?	Project striving to achieve points, not 100% confident	SILVER	85
NO	Project is unable to achieve these credit points	GOLD	100
		PLATINUM	135

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APPENDIX I: Referred Magazines

EM. 2005. *Environmental Management*. Oct/Nov. 1(1), 1-45.

EM. 2006. *Environmental Management*. Jan/Feb. 1(2), 1-43.

EM. 2006. *Environmental* Management. March/April. 1(3), 1-43.

EM. 2006. Environmental *Management*. May/June. 1(4), 1-42.

EM. 2006. *Environmental Management*. July/Aug. 1(5), 1-44.

EM. 2006. *Environmental Management*. Sept/Oct. 1(6), 1-41.

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APPENDIX J: Exam Report

The following table sets out the comments received by the three external examiners and the author's responses.

Examiner 1: Professor Ian Douglas[30], School of Environment, Education and Development, University of Manchester

Examiner 1, comments	**Author's response**
1.1 The thesis focuses well on the role of landscape design practitioners in contributing to biodiversity in urban areas through their work and their interpretation of green infrastructure as a habitat for urban nature and delivering ecosystem services. Ecosystem disservices receive attention as well. The first half of the thesis is devoted to a detailed, thorough review of the literature relating to urban ecology, biodiversity and ecosystem services, to socio-ecological systems, to human values and aesthetics regarding nature and to how such values enter into landscape design practice. The reviews are illustrated by some excellent summary tables and diagrams. I particularly appreciated the chapter structure diagrams and the clear diagrams about the systems being discussed.	Noted with thanks.
1.2 The second half of the thesis is the original research of the work. It takes in a detailed examination of some 658 articles in the three main landscape design magazines in South Africa, the results of 12 detailed structured interviews with landscape practitioners, conversations with some of the magazine editors, and a detailed analysis of the patterns of good practice awards made by professional bodies for landscape work in South Africa. While the detail derived from the practitioners and other interviewees is excellent, I felt that there must be a lot more detail from to analysis of the	Thank you for the comment. The aim of the content analysis was to show the larger discourses and how these connect to the subjective understandings and experiences of individuals identified in the interviews. It is true that the nature of the design project and the type of ecosystem service could have been explored in greater depth from the content analysis. However, during the actual review of the articles as set out in 7.5.1, the main focus of each article was identified in an unbiased way as far as

[30] Emeritus Prof. Douglas has had over 45 years of research experience relating to changes to the hydrologic and geomorphic systems in tropical rain forests and to the biophysical changes in the urban environment, especially in relation to materials flows, urban hydrology and flooding, and urban geomorphology. He is Past-President of the Society for Human Ecology, President of the International Council for Ecopolis Development; Chairman of the UK UNESCO MAB (Man and the Biosphere) Urban Forum; and Chairman of the UNESCO SCOPE Expert Group on Urban Futures. He is the editor and co-editor of several books on urban ecology.

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magazine articles that could have been used to show what type of design was meeting urban biodiversity needs in landscape practice.	possible and not at first related to ESS or predetermined value categories. This approach is based on qualitative research theory (Terre Blanche *et al.* 2006) and contextualist approaches (Harrison & Burgess 2003/2008) but was also confirmed through correspondence with Dr H. Ernstson, who has done much qualitative research using the ESS conceptual tool. This approach was followed to allow for themes to remain unique and locally specific without them being interpreted only in the ESS "language". For the same reason more detail on the specific types of ESS represented was not recorded during the analysis process, although this will be possible and can enrich the study. To do this a re-reading of the 144 magazines and 658 articles will be required. This could be a valid addition to the study that would be considered for future research and publications.
1.3 As a reader from another continent, I felt I was not always getting an idea of what sort of landscape would be desirable according to the goal of achieving multiple ecosystem service delivery through landscape practice.	A very valid comment. As an attempt to demystify this vagueness, Chapter 5 was written to identify the practical steps that could be taken in vegetation selection to improve biodiversity, green infrastructure and ecosystem services delivery in landscape design. This comment has been further addressed by adding examples of landscapes that do meet multiple ecosystem service delivery in the concluding chapter.
1.4 Perhaps more seriously, I thought that chapters 4 to 5 were a little long-winded. This may be the result of the style used.	Noted. Chapter 4 was deemed an important discussion. This chapter brings together studies on value creation and value change in order to comprehend the dynamics behind value operationalisation, which is rather complex. The application of values can raise questions of scientific legitimacy and objectivity due to contested areas between pro-environmental actions and human values (Ives & Kendal 2014:67). The aim of the chapter was to reveal and consider these contested areas that may

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	later surface in the data. The aim of Chapter 5 was to demonstrate some practical considerations for vegetation selection in facilitated landscapes. This goal relates to item 1.3 above to identify landscape design decisions to achieve multiple ecosystem services. It served as a measuring stick of functional values and considerations to be included in social practices such as the awards systems. Perhaps not all the aspects discussed in Chapter 5 were brought to bear on the award systems. The goal is that any other identified local social practice with potential (e.g. education, rating systems, and policies) can be further explored by means of the criteria brought together in Chapter 5. The lengthy style of the literature review was also commented on by another examiner. Articles already published on the thesis and in the making are proving that word economy and a more focused account is indeed favourable.
1.5 Another concern is the way in which in the chapters on research findings, there is constant reference back to literature reviewed earlier in the thesis. For example, much of the material on pages 242-3 is made up of comments from the literature. I would have expected the chapters on research findings to simply give the new material from the candidate's own investigations and that afterwards there would be another discussion chapter the demonstrates how those findings fit into the international context of previous work that had been discussed in the literature review. Such a chapter would bring out the importance of the original work in the thesis.	The findings and the discussion of the findings were provided in one chapter for each of the research instruments (Chapters 8, 9 and 10). The findings are supplied in the first half of the chapter and the discussion thereof in the second half, which led to the conclusions. The subheadings indicate these separations. The value of a more marked separation and discussion is however noted. The final concluding chapter was aimed at further digesting the implications and importance of the study by considering its contributions to practice and to theory. This advice to bring out the importance of the original work is appreciated and will be taken up through an article that is currently being finalised, aimed for submission to *Landscape and Urban Planning*.

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1.6 Nevertheless, the candidate's detailed attention to the literature is praiseworthy. There was just one significant author who did not appear in the list of references: R.T.T. Forman. His writings are distinctive and thought provoking.	Thank you for making me aware of his work for the possible enrichment of the study. I will follow this up for future publications.
1.7 I also felt that in places there was not significant recognition of the very different attitudes householders have to their front yards and back gardens: some paving virtually all their front yards for car parking, others carefully tending their back yards with exotic plants and yet others carefully nurturing native species. Such differences make up that complex suburban garden mosaic that assists biodiversity and which may improve upon any landscaping the developers of the housing estate had attempted.	Recognising different attitudes to front and back gardens (whether private or semi-public) is a significant reality. Thank you for emphasising this point that may lead to interesting considerations for ESS in future work.
1.8 While acknowledging the role of the landscape practitioner is the focus of the thesis: what happens after the design has been implemented is also important for the continuation of ecosystem services.	The reality after implementation is a significant consideration and although less in the hands of the designer could entail professionals through maintenance contracts and agreements. Thank you for the comment.
1.9 There is little emphasis of landscape design for the regulating services of drainage and flood mitigation. Sustainable urban drainage is of much concern in Europe and China and provides an opportunity to extend recognition of green infrastructure and the ecosystem services it provides.	The lack of emphasis on regulating services such as drainage and flood mitigation that came from the findings has also been commented on by examiner 2. It should be noted that projects that deal with storm-water were identified during the content analysis of the magazines; however this aspect was not reiterated in the interviews with experts. The researcher identified the tendency from the US to associate green infrastructure almost exclusively with storm-water management during the research process. The incongruence of this trend in the findings in comparison with China, Europe and the US has been added to discussion of the ESS findings in section 9.7.2. This international trend subsequently also needed to be mentioned in 2.2.6.–the literature review section on ESS.

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1.10 The thesis demonstrates wide understanding across a range of topics from the psychology of perception to mechanics of landscape change and climate change. It demonstrates an ability to pose hypotheses, test them, evaluate the test results, compare them with previous findings, and to show their practical importance in a specific national context. *The candidate has demonstrated research skills and the ability to communicate her results. I recommend that the degree of Ph.D. be awarded.*	Thank you. The comments and questions forwarded for possible use in the examination are thought provoking and useful to expand future research. The time and dedication given to the examination of the thesis is highly appreciated.
1.11 Typographical and other corrections required before the final printing of the thesis	Thank you kindly for the detailed list provided, these particular corrections to the text have been made or clarified in the text as suggested.
1.12 Possible questions for oral exam *1. Do all landscape designers see landscapes in the same way: if they do not, what is the impact of their professional education as opposed to more social and cultural influences?*	Differences certainly exist in the industry. As specifically discussed under 4.3.1 *Knowledge and change,* education, particularly during childhood, is significant in terms of value formation while the correction of misperception of facts can influence the held values of adults (Aaron *et al*. 1994). It was also highlighted as a social practice worthy of exploration by the findings of the study. Landscape designers identified in this study are educated through different institutions and one could explore whether professionals from specific institutions hold specific biases–which is likely. However, the curriculum is also adjusted, as it should be, which may also hopefully reveal change over time (or not). Education is deemed very important by the researcher. However, the aknowledgement of insufficient influence of scientific findings on socio-political governance (Alberti *et al*. 2008; Cilliers 2010) has steered the focus of the study away from education towards values. Research has indicated that for adults, values may override information and knowledge when

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	it comes to decision making. Knowledge is thus often value dependent (Bolderdijk *et al.* 2013). See for example study by McConnachie and Cowling (2013) on evidence-based knowledge, discussed in Chapter 6. Steg *et al*. (2014) explain that our most important value would 'filter' which information (based presumably on facts) we accept or reject. Lockwood (1999) similarly describe that the process of cognition that influence knowledge may rest on factually correct information or not.
2. Racial and gender differences in landscape attitudes and perceptions are not considered in the thesis. However, in reality these are important among the funders and commissioners of landscape design. Some of this could well mean contrasts in client briefs and expectations. What hope is there that raising awareness of urban biodiversity among landscape designers will go far enough to get the notion of multi-functional greenspace to promote urban nature widely accepted by the public and politicians?	Research has identified and considered the importance of different role players. Based on the literature review, design professionals have been mostly neglected as role players. From the findings, designers in South Africa see the client and the brief as very important; similarly the public and politicians may have a great impact in influencing briefs. Two factors from the theory were convincing in giving hope to the awareness that designers may spread: firstly through the idea of *discourse based valuation* (Wilson & Howarth 2002), where discussions among stakeholders may reveal aspects and formulate convincing factual arguments that not everyone was aware of; secondly through *goal framing theory* (Steg *et al*. 2014) where value cues have been shown to influence pro-environmental decisions and behaviour, due to them resonating with broader value orientations and making values accessible. In the thesis it is argued that landscape designers are well positioned through their knowledge to influence decision-making and social structures. They were also identified as leading figures and trend-setters in the green industry (Middleton 2012). As stated in Breed *et al*. (2014) "Once landscape designers are included in a project, municipal and client requirements are unlikely to hamper their creative pursuit of structural diversity, habitat creation, community involvement, and multifunctionality. This is, in

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	the authors' opinion, the crux of the power that landscape designers hold in terms of their professional decisions."
3. Are there clear political values and attitudes regarding urban greenspace that might frustrate the efforts of landscape designers?	Yes, see item 7. In South Africa historical racial exclusivity of recreational and conservation areas influence current political attitudes to these areas. In some cases attitudes result in the creation of more green space access for historically disadvantaged people, in others they lead to the neglect of quality green space areas in order to rather provide basic services to those in need. Transformation, skills development and poverty relief often do not go hand in hand with environmental considerations in the built environment. There seems to be a lack of holistic understanding or concern for the combined and equal importance of these goals. Furthermore, the neoliberal paradigm enforces economic rationalism and promotes conservation initiatives which have economic benefit with a tendency towards the commodification of that which requires protection (McEwan *et al*. 2014). Still hope remains based on the response in question 2 above.
4. Is there any link between the notion of accessible greenspace in urban areas (that a child should have a green space for play within walking distance of her/his home) and the attitude to delivery of ecosystem services other than recreation?	Not sure if I understand the question correctly? Based on the findings of the study, in the case of South Africa the current attitude of designers towards green space access is inclined to favour basic recreation only. This can also be seen in the range of neighbourhood parks created since 1994 in historically disadvantaged areas: they consist mainly of children's play equipment and a small soccer field. The need for robustness and low maintenance play an important role here, but many ESS opportunities are overlooked. Accessibility of green spaces has been shown to

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	influence people's health (Ward Thompson *et al*. 2014[31]). Green space exposure can also influence people's attitudes towards nature positively (Gobster *et al*. 2007). Landscape designers should aim to address a variety of values and ecosystem services in all accessible green space areas to improve green infrastructure. Yet, accessible green space and green ways–two themes that had more effect in the US–mainly resulted in recreational space considerations.
5. To what extent does cultural heritage (such as historic buildings) in landscape settings influence both the practical use of greenspace and its perceived value? Can cultural heritage make provision for biodiversity easier to achieve?	At the INCUL/IFLA conference on Urban Cultural Landscapes in Tehran, 2014, my presentation touched on this topic. Both Tengberg *et al*. (2012) and Plieninger *et al*. (2013) argue for opportunities embedded in closer integration of heritage and environmental conservation. These opportunities include existing tools and methods in cultural heritage that acknowledge human values (often intangible) and can be applied to urban biodiversity conservation. In the case of countries with rich cultural heritage traditions and many artefacts, like Iran, heritage artefacts can certainly increase the perceived value and conservation of green spaces. In South Africa our cultural heritage history is not only contested but tangible objects are not in excess. Furthermore, one of the neglected values identified in the findings was Heritage (cultural and natural) and intangible values. Therefore in South Africa the potential is unlikely to be that great. In the researcher's experience, heritage buildings in a landscape can result in anthropocentric values being considered more important than eco-centric values. Especially in terms of appearance and practical use.

[31] Ward Thompson, C., Aspinall, P. & Roe, J. 2014. *Procedia—Social and Behavioral Sciences*, 153(2014):10–22.

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6. How does green infrastructure to mitigate urban heat island effects impinge of landscape design practice?	From the research instruments, heat island mitigation did not feature as an ESS consideration in South Africa. Land cover influence heat island effect in urban areas and need to be considered in two decisions that can be influenced by landscape designers: the degree of soil sealing and the material choices that will influence heat absorption and reflection levels. Green and blue infrastructures hence become important considerations to mediate heat island effect. Vegetation relies on evapotranspiration processes that cool down urban areas, while shade and water also positively contribute. The social-recreational use, economic benefit and design aesthetic may here conflict with best practice to mitigate heat island effect. The landscape designer will need to steer the design towards meeting these sometimes conflicting goals without resulting in detrimental environmental trade-offs.
7. Green infrastructure implantation and maintenance creates jobs: is the future labour requirement for maintenance considered in landscape design?	Two contradictory tendencies exist in South Africa: a goal from government to create unskilled labour to help with unemployment and poverty relief; and a general tendency by developers, private individuals and municipalities to expect landscapes to be maintenance free. Municipal budgets have seen drastic cut-backs when it comes to maintenance budgets of public spaces. On the one hand the maintenance of green space is seen as less important than the provision of basic services to people; on the other hand the job creation opportunity and range of social and environmental benefits are not acknowledged. However, high intensity labour initiatives are currently being explored and promoted by the Department of Public Works in government projects, and the Council for the Built Environment is investigating these practices and promoting them to be included in tertiary education curricula.

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Examiner 2: Professor Robert L. Ryan[32], Department of Landscape Architecture and Regional Planning, University of Massachusetts, Amherst

Examiner 2, comments	**Author's response**
2.1 This dissertation thesis is an extremely well done exploration of landscape designers' values as explored through professional periodicals, interviews, and awards. The literature review in particular is extremely exhaustive and covers a broad range of relevant areas including urban ecology, human values and nature, professional values, and landscape design. In my estimation, the thesis is acceptable and the candidate passes as written. The following comments are reflections on the thesis and ideas for clarifying particular points that may be useful for the oral examination and/or for revision to future journal article publications of this thesis. The supervisor can determine which if any revisions are necessary within the thesis document.	Thank you, the comments are profound and thought provoking and will enrich future research. The time and dedication given to the examination of the thesis are highly appreciated.
2.2 The term, "social production" of ecosystem services is difficult to un-pack unless one is embedded in the literature. It might be useful, as described on the top of p. 22 to describe this term as "social factors", such as "values, social practices, and value articulation." The reader is left wondering if some social factors have been left out, such as the social mentoring that occurs within professional offices, peer-review (beyond awards), or other methods of transferring professional norms.	Social production occurs through "social practices" that was defined among the definition on p. 29 as "a customary way of operation, actions or behaviour of the individual; it is used to link common cultural actions to context. The focus is on the skills, knowledge and understanding of people". These practices articulate values and hold potential for operationalisation. Section 2.3 attempted to unpack the combination of considerations for social production and concludes on p. 73 "These social factors include actors, organisational levels, knowledge systems and implementation instruments (MEA 2005); in constructivist social theory, these factors and processes are termed social production."

[32] Prof. Ryan, FASLA is the Graduate Program Director for the Dual Degree Masters' Program in Landscape Architecture and Regional Planning. His courses have an interdisciplinary framework integrating landscape architects, planners, and allied professionals in order to give students the skills to deal with the increasingly complex interdisciplinary environmental problems. His course, People and the Environment, shows students from a variety of disciplines how to apply environment and behaviour research to design and planning. He teaches the graduate MLA studio in landscape and greenway planning, senior BSLA integrated experience studio, and a sustainable green infrastructure seminar.

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	The practices of mentoring and peer review mentioned here by the examiner, therefore do indeed fall among what influences skills, knowledge and understanding. It is important however that these practices link cultural actions to context and are thus identified as part of the local setting. For the same reason the practices at stake for this study could only be identified through the research instruments. A list of eight pertinently identified practices is discussed for consideration in Chapter 9, p. 296-298. The definition provided for social production on p. 29 was too simplistic and is amended based on this comment.
2.3 The systems models shown in Figures 7-9 were very useful for describing the theoretical underpinnings of this dissertation; it is important for the author to translate these into terms that will be readily understandable outside of academia, for the professional audience that this research hopes to transform.	The need to translate terms to be accessible to a wider audience is a very valuable point that is noted. In the past year the researcher has been focusing on wider publications in local popular media to reach the professional audience which calls for the simplification of terms and concepts as suggested.
2.4 In particular, the landscape architectural education system and professional licensure, as well as membership in professional organizations are all key steps along the way to forming the values of young professionals. In the final chapter of the dissertation (Chapter 11), or in subsequent articles, the author could expand upon how each of these steps would need to be transformed to expand awareness of ecosystem services and the role that landscapes have in provided these services, particularly provisioning and supporting services.	In Chapter 10, the award systems was selected and used as an example of how a practice can be explored for potential operationalisation. Certainly the other practices identified in industry e.g. education, legislation, rating systems also hold unique potential. The recommendation to explore the education system and professional licensure for ESS awareness is acknowledged and noted for future publications and research.
2.5 The discussion on ecosystem disservices was particularly useful in bringing a balanced assessment to the literature review and dissertation as a whole. In many ways, these disservices, such as allergic pollen, disease vectors in the form of mosquitoes and other insects, fear of wildlife predation, etc. are	Noted with thanks.

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powerful forces in urban populations' opposition to more "natural" ecosystems that might perform beneficial ecosystem services, such as rain gardens, native plantings, and pollinator gardens.	
2.6 There are a couple of places in the dissertation where the summary statements are a bit cursory and possibly unsupported by the preceding text. For example, on p. 100, 2nd paragraph, "It thus appears that qualitative methods have better potential for addressing the research questions posed by this study." This sentence appears a bit out of place and does not directly follow the paragraph above. This sentence could be moved later in the chapter to p. 102 where the discussion of methods is better articulated.	Noted and amended.
2.7 While I agree that qualitative methods are generally more useful for exploring values, particularly, as in the case of this dissertation, when the values have not been well studied previously. However, once these values have been identified, a larger scale, quantitative socials science instrument could be used to determine if these values are held by the larger population, in this case landscape architects and designers. Considering the relatively small number of landscape professionals in South Africa (329 total as noted on p. 205), it would be relatively easy to follow up this dissertation research with a survey of these professionals. This should be articulated in the final chapter of the dissertation as a direction for future research.	I agree fully and this has been suggested under 11.2 *Future areas for research* on p. 368 "The study propounds that value considerations in landscape design should be consciously deliberated. A broader study with participants from different age, gender and racial groups can potentially shed more light on the current findings. Although this study preferred a more phenomenological approach, a detailed structured enquiry with predetermined categories could confirm and refute some of the current findings. The literature review highlighted the popular use of surveys and questionnaires developed for value studies which will make larger participation and quantification possible and may be suitable for such investigations."
2.8 In many ways, one of the most unique aspects of this study is its focus on South African landscape design professionals' values, as described on p. 188-189. Later in the dissertation, the author compares these values to studies done in the UK due to the colonial connection between the two countries. This is perfectly reasonable for a dissertation. However, in publishing this research as an article in international journals, I	Noted. The reason why this was not done in the dissertation is due to the fact that no such studies could be located for comparison. If the examiner is aware of any such studies I would greatly appreciate the references.

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would recommend comparing the study results to landscape studies in the United States and other countries.	
2.9 The study methods as described in Chapter 7 were described very clearly and well-defended in the dissertation. Triangulation is a key aspect of this mixed methods approach. However, the author could have brought the discussion of triangulation of data earlier in this chapter from its location in Section 7.5.2, p. 217 to Section 7.3 Rationale for research design.	Noted and amended.
2.10 The small sample size of interviewees (n=12) is a limitation of this study which should be acknowledged in the limitations section, p. 31, Chapter 7, as well as in the final discussion chapter. While qualitative research often relies on small samples due to the time intensive aspect of interviewing and data analysis, it is unclear if this small sample allowed the researcher to explore the full range of values held by landscape design professionals.	There exists the temptation to judge qualitative research as less scientifically rigorous by applying quantitative research sampling principles. This depends whether a positivist or an interpretivist/constructivist perspective is employed. As a guideline six to 20 sampling units are recommended for a homogenous sample, depending on the duration of the interview. In terms of exploratory research, the idea is to identify the pertinent issues for a larger study which calls for fewer samples (Kelly in Terre Blanche *et al*. 2006:288). The duration of time experts have spent in industry, their diverse location and background, and testing them on the findings of the content analysis, all were efforts to get a wide representation of possible values. Furthermore triangulation was employed and the large sample size and several year reviews through the content analysis were seen as balancing the smaller number of experts. Based on this comment the above considerations were explained and included in 7.5.2.2 *Limitation*s (Chapter 7). The final discussion and recommendations for future research do recommend larger quantitative studies as pointed out in 2.7 above.

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2.11 It was especially revealing that many of the interviewees did not know the term, "ecological services." This simple finding within the research process shows just how far the profession may need to go to embrace these ideas as goals for professional projects. The author did a good job acknowledging this limitation, but it could bear further discussion in the study results/ discussion chapter.	Noted and true. However, the concept of ESS is also associated with commodification of nature as a potential negative influence on local ways of seeing and knowing, for the same reason local terms would be preferable (Ernstson & Sörlin 2012).The concept of ESS was used in the study as a bench mark, what is important is not the word use but the values that are acknowledged. At this point in time it would appear that the term will likely come and go with little influence in South Africa on landscape design, even in academia. Since the researcher may be biased on the potential of the concept and since it never became the topic of discussions in interviews, it was opted not to discuss this again in the conclusion. However, such a discussion for future publications is a valid recommendation.
2.12 In Chapter 8, it was unclear if the residential project category shown in Table 31 including single family homes or just multi-family homes and/or neighbourhood designs. The approach to designing an individual's garden is often very different from those that are more public or shared spaces found in residential complexes.	This is valid and the need for distinction noted. In the field work data the difference between private homes and residential estates were recorded as either being private or semi-private respectively, but this aspect was not quantified as part of the data set to reflect in the findings. This data category was merely used in terms of considering the representativeness of the projects that were reviewed as part of the content analysis.
2.13 In general, the themes that were derived from the content analysis of the trade magazines were well formulated and supported by literature.	Noted with thanks.
2.14 However, in section 8.5.2, p. 240, the Van Riper et al. (2012) study does not seem as transferrable to the dissertation study as it looked at national park visitor values rather than those more related to urban landscape architecture projects, such as parks. The author should consider only using Alessa et al. (2008) as	Noted and corrected on Table 18. The reason both sources were listed was because Van Riper *et al*. (2012) used exactly the same value categories as Alessa *et al*. (2008), (based on Rolston & Coufal 1991).

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a reference support in Table 18.	The reason the study was discussed at all is because the different findings of Van Riper *et al*. (2012) do demonstrate the social situatedness of values–whether to local context or to national culture. It was also the only study found that related Landscape Values to Ecosystem Services.
2.15 The lack of consideration to supporting ecosystem services and provisioning services was particularly striking in this study. The fact that these values held relatively constant over the study period was also very surprising, as on the surface, there appears to be an increase in awareness in the landscape profession to these values.	This is true and was also an unexpected outcome of the study for the researcher.
2.16 The results of the expert interviewees described in Chapter 9 was well-done. The emergent themes resonated with tile content analysis and were supported by the literature. In particular, Section 9.2.3.4 Knowledge and experts, p. 262 highlights the importance of good project examples. The need for demonstration projects that provide multiple ecosystem service could be developed through partnerships between university partners, professionals, and public agencies. There are many examples of these in other countries that might be models for South Africa, such as Seattle, Washington (USA) - SEA Street program- http://www2.cityofseattle.net/util/tours/seastreet/slide1.htm	Thank you, I am familiar with the SEA street program, and as examiner 1 also requested examples to be added, I have included it as a reference to a good example in the concluding chapter.
2.17 In general, throughout the thesis there was a lack of results or discussion regarding innovative storm-water management as a theme in landscape design projects that provide ecosystem services. This finding is rather surprising and provides a stark contrast to the ecosystem service discussion in Europe and the US, which should be part of the discussion. In addition, the discussion about water conserving landscapes is one that has been seen in other countries, regions, such as Australia and southwestern US due to long-term droughts.	Noted. Examiner 1 also commented on this and a reference to the international tendency on innovative storm-water management was hence added to the study as a remark on the particularity of the findings. As an anecdote it can be noted that a number of projects that do address this were identified in the magazine review, but that it did not feature as a strongly perceived tendency identified by experts.

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2.18 The discussion about the rural-urban divide in South Africa in Section 9.5.4, p. 280 was a bit difficult to follow because the rural landscape is more complex than presented. The role of landscape architects in large scale rural planning efforts such as habitat conservation, scenic resource planning or farmland protection differs sharply from more site-specific endeavours at the residential or village scale. The aesthetics of rural planning in such areas as the wine-growing region of South Africa for tourism are another example of this work. Clarifying this discussion to the type of rural landscape would be helpful. If at the site scale, the author is correct in the need to focus on provisioning services provided by landscapes which in addition to food include forestry and fibre products when discussing the dire socio-economic problems of many rural South African residents.	Noted and clarification added on p. 280. The reference was mainly pertaining to site-specific endeavours at the residential or village scale. As stated in the limitations, the study mainly focuses on urban centres in South Africa. Rural areas were used as a way to distinguish from urban areas in the fieldwork, which did reveal some interesting value projections, implications and consequently suggestions for rural areas in the findings. The suggestions considered are only in as far it relates to urban areas and aspects of urbanisation.
2.19 In Chapter I0, the analysis of the landscape awards system was very interesting, but also reveals a tension in this dissertation which included both landscape architects and designers, as well as landscape contractors who do landscape installations. It might be expected that these groups would have overlapping as well as distinct value sets. These results support the stereotypes of contractors being more functionally oriented, while designers may have a more aesthetic outlook that can sometimes appear less practical or implementable.	This is true however; only contractors that also do design work were interviewed. In South Africa a very large percentage of landscape design work, especially at a residential scale is done as “design-and-build” projects. Therefore both landscape architects and landscape designers were interviewed. The projects reviewed in the content analysis included design work from both fields. As set out in the 1.4.1 *Delimitations* the National Qualifications Framework, is currently guiding other green industry professions to be incorporated in the South African Council for the Landscape Architectural Profession (SACLAP). Once this process has been formalised the skills requirements of each professional category could be better defined, monitored and regulated.
2.20 The lack of clearly stated intrinsic values as described in p. 335 is not surprising in that intrinsic values are often harder to articulate or appear less "defensible" than extrinsic values, such as economics.	This is true, but it is interesting that as described on p. 240 in a National Park study by Van Riper *et al*. (2012), intrinsic values were frequently articulated (in fifth place). The difference in setting acknowledged, it may still be indicative

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	of cultural specific attitudes towards what is regarded as a legitimate value, but this needs to be further researched.
2.21 It was unclear if interviewees made a distinction between landscapes that had been "preserved " and incorporated into a design, such as significant trees, rock outcroppings, or streams, versus those that were designed and installed for the project. Intrinsic values could play a key role in these type of projects.	The preservation of existing elements on site was not specifically raised by interviewees. On page 332, Table 31, the criteria from the SALI awards: "Rehabilitation of Natural Elements" and "Protection of existing elements" and "Protection/Conservation" from ILASA, were considered by the researcher as values on biodiversity and rather classified as fundamental value (improving sustainability) than intrinsic value cues. The potential connection of existing elements to be preserved with intrinsic values is noted and valuable for future consideration and exploration.
2.22 This conclusion to this chapter did a good job showing the lack of focus on values related to therapeutic value, spiritual value, future knowledge and experience, and scientific learning. As noted in the Table 29, the SITES 2014 system does have a credit, focus on promoting sustainability education as part of sustainable landscape designs that could be useful in recommendations for increasing this value.	Noted, thank you for pointing this out.
2.23 Many of these same values were reiterated in the earlier interviews with landscape experts and in content analysis of magazines. This raises a methodological question. Did any of the magazine issues that were reviewed also contain the award-winning projects from the study period? If so, is it possible to more closely compare the articles about the award-winning projects with what the interviewees in the award section discussed, as well as the review of the awards criteria?	The magazines do feature award winning projects and it would be possible to compare these as suggested. This recommendation is useful for future publications, thank you.
2.24 The final chapter, Chapter 11 does an elegant job knitting together the themes and results of these nested studies on landscape values. It raises some interesting areas for future	Both this examiner and examiner 1 have reiterated the importance of examples for clarification, an example of co-creation was added to the conclusion chapter among those

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research, especially the mismatch between the new green spaces installed in disadvantaged peri-urban areas and the needs of local residents (p. 345). This suggests that the values of the designers and government officials are being operationalized without feedback from local residents. It would be good to use some South African examples where co-creation of these spaces has occurred, as this seems to be the model that the author is proposing.	that talk to the inclusion of multiple ecosystem service.
2.25 In general, it might be helpful to use a few project examples to illustrate the major points discussed in the final chapter. For example, what would a landscape project look like that included multiple functions? For example, preserving large trees can have biodiversity value, but also provide spiritual and intrinsic benefits.	The use of examples was also recommended by the first examiner. This suggested inclusion has been made in the final chapter.
2.26 The learn-by-doing model proposed by the author (based on Ahern et al., 2014) seems very relevant to the scientific and practical concerns of landscape designers. The challenge will be to have social science measures to study the more intangible values of these landscapes.	Noted. Tengberg *et al*. (2012) and Plieninger *et al*. (2013) both suggest that established strategies and tools used for cultural landscape and heritage projects could be adapted to incorporate ecological concepts of intangibility. These may be useful to elaborate models for practice in terms of specific tools and indicators to be included.
2.27 On p. 362, par. 4, the author chastises landscape designers for not engaging in land use and land cover issues. This begs for a discussion earlier in the dissertation on the role of landscape architecture as a profession in South Africa. Do professionals engage in large-scale landscape planning projects as they do in countries such as the Netherlands and Germany or are those under the prevue of planning professionals? This seems to be a discussion to bring back to landscape education and professional licensure requirements and restrictions.	A discussion on professional practice was also requested by the third examiner. This was included as an elaboration of p. 205, 7.4.1 *Study area and population.* Although general land use zoning is done by town planners in South Africa, the site specific land uses and land cover options can be influenced by landscape designers as part of the design team. These considerations are certainly part of landscape architecture education but perhaps not part of the education of all landscape designers. The implication this finding may and should have for education requirements or restrictions for professional licensure is noted for future reference.

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2.28 While awards are very important within the design professions, one would hope to go beyond these awards to other efforts to more directly influence incorporation of ecosystem services within design projects, including working with government policy, corporate sponsors, and academic institutions.	This is true and also the view of the researcher, but perhaps not clearly stated. This has been highlighted in the conclusions so as to also resonate with recommendations of the other examiners.
2.29 On p. 367, the author calls for acknowledging more diverse values in the awards process. I suggest looking at other existing design awards that have incorporated social and ecological values such as the EDRA/Places awards or the Rudy Bruner awards programs.	Thank you for bringing these to my attention. This is certainly a valid avenue for future research and considerations.
2.30 The future areas of research section, p. 368 highlights some very interesting key questions. The first one, "How can particular racial or cultural value preferences ... aid approaches to greater social-ecological resilience?" appears to follow the practical approach of working with existing values. However, since the dominant paradigm is very privileged by income and the history of apartheid, it appears that new values need to be inserted by either collaboration with underrepresented groups or by ate inclusion of these groups within the ranks of future professionals. This disconnect between designers and the populations they serve is not unique to South Africa, so future research could look to efforts in other countries as well.	Noted with thanks. This disconnect was identified in the article by Hoffman *et al*. (2012) in Germany that distinguish between perceptions of parks and urban derelict land by landscape planners and residents. In the thesis it is recommended that inclusionary and co-creation processes are used and therefore there is not a formal proposal for new categories in the awards as suggested by examiner 3. The study identified value biases that designers hold, but determining site specific ecosystem requirements needs to follow processes such as that of Ahern *et al*. (2014) that consult and recognise both the local residents and the broader context requirements.
2.31 In summary, this dissertation explored a wide-range of the values within the landscape design profession within South Africa and provides a much-needed contribution to the landscape architecture body of research on landscape values and ecosystem services.	Noted with thanks.

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Examiner 3: *Doctor Julian Raxworthy[33], Master of Landscape Architecture programme, School of Architecture, Planning and Geomatics, University of Cape Town*

Examiner 3, comments	**Author's response**
3.1 I congratulate the author on a thorough, in-depth, rigorous and well researched dissertation. It demonstrates that the author already functions as a researcher at a doctoral level and I have no hesitation in suggesting the author is awarded their doctorate, on the basis of what it demonstrates about their capability.	Noted with thanks.
3.2 I feel that there are some significant problems in the thesis that need to be addressed to ensure it meets the standard it sets for itself. Most of these centre around two contradictions: taking a social science approach to a creative practice and; wanting to cover the topic completely, and a necessity to be limited. *My answer to both is to be more limited: focus on South Africa as a social/environmental milieu in the former, rather than the bigger concepts, which have had much reiteration and to which you can only add the local anyway and; focus on biodiversity performance in the latter rather than values or design.*	I respectfully disagree that taking a social science approach to design (as a creative practice) is problematic or contradictory. Social science approaches are part of all research at Cultural Landscape Conferences held by IFLA. The importance of social science approaches is also acknowledged in a recent conference call by Kelly Shannon, University of Southern California, for 2016 on *Landscape as Necessity*: "Landscape architecture is uniquely able to synthesise ecological systems, scientific data, engineering methods, social practices, and cultural values, integrating them into the design of the built environment." Furthermore, there is much landscape design research that follows social science approaches, e.g. consider these objectives from renowned and highly cited studies by Nassuaer & Opdam (2008:635) *"We examine whether landscape design enhances the credibility, saliency and legitimacy of scientific information in society, and whether it provides a common ground for practice and science;"* or Gobster *et al*. (2007:958) *"…we discuss how interventions through landscape planning, design, and management; or through enhanced knowledge might establish desirable relationships between*

[33] Dr. Raxworthy is a practicing Landscape Architect. Initially working as a landscape tradesman, he studied at Ryde Horticulture TAFE, until 1992. He later graduated with his undergraduate degree (with honours) and research master's degree (by design) in landscape architecture, both from RMIT, Australia. He completed his PhD with the University of Queensland, Australia in 2013, concerning the relationship between gardening and landscape architecture, in regard to change, which continues to be the focus of his scholarship.

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	aesthetics and ecology." Both the first authors here are currently on the editorial board of *Landscape and Urban Planning*, one of the most significant international scientific journals for landscape architecture. I agree that the local South African focus is important and have aimed to reflect the importance of contextual matters throughout, without exclusively making the study applicable to a South African audience. The study may have been ambitious in connecting various interdisciplinary fields, which resulted in a lengthy literature review. However, qualitative and inter-, multi- or transdisciplinary studies are not only highly valued but also recognised as being challenging and lengthy. Articles of these studies often get allocated more words in journals such as *Landscape and Urban Planning*. Although practical considerations for biodiversity, ecosystem services and green infrastructure are set out in Chapter 5, the study and research question are primarily focused on values and operationalisation (as stated in the research question and set out in Chapter 3 and 4). The significant contribution aimed for in the thesis is not in terms of practical considerations on performance, as these studies are more abundant. Rather the focus was specifically on how the values of landscape designers may influence design outcomes in terms of ESS and ways of operationalising these values. The focus of this study can therefore not be changed without changing the research question. Similarly the field work will have to be redone to enable findings that respond to a new focus and a new question. This will result in a new and different study and not add to the present one. The specific research design was selected after contemplating various alternatives (see 7.2

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	Overview of possible research designs). Interpretative research, although derived from every day skills, do imply the development of special skills by the researcher (Terre Blance *et al*. 2006). The researcher completed a Masters degree in Urban Studies with a focus on qualitative methodology. The two year tought programme included intense prescribed reading, three concentrated qualitative method workshops assited by experts, several practical assignments and the subsequent masters thesis research itself. This background places the researcher in the position to make a unique contribution as a landscape architect, designer and academic in South Africa.
3.3 Social/Political & Ecology in South Africa *South Africa is a unique context and in which the social/political and economic are imbricated with the ecological. Early on in the thesis the candidate seeks to exclude issues of environmental justice but I do not think you can do so because it is at the core of the constitution and also is present in the practitioners' responses. If only 10% of people can participate in formal planning processes because of informality, or education, or economics, then the agency of your proposals is very reduced, because these people are outside the ecological measurement systems.* ***Recommendations:*** *The topic comes up numerous times in the thesis and I recommend writing a new section by consolidating these that addresses this question early on rather than excluding it but talking about it nonetheless.*	I fully agree that the social political context is important to acknowledge and an interesting part of the study. Considering the agency of design in areas of informality by engaging with the general public and using alternative methods of public participation were aims of my Master's degree. I found the outcomes limiting due to a too strong focus on the political and have opted in this study to mainly consider designers and their values. In the study the social-political is therefore acknowledged as far as it affects (and should affect) ESS requirements and to the level it surfaced in the value statements of designers. As stated in 1.4.1 Delimitations: "This study does not consider questions of distribution of ecosystem services or issues relating to politics of ecology and environmental justice in any great depth, as these are studies in their own right." This delimitation was based on the focus of the research question and the contribution the study desired to make. I agree with the examiner that particularities of the context could have been elaborated on. I have added to 7.4.1 *Study area and population* to more purposefully speak about the South African reality and its implications for landscape

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	design.
3.4 Ecological Focus *The ecological focus of the thesis is worthy and relevant, however the thesis is too broad in its environmental focus. The question is tied to biodiversity but throughout ecosystem services and green infrastructure get arbitrarily interchanged. While both these interact with biodiversity, a focus on biodiversity as a criteria to determine what gets discussed and what doesn't could have allowed this thesis to be much more tightly argued and with greater brevity, making its argument stronger.* ***Recommendation:*** *Choose a focus and give this priority in the literature review. This should be biodiversity and then ecosystem services and green infrastructure become tools or criteria for mobilizing it. Merge the South African and international discussions into a single chapter. Focus on the performative requirements of what can be done on a site scale.*	I agree with the examiner that the thesis could have been more tightly argued. Articles published and in process have by nature of word length resulted in very specific emphases in the literature. The articles thus far focused on either green infrastructure (e.g. Breed *et al*. 2014) or directly departed from the ecosystem services premise (e.g. Breed in progress). The selected focus of the study was on ESS as a tool to operationalise biodiversity. ESS not only includes and rests on biodiversity for its functions and processes; it also embraces the much required social dimensions and reality as part of social-ecological systems. ESS thus brings biodiversity and values together as illustrated in the system models in Chapter 2. Based on the literature review, for the built environment biodiversity at a site scale (and therefore ESS) cannot be divorced from implications of scale and connectivity (Lindenmayer & Fischer 2006). For this reason the concept of green infrastructure was defined. The linking of these ideas as a point of departure for the study was the focus of Chapter 2. South African studies that resonated with the points set out in Chapters 1 to 5 were included and discussed among the international studies (e.g. Schäffler & Swilling 2014; Avlonitis 2011; Molebatsi 2010; Cilliers & Siebert 2011; Cilliers 2010 etc.). The specific reason for reviewing South African studies also separately is stated on p. 33 “to demonstrate a lack of focus in the literature on environmental values as related to professional practice and specifically landscape design practice.” The aim of the review was further to recognise the local research that relates to questions of values, ecosystem services and urban ecology–albeit only with indirect implications for the research questions. Although the works reviewed are applicable to landscape design practice, academic landscape

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	designers in South Africa largely do not engaged with these studies. Chapter 5 summarises landscape process knowledge in green infrastructure, ecosystem services and plant selection, as scientifically recognised Functional Values (performative functions) that pertain to landscape design mainly at a site scale. Much of this knowledge is available to designers, yet with little effect in South Africa (Schäffler & Swilling 2014). Internationally there is an aknowledged lack of influence of scientific findings on socio-political governance (Alberti *et al*. 2008; Cilliers 2010) which steered the study away from a prime concern with knowledge towards values. Hence the main research question's focus on "operationalisation of values" as opposed to "operationalisation of performative functions".
3.5 Design/Values/Performance *Apart from the political, the way that the thesis discusses values, and design is generally the biggest problem with the thesis. The design discussion in the thesis is simplistic and reductive and somewhat offensive to designers. It tries to take a social science approach that fragments design into "values", when rather values (if they are relevant at all) inform how one designs. Breaking off aesthetics or naturalness seems irrelevant, or at least its role is not properly argued. If the argument is that "biodiversity is seen as messy", then I would argue design is regarded as styling. I would have preferred a performative approach, where the focus is on what works, rather than "aesthetics". It is not possible to give a decent account for design in this thesis, so why bother? Discuss the values embedded in design, not in opposition to it.* ***Recommendation:*** *Values section needs to be reconsidered so that it doesn't oppose design to environmental value by focusing on performance. Either clearly state why aesthetics (your term) has been separated from performance or how design is getting in the way*	The scarcity of peer reviewed international research on design written by active designers themselves necessitated the inclusion of academic writing. This would be the case for most design disciplines. In terms of landscape designers cited, e.g. Swaffield (2012); Steiner (2014), they are directly and indirectly engaged with practice and design and have been trained as designers. The articles and publications used are from reputable peer reviewed sources. Due to the focus of the main research question, the discussion on design, located inside the section 4.7 *Knowledge, discourse and values in landscape design,* is rather in the light of values. One of the main points of 4.7.2 is that values frame the design process and are "embodied in design outcomes" (Swaffield 2013). This section did not aim to explain the design process as such but rather considered proposed procedural models by Nassauer and Opdam (2008) and Swaffield (2013) that acknowledge values as part of the design process. To provide a more balanced discussion as

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of implementing biodiversity, in a manner that is related to the question or drastically reduce this discussion. If you do discuss design as a central concern then you need to have a more sophisticated discussion drawn from designers writing themselves rather than simply from people writing about how people design.	suggested, and additionally to provide a better understanding to non-designers (e.g. ecologists), sources and references were added to this section.
3.6 Literature Review & Findings *The grasp of the literature was excellent and thorough, which was also its problem. The literature review was much too long and not always relevant in what it allocated space to. Splitting topics up so they appeared multiple times under different chapters made the thesis repetitious. Merging definitions into the South African chapter could have reduced the size of the thesis and made the concepts directly relevant to a local consideration. The literature review was, in this readers opinion, detrimental to the thesis because of the width of its range and its length, making the real findings seem brief and under-considered, and much of the professional portion under-theorised* ***Recommendations:*** *Reduce literature review by a third to a half on the environmental and add a new section about the profession and professional practices to support this focus of the thesis. Expand discussion of findings and allocate more weight to it in the thesis by integrating more from the appendices and letting this material be more directing to the conclusions rather than reorganizing it. Also, consider removing the periodical section which is not properly used and seems peripheral to the interviews.*	The fact that the literature review is perhaps written in a style that made it too lengthy and that certain sections could be reduced is acknowledged. However, bringing together these interdisciplinary sources and themes, and relating them to landscape design is a much needed exercise. This reference will hopefully serve many in the South African context as research in landscape architecture is scarce. The recommendation to include a section on the profession or professional practice is noted. The general role of professionals was highlighted in sections 2.3.6; 2.3.7; 4.6 and 4.7, but perhaps not specifically enough. In the article written Breed *et al*. 2014, reviewers asked about the South African context and the local role of professionals, which was included in the article yet hard to generalise. Section 7.4.1 has been elaborated to contextualise better the professional role of landscape designers in South Africa as suggested also in 3.7 below. This was however done in broad terms as the study is not focused on landscape *architects* as designers only and may hence be generalising on certain aspects of overall professional conduct. The material in the appendices was removed from the body of the thesis since it did not contribute any further to the answering of the research questions. Based on the recommendation of the examiner, the appendices data will be considered for the elaboration of other kinds of topics in landscape design (e.g. the profession) in future research

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	and publications. The recommendation to expand the findings, but remove one research instrument and its results altogether, is found somehow contradictory and also problematic. The recommendation is in detriment to the strength of the research design as supported by social science theory. As set out in the research design chapter 7.4.2 p. 207, the two research instruments were selected to complement each other. The qualitative research made use of triangulation–improving understanding through using approaches from different instruments and sources (Kelly in Terre Blanche *et al*. 2006; Lockwood 1999). Constructivist methods, such as content analysis, show how the interpretavist understanding and experiences (derived from the interviews) feed into larger discourses (Terre Blanche *et al*. 2006). In quantitave terms, the smaller number of interviewees are also balanced by a large number and longer period of periodical review. The themes and results derived from the two research instruments are by no means identical, but are supportive in their findings. The use of periodicals to identify existing discourses at a social level is an established and recognised qualitative method (Aguilar Díaz 1998; Kellert 1985; Lockwood 1999; Terre Blance *et al*. 2006).
3.7 Landscape Architecture Profession/Operationalization *The profession deserves more discussion and this is the most interesting part, when the author talks about how it works specifically in South Africa rather than values. Also, the interviews are the major evidence that are not discussed enough, when this is the basis of the contribution. The stridency of "operationalize" in the thesis is rendered weak in the awards chapter, and means that the suite of factors should be considered in more depth. Since the discussion of the awards ends up simply being*	Although the awards as a system was selected based on both the findings and the literature review, it is not considered the only way towards operationalisation. It was merely selected as the best example to explore, based on the findings of the study. The awards systems are not only discussed in terms of the criteria 10.5.3, they are also discussed in terms of the opportunities of identified discourses 10.5.1 and recent trends in the awards 10.5.2. The three discussions in dialogue with the literature combinedly led to the recommendations (p. 339) of operationalisation through social rituals,

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the only way of "operationalizing", then discussing the criteria is not enough. If only discussing criteria then also perhaps discuss rating systems or, more importantly, the SACLAP ratings table. ***Recommendation:*** *Either downplay awards and cover it as part of an expanded suite of tools like ratings and SACLAP, or make a formal proposal of either new categories or a "meta" reading that is rating at the awards that measures performance of all projects submitted in the other categories. Also, add more evidence to the discussion from interviews and consider removing periodicals.*	alignment with existing values, concepts of multifunctionality and Cultural Services; and examples of best practice Using a suite of practices for operationalisation of ESS, will imply efforts that engage with different artefacts and arenas (Ernstson 2013) with an increased likelihood of overall success. Chapter 9, 296-298 discusses eight potential practices identified in detail and the Chapter 10 introduction explains the rationale of the selection process. Although the value of rating systems is acknowledged, the reasons why rating systems were not selected as best example are explained on p. 300: "The incentives produced by rating systems are material and non-normative. These incentives do not produce long-term change and can further potentially erode exiting pro-environmental normative practices." A statement that several social practices hold potential and a combination is valid to explore in future research, was added in the conclusion chapter. In the thesis there was an interest in the potential existing social practices hold for operationalisation. The awards systems were explored to demonstrate this potential. As explained on p. 327, in the thesis the principle of co-creation was supported and therefore new categories for the awards were not proposed. Examiner 2 (in 2.29 above) suggested other award examples which will be explored towards more detailed guidelines in future research. In qualitative research, evidence from one research instrument only is considered weaker than using two different instruments and data sources that can support findings (Lockwood 1999; Terre Blance *et al.* 2006). As stated in 3.6 above, the two instruments were selected to combinedly show how subjective understanding and experience (derived from the interviews) feed into larger social discourses (identified in

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	the content analysis (Kelly in Terre Blanche *et al.* 2006). The value of discussing the profession in greater detail based on the findings of the interviews is noted and will be pursued in future publications.
3.8 Examiner's reading notes	The notes illustrate the examiner's wide-ranging knowledge on landscape design. The dedication of the examiner to read the thesis meticulously and to critically consider each and every argument to provide recommendations is much appreciated.

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