Factors affecting ecoagriculture for integrated farming and biodiversity conservation in a transfrontier conservation area in Southern Africa

By

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Title: **Factors affecting ecoagriculture for integrated farming and biodiversity conservation in a transfrontier conservation area in Southern Africa**

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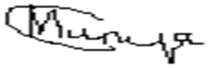
Abstract

The transfrontier conservation areas (TFCAs) concept appears well-timed and appropriate to Southern Africa but the role of local communities in these enterprises is not defined. A framework that fully integrates agriculture, biodiversity conservation and livelihoods, known as ecoagriculture, provides opportunities for achieving TFCA goals through bottom-up means. The aim of this study is to investigate the feasibility of planning and managing ecoagriculture in the Lubombo TFCA spanning across the borders of South Africa, Mozambique and Swaziland. The study area is a biodiversity hotspot and is inhabited by poor people who need to meet their livelihood needs through utilising local natural resources. There is thus a need for initiatives that balance biodiversity protection and utilisation. Methodological triangulation including transect surveys, participant observation, key informant interviews, household questionnaire surveys and participatory approaches is employed. The study involves stakeholder identification and consultation, participatory landscape performance assessment, evaluation of the community's future visioning and the analysis of policy and governance mechanisms impacting on ecoagriculture implementation.

The study revealed a unique combination of stakeholders with varying degrees of importance and influence in the TFCA communities under focus, a situation which cannot be expected in an ordinary communal farming area. Potential conflicts of interest were evident among certain stakeholder groups but the stakeholder roles and interests were largely complementary. Key informant interviews pointed towards a high feasibility of planned ecoagriculture implementation in the area. The questionnaire survey showed an overwhelming willingness to plan the integration of biodiversity and farming. According to the participatory evaluation of the landscape's performance the area's overall performance score was 2.97 out of a possible score of 5, which implied a performance in the middle of the range. There were significant differences in the scores for the landscape dimensions (p-value < 0.01) but there were no significant differences in scores across the landscape (p-value = 0.37). The area is a mosaic of unplanned ecoagriculture with a good potential for transformation into systematically managed agriculture-biodiversity integrated approaches. Biodiversity-agriculture integration elements are evident in the Mathenjwa community vision, reflecting the community's consciousness of its future in the TFCA. None of the Lubombo TFCA countries has an explicit ecoagriculture policy but ecoagriculture aspects are implied in existing legislation. Weak transboundary collaboration makes the Lubombo TFCA to exist as a treaty on paper rather than on the ground. Conflicts between customary norms and public legislation create policy enforcement challenges and pose a barrier to ecoagriculture implementation. Existing conditions could be improved to allow stakeholder-driven integrated landscape management. Innovative efforts (like policy harmonisation, capacity building and campaigns to raise awareness of the benefits of agriculture-biodiversity integration) are recommended for ecoagriculture to become a systematic landscape management practice in the area. The contributions of this study include: (i) a suggested framework for local community involvement in TFCAs which improves their resilience to climate change impacts, (ii) a suggested ecoagriculture feasibility index (EFI) for a specific landscape, (iii) a proposed landscape evaluation tool that practitioners and researchers can adopt, (iv) a methodological contribution to landscape studies involving the use of participatory processes and (v) contribution to the literature on the subject and practice of ecoagriculture.

Declaration

I, Munyaradzi Chitakira declare that the thesis, which I hereby submit for the degree of Doctor of Philosophy in Environment and Society at the University of Pretoria, is my own work and has not previously been submitted by me for a degree at this or any other tertiary institution.

SIGNATURE: 

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Disclaimer / Warning

This thesis comprises of chapters that have been prepared for submission to different scientific journals for publication. In order to secure publishable entities overlaps may occur and the style may vary across the chapters.

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CHAPTER ONE: GENERAL INTRODUCTION

1.1 Introduction

This thesis comprises six chapters which include published papers or papers under consideration for publication in scientific journals. The current chapter provides the conceptual background to the study and presents the research objectives, methods and the organisation of the thesis.

1.2 Conceptual framework

1.2.1 Biodiversity-agriculture integration challenge

Protected areas (PAs) have been the major strategy for safeguarding the world's biodiversity and are still an essential part of conservation programs, particularly for sensitive habitats. However, the fact that 40% of terrestrial area is under agricultural land uses and just 12% is protected implies that PAs alone are not sufficient to guarantee the conservation of the full range of biodiversity, particularly the myriad of species that occur in areas inhabited and utilised by human beings (Millennium Ecosystem Assessment 2005, Shames and Scherr 2009, Perfecto and Vandermeer 2010, Tscharntke et al. 2012). Many endangered species exist that cannot be conserved by a system of fenced and isolated conservation areas, for instance cranes, vultures, and smaller mammals such as the golden moles. A highly connected matrix composed of semi-natural habitats, managed habitat and reserves, is required in this regard (Linnell et al., 2005). The success of biodiversity conservation in future hinges upon the ability to experiment successfully with a range of institutional forms, including those that permit human use (Persha et al 2010).

The observations above lead to two interrelated assertions. First, human inhabited landscapes are extremely important for biodiversity conservation and this conservation potential must be recognised. Second, biodiversity conservation in landscapes outside PAs, on which local communities depend for livelihoods, needs attention. These assertions bring out a challenge to effectively integrate agricultural production with conservation in order not only to maximise agricultural biological diversity (or agro-biodiversity in short) but also to manage ecosystems as

a whole for the wellbeing of both the people and the environment. Agro- biodiversity (which is a subset of all biodiversity) refers to all elements of biological diversity of relevance to food and agriculture. Biodiversity elements existing within agricultural landscapes comprise species and varieties of domesticated crops, grasses, trees and livestock, wild species like pollinators, fungi and soil microorganisms essential for production, as well as wild species that use farming areas (e.g. river banks, hedges, field edges) as their main or supplemental habitat, related habitats and the broader ecosystems or landscapes (CBD 2011).

A mutual relationship exists between agriculture and biodiversity in that sustainable agriculture promotes biodiversity and is, in turn, enhanced by biodiversity. Biodiversity is the basis of agriculture and is essential for the production of raw materials for clothing, shelter and medicines. Agriculture performs services (like soil and water conservation) that are important for human survival, supports adaptability and resilience to changing environmental and economic conditions, and sustains rural peoples' livelihoods (CBD 2011). Thus, conservation of biodiversity is essential for the sustainable production of food and other products and the benefits these provide to humanity. Improved land-management practices are essential for the expected synergies to be realised. Practices such as integrated pest management, some forms of organic farming, and protection of habitats on field margins can promote synergies between agriculture and domestic or wild biodiversity. Studies by Hole et al. (2005) revealed that species richness and abundance across a wide-range of taxa is higher in organic farming systems than conventional agriculture. There are certain management practices within organic systems which are either absent or rarely utilized in the majority of conventional systems such as minimum tillage, suppressed use of chemical pesticides, mixed farming, intercropping, under-sowing, sensitive field margin or hedgerow management and the creation of non-crop habitats. However many issues relating to this subject remain unclear and further investigation is required to make a full appraisal of the potential role of organic farming on biodiversity conservation in agro-ecosystems (Hole et al. 2005).

In recent decades agriculture has tended to focus on maximizing yields using few relatively productive species and ignoring the importance of biodiversity even though research shows that biodiversity and agriculture are strongly interdependent (Méndez et al. 2007, Pretty 2008, Toledo and Moguel 2012). As pressure to feed the increasing human populations mounted,

the farmers in sub-Saharan Africa resorted to raising production even at detrimental costs, (e.g. highly increased production costs), but the purely production-oriented agricultural practices have contributed to degradation of land, soil, and local ecosystems thereby threatening the livelihoods of the farmers who largely depend on natural resources (Chitakira and Haruzivishe 2007, Buck and Scherr 2011). Agriculture has thus become a major driver of biodiversity loss, and to reverse this situation there is need to restore sustainable land management practices. Conservation programmes that are sustainable have a capacity to satisfy environmental, economic and social objectives simultaneously (Sullivan 2003). Efforts to achieve a sustainable balance between conservation and agricultural concerns at the local scale have seen the emergence of various land use or production strategies such as agro-ecology, agroforestry, organic farming and more recently, ecoagriculture (Gliessman 2004, Nair 2007, Scherr and McNeely 2008, Perfecto et al. 2009, Müller-Lindenlauf 2009). Efforts were also seen at the regional level where national governments sharing common borders collaborated in creating transboundary parks and transfrontier conservation and resource areas (TFCAs).

1.2.2 The transfrontier conservation and resource areas concept

Transfrontier parks refer to areas where only PAs, normally national parks, were adjoined across borders with the objective to improve wildlife conservation through joint management by the countries involved. The term TFCA includes not only protected areas but different land-uses including multiple resource use areas inhabited and utilised by humans (Ron 2007). TFCAs are defined as natural ecosystems that cross political boundaries between two or more countries and include one or more protected areas and multiple resource use areas (SADC 1999). The main purpose of TFCAs is conservation and sustainable use of biological and cultural resources, whilst promoting socio-economic development, regional peace and co-operation (Sandwith et al. 2001). TFCAs have been designed to combine the objectives of conservation and of development. Their establishment implies that wild biodiversity should coexist with human beings. The first formal transboundary protected area in Africa, was the Kgalagadi Transfrontier Park (KTP), established following an agreement signed between the Governments of South Africa and Botswana in April 1999. By 2011 fourteen TFCAs were being developed in Southern Africa and potential areas were being identified. The TFCAs range in size from the 2,000 km^2 Chimanimani TFCA

bordering Zimbabwe and Mozambique to the largest and most complex 400,000 km^2 Kavango-Zambezi (KAZA) TFCA which includes areas from Angola, Botswana, Namibia, Zambia and Zimbabwe (Cumming 2011).

The establishment of TFCAs in Southern Africa was promoted and supported by several donors and NGOs, and the Peace Parks Foundation (PPF) played the most prominent role in this regard. The PPF's facilitates and guides the TFCA establishment processes, supports the establishment of required infrastructures, and supports the funding of TFCA's institutional structures and key positions such as TFCA coordinators (Ron 2007). The concept of TFCAs is relatively easily embraced in Southern Africa because the principles of cross-boundary cooperation in natural resources use and management are not new to the region since communities around border areas have often maintained old family and cultural ties across the borders (Murphy et al. 2004). It is however unfortunate that many TFCAs in the SADC region were established through a top-down approach and local communities and other key stakeholders were informed after the TFCA had been established (Ron 2007) and this potentially generates conflict with the locals.

In most cases TFCAs fall within agriculturally marginal zones and it is assumed that conservation activities in these areas can generate money for local residents. But TFCAs generally have limited infrastructure and poor access to markets (Cumming 2011) which are challenges to effective community involvement and the success of community-based development initiatives. TFCAs are a model of multifunctional landscapes designed to achieve conservation, development and socio-cultural goals through international cooperation. This represents a sound vision yet a formidable challenge, mainly because there are intrinsic contradictions. Historically, the conservation of biodiversity resources has been at odds with development and it is only recently that some initiatives such as communal areas natural resources management programs have shown that these two objectives are not necessarily antagonistic (Murphree 2009, Taylor 2009). It is a challenge to make conservation development objectives across borders compatible given the conditions that differ strongly between countries. Thus, many TFCAs mainly exist on paper with minimal development activity.

1.2.3 The ecoagriculture framework

Ecoagriculture refers to "integrated conservation-agriculture landscapes where biodiversity conservation is an explicit objective of agriculture and rural development, and the latter are explicitly considered in shaping conservation strategies" (Scherr and McNeely 2007:1). A key term in this definition is "landscape" which conveys an idea of a heterogeneous area with several functions. An ideal ecoagriculture landscape is multifunctional and fulfils three interlinked goals (i.e., agricultural production, biodiversity conservation and viable local livelihoods) in the same space and time. Ecoagriculture has a potential to improve the natural assets of poor people by protecting wild species important to human health and livelihoods, by ensuring the provision of environmental services critical to the peoples' livelihoods and by supplementing incomes with biodiversity payments (McNeely and Scherr 2003). Countries like South Africa (Department of Environmental Affairs and Tourism 2004) that seek a national climate change response strategy to integrate the programmes of various government departments and to support key government objectives like poverty alleviation may find an answer in the ecoagriculture approach. Ecoagriculture is a sustainable climate change adaptation and mitigation strategy which meets national goals such as food security (Ecoagriculture Partners 2008b) and such countries may consider fostering ecoagriculture implementation as a solution.

Ecoagriculture can be envisioned as a body balancing on three legs (Figure 1). Support from stakeholder institutions is important for the overall success of ecoagriculture systems. Supportive legislative and governance regimes are also essential for the success of ecoagriculture.

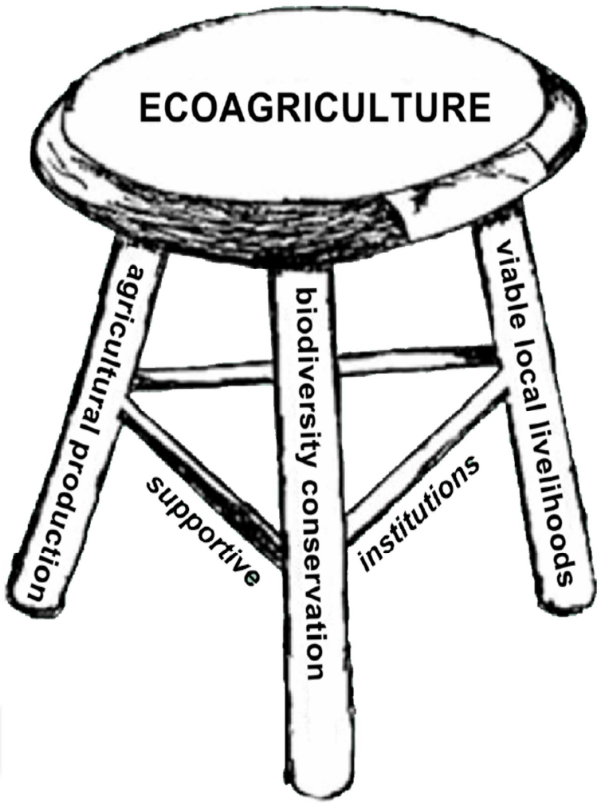


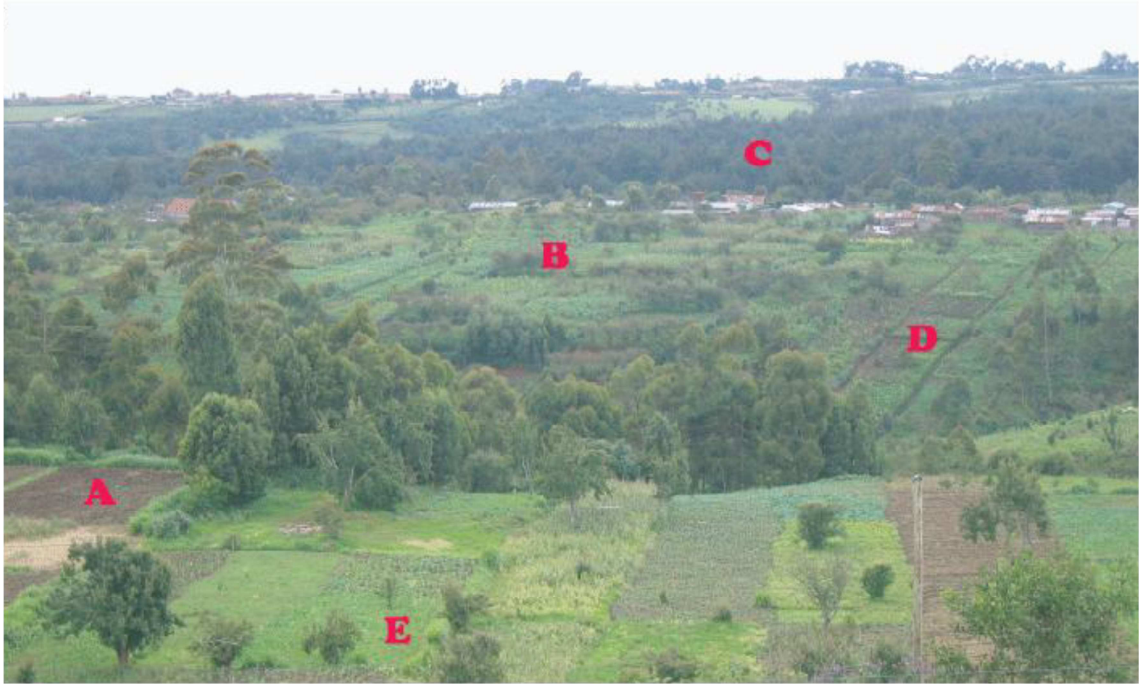
Figure 1.1: The ecoagriculture concept (Source: Scherr and McNeely 2007)

The goal of ecoagriculture is the management of farming mosaics that are balanced in terms of food production and environmental protection to achieve viable local livelihoods. All the components interacting in space and over time including soils, water, plants, animals, climate and human beings are integrated into one system which promotes high biodiversity. From a social perspective, diverse crop, livestock, tree and wild species ensure enhanced livelihood security and income generation through opening commercial options in agriculture and other sectors (Ecoagriculture Partners 2008). Ecoagriculture involves a variety of land management practices. Examples include:

i. protecting and promoting local crop and livestock diversity;
ii. maintaining connectivity between natural habitats within agricultural landscapes;
iii. planting hedgerows around cultivated fields;

iv. protecting watersheds with perennial natural and planted vegetation;
v. maintaining all-year-round soil cover to enhance rainfall infiltration;
vi. managing inputs and wastes to minimize agricultural pollution of natural habitats;
vii. designing farming systems to resemble natural ecosystems in terms of structure and function (Ecoagriculture Partners 2008).

Figure 1.2 illustrates some elements of an ecoagriculture landscape in East Africa. The practice of ecoagriculture is distinguished from related practices like agro-ecology or agroforestry in that it operates only at the landscape level whereas the other practices are also applicable at smaller scales such as the farm level.



KEY:

A: Farmers manage soils to maintain organic matter with benefits for crop yields, rainfall infiltration, and below-ground biodiversity.

B: Trees interspersed in cropland protect soils, increase and diversify production, and provide food and cover for wildlife.

C: Products from natural areas like forests and wetlands are sustainably harvested to provide essential subsistence products and income sources.

D: Grass strips on steep slopes create terraces that slow water flow and reduce erosion.

E: Farmers produce numerous crops, grasses and trees in different parts of the landscape mosaic. This diversifies income and creates habitat niches for a broad range of wild plant and animal species.

Figure 1.2: A typical ecoagriculture landscape (*Source:* Ecoagriculture Partners 2011).

Many rural communities worldwide practice ecoagriculture although without the same name. Many farmers have adopted innovative strategies for conserving the natural resources important to their livelihoods. In Kenya, projects for enhancing agricultural productivity were implemented on the Margins of Kakamega Forest (Ecoagriculture Partners 2009). In the year 2000 projects coordinated by the International Centre for Insect Physiology and Ecology (ICIPE) brought together international and local organizations to diversify economic opportunities and increase productivity on existing agricultural lands at the forest margins, thereby relieving pressure on the forest. Agroforestry trees were introduced as an alternative source of timber. Commercial cultivation and processing of indigenous medicinal plants was instituted and energy conservation techniques, beekeeping and silkworm rearing were introduced. Community groups were given access to credit loans. These developments fostered the simultaneous achievement of conservation and development objectives. Neely and Butterfield (2004) report about a holistic landscape management strategy with livestock as an integral part of the landscape in the Hwange communal lands in Zimbabwe since the mid 1990's. The Hwange communities had been experiencing challenges of desertification, drying rivers, AIDS, and loss in land quality, vegetation, water and biodiversity, but through an innovative perspective towards livestock management the area was restored into ecoagriculture landscapes. Degraded soils in the Dimbangombe cattle ranch became re-vegetated and through planned grazing, livestock health was improved within a year. The community proposed training the local youths on tourism and safari, and the local Dimbangombe College of Wildlife, Agriculture and Conservation Management started offering vocational training programs. Some groups of villagers tried the

holistic management in their own lands resulting in improved forage production. These success stories testify to the possibility of local communities establishing and managing ecoagriculture landscapes, taking cognisance of potential challenges presented by existing socio-environmental and policy conditions.

The ecoagriculture concept relates closely to the UNESCO's Man and the Biosphere (MAB) Programme intended to promote solutions to reconcile biodiversity conservation with its sustainable use (UNESCO. 2010). Within the framework of MAB Programme, areas of terrestrial and coastal marine ecosystems, known as biosphere reserves, are nominated by national governments for inclusion in the World Network and remain under sovereign jurisdiction of the states where they occur. There are 610 biosphere reserves in 117 countries worldwide, of which six are in South Africa (namely Kogelberg, Cape West Coast Extension 2003, Waterberg, Kruger to Canyons, Cape Winelands and Vhembe) (UNESCO 2012). Mozambique and Swaziland, the other countries covered in the current study, had no recognised reserves as of 2012. The principles of biosphere reserves deal with multi-functional landscapes in ways that support ecoagriculture practices and in turn ecoagriculture promotes the MAB Programme through reconciling biodiversity conservation and utilisation at the landscape level.

Critique of ecoagriculture. The ecoagriculture concept has received criticism (Altieri 2004, Altieri 2012). The criticism is mainly attributed to a misconception of the vision of the ecoagriculture framework and the philosophy surrounding it (Ecoagriculture Partners 2004). The current thesis takes an inter-disciplinary perspective and recognises the significant overlaps existing between ecoagriculture, agroecology, organic agriculture, agroforestry and several other innovative approaches to sustainable farming across the world (Chapter six).

1.2.4 The landscape scale

A landscape is a spatially heterogeneous area which often comprises mosaics of patches with varying size, shape, composition, and history (Wu and Qi 2000). As a geographical construct, a landscape is defined by biophysical, social, political, psychological and other components

(Farina 2006), thus it includes not only the biophysical features of an area but also its socio-cultural and institutional attributes. In cognitive terms, a landscape is taken as a piece of land that people perceive comprehensively around them without looking closely at individual components (Haber 2004, Pfund 2010). In terms of structure, a landscape is a spatially heterogeneous area made of individual patches which differ on some criteria such as a series of farms or cultivated fields, grasslands, bush, natural forests, plantations, wetlands, valleys or a series of hills. There is no standard size for a landscape since landscapes can vary in spatial extent from as small as tens of square meters (if landscapes are defined according to organisms or ecological processes under consideration, e.g. landscape of an anthill), to as large as thousands of square kilometres. Sustainable landscapes that combine production and conservation can be achieved through identifying natural areas that can be conserved or protected within a matrix of other land uses, and making interventions to improve the biodiversity compatibility of production while reducing negative ecological impacts and enhancing livelihoods. In a landscape approach, a variety of tools can be used for sustaining production and conserving biodiversity. For instance, land-use planning, decision-making and law enforcement can be combined with formal protection of sensitive areas and proactive engagements that can raise awareness of the value of biodiversity, bring about voluntary changes in attitudes as well as the adoption of more biodiversity-compatible production methods (Cadman et al 2010).

1.2.5 Multifunctional landscapes

Multifunctionality is the simultaneous and interrelated provision of different functions from a land unit (Carvalho-Ribeiro et al. 2010). Landscape functions are diverse and complex, and while the aesthetic attributes of the landscape tend to be more apparent, many functions are not easily appreciated by the landscape users (Adimo 2005). The principle of multifunctionality has increasingly become central to land use planning (Selman 2009). Multifunctional landscapes can be designed to provide a range of environmental, social, and economic functions, while considering the interests of landowners and users (Lovell and Johnston 2009). Multifunctional landscapes are characterised by interaction as opposed to mere co-location of land uses such that there is simultaneous spatial integration of functions, leading to a wide range of social, environmental and economic benefits; and where functional interactivity is positive (and not

dysfunctional such as pollution), the result is a more self-sustaining landscape (Selman 2009). Multifunctional agricultural landscapes have several confirmed positive livelihood impacts. Asaah et al. (2011) conclude from the experiences of the "Agricultural and Tree Products Program" in Cameroon that it is possible to take the concepts of multifunctional agriculture forward and break the cycles of land degradation, social deprivation and poverty and so steer a path towards social, economic and environmental sustainability. The principles of landscape multifuctionality thus overlap with those of ecoagriculture.

Central to the design of multifunctional landscapes is the concept of ecosystem services since health and wellbeing depends on the range of services provided by ecosystems and their constituent parts such as water, soils, nutrients and organisms. These services include support (necessary for all other ecosystem services, e.g. soil formation and photosynthesis), provision (e.g. food, fibre, fuel), regulation (e.g. air quality, climate control, erosion control), and culture (non-material benefits, e.g. aesthetic qualities and recreational experiences) (Landscape Institute, 2009). The concept of ecosystem services implies that nature does not only have aesthetic value but ecosystems are actually useful to humanity. The idea of rewarding or payment for ecosystem services (PES) takes this further in suggesting that such services are not for free, but rewarding those who are managing the ecosystems would encourage responsible stewardship. The implementation of this concept is not simple, for instance, how to identify potential buyers and sellers of ecosystem services is a tricky question. The strength of the PES paradigm is that it links conservation and development objectives in that if somebody makes income from nature conservation, more conservation means more development. Bolliger and Kienast (2010) underscore the urgent need for assessing the capacity of landscapes to provide the range of services under changing environmental conditions. This assessment is a planning tool required for the maintenance of current landscape multifunctionality to ensure long-term sustainability.

1.3 Statement of the problem

The global human population is increasing rapidly and there is a need to produce 70 to 100 percent more food (Godfray et al. 2010) but this must not be achieved at the expense of biodiversity. The potential to increase food production by agricultural intensification is possible with the high-input commercial sector whereas the low-input smallholder sector of

predominantly poor farmers relies more on biodiversity and associated ecological processes like beneficial trophic interactions and stress-adapted crop genotypes (Chitakira and Torquebiau 2010, Jackson et al. 2007). Techniques are thus needed for achieving biodiversity conservation and agricultural production goals at the same time and in the same space (Scherr and McNeely 2007) in smallholder farming communities. The past decade has seen the TFCAs concept gaining popularity among Southern African nations and this concept offers opportunities for addressing the biodiversity-agriculture integration challenge in the region. However, there are gaps on the role of local communities as partners and biodiversity stewards in these enterprises. Research is needed to establish the practical roles of the local communities in order to enhance the achievement of TFCA goals. The general purpose of TFCAs and ecoagriculture objectives overlap such that the promotion of ecoagriculture innovations in Southern Africa could help to achieve the TFCAs goals and at the same time mitigate the environmental effects of climate change and variability. The present study has been undertaken in recognition of these observations and also to contribute towards closing the aforementioned research gap. This study assesses the feasibility of ecoagriculture implementation by communal farmers and other stakeholders in a TFCA context and investigates strategies to foster local community involvement in the management of TFCAs towards the achievement of the desired goals.

1.4 Study rationale

The Lubombo TFCA, spanning across South Africa, Mozambique and Swaziland, was selected as a study site. It is part of the Maputaland-Pondoland-Albany Centre which is a globally recognised biodiversity hotspot due to its endemic flora and fauna (Van Wyk and Smith 2001). It is crucial to conserve the biodiversity of this area in accordance with the United Nations' Convention on Biological Diversity (CBD) to which South Africa, Mozambique and Swaziland are signatories. At the same time, the area is inhabited by some of the poorest people in Southern Africa who meet their livelihood needs largely through utilising local natural resources. For conservation efforts to be sustainable in the communities there is need to balance the conservation of wild biodiversity on one hand and meeting livelihood needs on the other.

The potential of ecoagriculture as a framework to achieve production, conservation and livelihood objectives simultaneously and in the same space may not be fully realised if the level

of ecoagriculture knowledge and practice remains low. Scherr and McNeely (2007:483) note, "Little effort has been devoted to explicitly pursuing agricultural development and biodiversity conservation objectives jointly at a landscape scale, so experience is poorly documented and the science is immature and poorly synthesized across disciplines." Progress has been witnessed in terms of research work, and conference participation (Perfecto et al. 2009, Scherr et al. 2011, Scherr 2011) but more research needs to be done to generate information essential for the planning and management of integrated biodiversity-agriculture landscapes.

1.5 Significance of the study

Considerable research work has been done on various issues relating to TFCAs in Southern Africa including conservation implications on societies (Jones 2006), landscape analysis (Smith et al. 2008, Torquebiau et al. 2012), economic impacts of TFCAs (Suich et al. 2005), constraints to conservation and development success (Cumming 2011), animal health challenges (Bengis 2005), policy development (Shongwe 2005) and the Lubombo Transfrontier Project (Centre for Environmental Studies 2009). The Lubombo Transfrontier Project has been running since 2007 as a collaborative work by various partners including Ezemvelo KZN Wildlife, Wildlands Conservation Trust, CIRAD, University of Pretoria (South Africa), Eduardo Mondlane, University (Mocambique), University of Swaziland (Swaziland), Peace Parks Foundation and local communities. The present study forms part of the Lubombo Transfrontier Project and brings in a different perspective by investigating the feasibility of implementing systematic (or planned) ecoagriculture within the TFCAs context. This could be the first attempt, at least in this part of the world, to take on such a perspective. The findings contribute to literature on TFCAs and on the subject and practice of ecoagriculture.

This study adopts bottom-up participatory approaches, recognising that involving local communities in decision-making and planning resource utilisation promotes sustainable management, minimises conflict and maximises equitable benefit sharing (Evans et al. 2006). By employing participatory approaches the study stimulates, to an extent, awareness of biodiversity-friendly farming practices among local communal farmers. Such awareness-raising is an integral part of the participatory approach, where the research process (i.e. interactions between the

researcher and the participants) is as important as the research result itself. Through the use of participatory processes the study also makes a methodological contribution to landscape studies.

The study provides insights into ecoagriculture as a conservation approach that incorporates community livelihood needs into biodiversity conservation at a landscape level. It is participatory in bringing in local people's perspectives on resources use. It also brings out that conservation efforts need not be confined to formally protected areas but rather include the areas beyond these confines. It is hoped that the findings will form a basis for engaging local farmers and other stakeholders in planning the combination of agricultural production and biodiversity conservation targeted at achieving better living standards through improved food security, nutrition, health and income.

1.6 Research questions

This study attempts to answer two major interlinked questions:

i. What are the opportunities and constraints relating to the implementation of ecoagriculture in smallholder farming communities in the Lubombo TFCA?
ii. How can integrated production and conservation landscape management be achieved in this area?

1.7 Hypotheses

Two hypotheses are considered:

i. The socio-economic, bio-physical and policy environment in the Lubombo TFCA is conducive to a sustainable people-driven integrated production and conservation landscape management;
ii. For integrated production and conservation landscape management to become sustainable in TFCAs, innovative efforts are necessary in the form of more harmonised policies and governance mechanisms, capacity building, campaigns to raise awareness of associated benefits and skills training to adopt new technologies.

1.8 Aim and objectives

The study's main aim is to assess the feasibility of promoting and managing landscapes that are balanced in terms of agricultural production and biodiversity conservation for improved local livelihoods in TFCA communities. The specific objectives are to:

i. identify and analyse key stakeholders to integrated production and conservation landscapes management;
ii. evaluate the performance of a landscape within a TFCA setting, based on a range of ecoagriculture criteria;
iii. examine the conditions for or against the achievement of landscape level biodiversity-agriculture integration;
iv. evaluate the visioning (imagination of the desired future: goals, objectives, outcomes) of a community in the Lubombo TFCA;
v. assess the potential influence of existing policy and governance regimes on biodiversity-agriculture integration in the Lubombo TFCA and advance some policy and planning recommendations.

1.9 Research design

The study employs both qualitative and quantitative techniques to examine the human and natural environments and the influence they have on ecoagriculture in the area under focus. It is also participatory in that it involves stakeholders in landscape performance assessment and visioning activities. It is also a case study on ecoagriculture in the Lubombo TFCA with a special focus on the Mathenjwa peasant community in northern KwaZulu-Natal Province of South Africa. Case studies examine few subjects or single instances in greater depth and the subjects of study are not selected through a formal sampling process (Casley and Lury 1981, Moore and Lapan 2012). Considering that case studies have the capability to influence decision and policy (Gwimbi and Dirwai 2003), results of the current study are intended to positively influence the development of policies relating to integrated production and conservation landscapes management.

The study adopts methodological triangulation involving consulting multiple sources of data, use of different methodologies in combination and employing expert judgement (Moyo et

al. 2002; University of California, 2008). Questionnaire surveys, key informant interviews and discussion groups were used to gather related data from various stakeholders. Transect surveys, observations and review of secondary data were conducted to gather complementary information and to check the validity of study findings. Triangulation combines both quantitative and qualitative approaches and is one of the guiding principles of participatory approaches (Sanginga and Chitsike 2004). Since every research tool or method has limitations, a skilful combination of several alternative methods and information sources was necessary.

Issues handled in this study are complex and span across several disciplines and sub-disciplines such as ecology, agriculture, sociology, marketing, tourism, wildlife management, soil conservation, water resources management, and international trade and relations. A single study cannot expect to fully address the many questions and sub-questions arising henceforth. The importance of new engagements between different knowledge bases is gaining increasing recognition among scientific institutions (Pretty 2011). Interdisciplinary work provides many opportunities for synergies in research and extension although several studies reveal the difficulties and costs in conducting interdisciplinary research (Acevedo 2011, Lang et al. 2012, Francis et al. 2008, Cummings and Kiesler 2005). By adopting an interdisciplinary approach the present work hopes to draw the various disciplines closer or, at least, to draw attention to the value of their inter-linkages.

1.10 Organisation of the thesis

Four major interrelated concepts that have been subdivided into separate chapters and papers make up this thesis. Chapter One is this general introduction to the study. Chapter Two (published paper) outlines the stakeholder identification and consultation procedure undertaken, and reveals the unique combination of stakeholders in TFCAs, conducive to the promotion of ecoagriculture practices. In Chapter Three (submitted paper) the procedure and outcome of a participatory landscape performance assessment facilitated for various stakeholder groups is presented while Chapter Four (published paper) analyses a local community's vision of a desired future. It is known that because of little formal education or isolation, poor rural communities rarely get opportunities to contribute to decision-making and development of policies affecting local natural resources, as such, their concerns remain unaddressed (Evans et al. 2006). Chapter

Four explores the role of local communities as partners in the management of TFCAs towards achieving the intended goals. The policy and governance situation in the three countries of the Lubombo TFCA is reviewed in Chapter Five (submitted paper) and possible adjustments to foster the management of integrated production and conservation landscapes are discussed. The preceding chapters are wrapped up in a general discussion in Chapter Six, the final chapter of the thesis.

CHAPTER TWO: STAKEHOLDER ANALYSIS

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Unique Combinations of Stakeholders in a Transfrontier Conservation Area Promote Biodiversity-Agriculture Integration

The world seeks to balance biodiversity protection and food production. Transfrontier conservation areas (TFCAs) provide unique opportunities for strategies that combine agriculture with biodiversity conservation at a landscape level, known as ecoagriculture. We identified and consulted ecoagriculture stakeholders in a smallholder farming community within a TFCA. Data were obtained through key informant interviews and questionnaire surveys. Eighty-eight percent of key informants indicated that planned ecoagriculture was feasible in the area and 95% of interviewed farmers positively considered to plan the integration of biodiversity conservation and farming. Potential conflicts of interest were revealed among stakeholders but to a large extent, stakeholder roles and interests were complementary, creating an environment conducive to effective coordinated ecoagriculture planning.

KEYWORDS

Stakeholder analysis, ecoagriculture landscape, biodiversity conservation, livelihoods

INTRODUCTION AND CONCEPTUAL FRAMEWORK

The world is under increasing pressure to effectively protect biodiversity as a critical resource on one hand and to produce enough food for its ever-growing human population, on the other. Agriculture and biodiversity conservation have traditionally been considered antagonistic and in many countries of the world, including South Africa, industrial and smallholder farming remain separated from conservation schemes and protected areas (PAs). Conservation schemes have tended to prioritise the establishment of PAs and the preservation of specific fauna and flora species and habitats (Shames and Scherr, 2009). While such efforts are commendable, the level

of protection so far attained is too low to maintain critical habitat and ecosystem services. Over 50% of all wild species exist principally outside PAs, mostly in agricultural landscapes (Millennium Ecosystem Assessment, 2005). Thus PAs alone cannot sufficiently address the challenge of biodiversity conservation.

Like other production systems such as mining and manufacturing, agriculture needs to adjust to global climate change and current environmental concerns (Pretty, 2008). Meanwhile, communal farming areas particularly in Sub-Saharan Africa are synonymous with poverty and deprivation (Eriksen and Watson, 2009; Triegaardt, 2006; van Oosterhout, 2005). Investing in agricultural production approaches that are compatible with prevailing social and biophysical circumstances and that simultaneously generate significant incomes for the farmers could change the fate of these communities through reducing poverty.

Literature focuses on the negative impacts of agriculture on the environment and little is said about the potential of agricultural areas to conserve biodiversity. However, agricultural landscapes have the potential to increase the efficiency of neighbouring PAs, to improve the effectiveness of biological corridors (passages of natural vegetation) cutting across unprotected areas and, to provide patches of critical habitat in uncultivated or farmer-protected areas (Shames and Scherr, 2009). This status may be achieved through production-with-protection strategies. One such strategy is ecoagriculture. Ecoagriculture refers to integrated conservation and agriculture mosaic landscapes in which biodiversity conservation is an explicit objective of agriculture and rural development (Scherr and McNeely, 2007). Ecoagriculture is a multi-dimensional practice whose main goals are agricultural production, biodiversity conservation, livelihoods improvement and institutional coordination (Buck, et al., 2006). It is implemented at the landscape level extending beyond the individual farm or single project level. A ‘landscape’ is a cluster of local ecosystems characterized by a particular configuration of topography, vegetation, land use, and settlement (Scherr et al., 2011). The functionality of many ecosystem services emerges at the landscape level (Perfecto et al., 2009) and for ecoagriculture to make an impact the elements of the landscape should be considered as a whole. The goal to maintain biodiversity and ecosystem services, manage agricultural production sustainably and contribute to improved rural livelihoods cannot be achieved at a mere farm or plot level, but are linked at the landscape scale (Scherr et al., 2011). Different parts of a landscape may provide food, fuel,

water, pollination or pest control functions. Mosaics or patches of land cover and land uses that make up an ecoagriculture landscape include crop fields, pastures, forests, protected areas, corridors, wetlands and ecological infrastructures such as hedges or terraces (Ecoagriculture Partners and IUCN, 2007; Scherr and McNeely, 2008). Environmental and production functions are optimised by managing such different units in a complementary way (Sayer and Campbell, 2004; Lindenmayer et al., 2008) for the simultaneous well-being of people and the environment.

The present work is part of a broader study that seeks to promote ecoagriculture in a smallholder farming community located in a Transfrontier Conservation Area (TFCA). TFCAs are natural ecosystems that cross political boundaries between two or more countries and include one or more protected areas and multiple resource use areas (SADC, 1999). Their main purpose is conservation and sustainable use of biological and cultural resources, whilst promoting regional peace, co-operation and socio-economic development (Sandwith et al., 2001). This purpose coincides with ecoagriculture goals. Ecoagriculture innovations present opportunities for achieving the TFCA purpose and are therefore expected to be attractive to communities in or around TFCAs. The present study recognises smallholder or communal farmers as fundamental biodiversity stewards and top-priority beneficiaries of conservation initiatives. The study believes that the farmers along with other key stakeholders must be actively engaged in planning and managing resources in their locality. Participatory decision-making creates a sense of ownership and greater commitment to project goals resulting in more sustainable management (Evans et al., 2006; Nemarundwe et al., 2003; Ecoagriculture Partners, 2008a). Local laypersons have intimate knowledge of their surroundings and how they have changed over the years (Buck et al. 2006). Involving local communities therefore utilises the wealth of indigenous knowledge systems and practices. These observations motivated stakeholder engagement in the current study.

Stakeholder analysis (SA) is a pre-requisite of stakeholder engagement. SA is a process of systematically gathering and analysing qualitative information to determine whose interests should be taken into account when developing or implementing a policy or programme (Schmeer, 2000). In natural resources management, SA implies the procedures for identifying who has a stake in a particular resource, assessing their interests and roles and establishing their opinions regarding a proposed project. SA helps to identify present or future opportunities and

threats to projects (Blair and Fottler, 1990). In the present study, SA was expected to yield information that would guide the ensuing stages of the broader study as well as to reveal prospects of ecoagriculture planning and implementation in the study area. SA would also provide deeper insights into the area's socio-economic and institutional landscape as well as produce information useful to facilitators of ecoagriculture projects.

The objectives of this study were to identify key stakeholders with regards to the possible development of an ecoagriculture landscape in a smallholder farming community within a TFCA, to assess the roles and interests of the stakeholders and to establish their perceptions regarding the feasibility of systematic ecoagriculture in the area. An underlying assumption was that the existing socio-economic, biophysical and policy conditions were conducive to sustainable stakeholder-driven ecoagriculture landscape management.

STUDY AREA CHARACTERISTICS

The study was conducted in the Mathenjwa Tribal Authority (MTA), a communal farming area in northern KwaZulu-Natal Province of South Africa (26°48'S to 26°57'S and 32°00'E to 32°10'E). The area covers approximately 547 km^2 of which 19% is within the Ndumo Game Reserve managed by a provincial nature conservation body, Ezemvelo KwaZulu-Natal Wildlife. A further 6.4% is allocated to the Usuthu Gorge Community Conservation Area (CCA), a conservancy managed by the local community.

The MTA falls into the subtropical savanna biome (Mucina and Rutherford, 2006) with an annual rainfall between 500 mm in the eastern lowlands (around 100 m ASL) and 800 mm in the western plateau (about 600 m ASL). Most of the rainfall is received in summer from November to March but light rains are occasionally received during winter. The mean annual temperature is around 21^{o}C with summer maximum reaching 40^{o}C. Thus the area is generally dry and warm to hot throughout the year.

The MTA lies in Maputaland Centre which is an ecological region characterised by endemic flora and also a globally recognised biodiversity hotspot (Van Wyk and Smith, 2001). It is therefore important to conserve the biodiversity of this area which harbours many endemic plants and some of the most endangered vegetation types in South Africa, classified as

vulnerable (Mucina and Rutherford, 2006). The MTA became part of the Lubombo TFCA (Figure 1) after South Africa, Mozambique and Swaziland signed a trilateral protocol in 2000 (SADC, 2006).

The inhabitants of Maputaland are among southern Africa's poorest people who have traditionally depended significantly on harvesting natural resources (Sotho et al., 2001). The MTA is one of the many rural areas of South Africa that lack access to basic services and infrastructure essential for economic growth and development (Herselman, 2003; Jozini Local Municipality, 2009). Unemployment and poverty levels in the area are high. The poor community members put biodiversity under threat as they strive to make a living. In order to achieve the aims of the TFCA there is thus a need to foster conservation strategies in the area but without compromising local livelihoods.

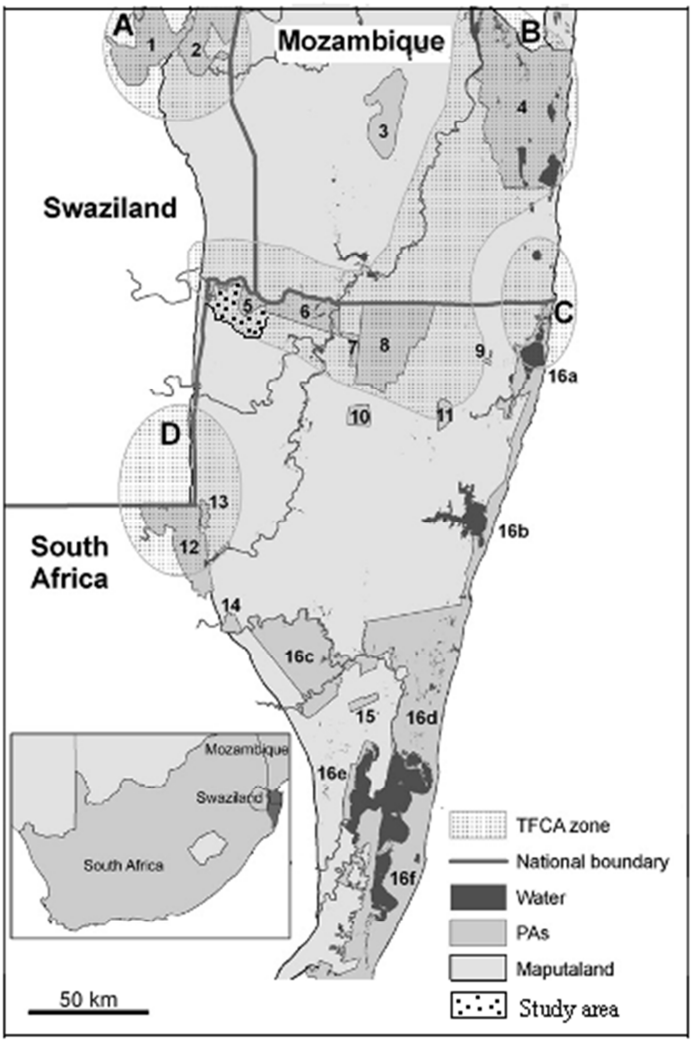

FIGURE 1 Study area (modified after Smith et al., 2008). Key: TFCA zones are labelled alphabetically and PAs are labelled numerically: A = Lubombo-Goba, B = Usuthu-Tembe-Futhi, C = Kosi Bay-Ponta do Ouro, D = Nsubane–Pongola; 5 = Usuthu Gorge Community Conservation Area, 6 = Ndumo Game Reserve (GR), 7 = Bhekabantu CCA, 8 = Tembe Elephant Park.

METHODS

Different approaches can be used for conducting SA and there is no blueprint to this regard (Grimble, 1998). The present study employed information from informants as a tool to identify stakeholders and establish their roles and interests. The SA process involved several stages from the identification of primary key informants up to stakeholder importance-influence

determination as illustrated in Figure 2. Outputs from each stage are shown in the adjacent boxes.

Five primary key informants (including three local community members and two professionals) knowledgeable about the MTA were consulted. A stakeholder analysis matrix was used to capture information provided. These informants were asked three basic questions: (i) who needs to be involved to get ecoagriculture implemented? (ii) who can prevent progress towards this goal? (iii) who will be affected as this goal becomes realised? They were then asked to indicate as individuals the "impact" of each stakeholder by awarding a score ranging from 1 (minor) to 3 (major). "Impact" was interpreted to mean the extent to which a stakeholder's presence or activities were being felt in the community. Total scores for each stakeholder were used to rank the stakeholders to determine key players. Secondary data sources including official reports, newsletters, mission statements and websites were consulted to obtain more information on the stakeholders' roles and interests.

Stakeholder consultation was achieved through 17 semi-structured key informant interviews with selected representatives of the identified key stakeholder institutions and, 170 questionnaire interviews with randomly selected farmers' household heads. To ensure that respondents had a common understanding of what ecoagriculture involves and thus improve the reliability of responses, the ecoagriculture concept was explained and illustrated prior to each interview. The responses were recorded on the questionnaire and later processed using the IBM Statistical Package for the Social Sciences (version 17.0, Johannesburg, South Africa).

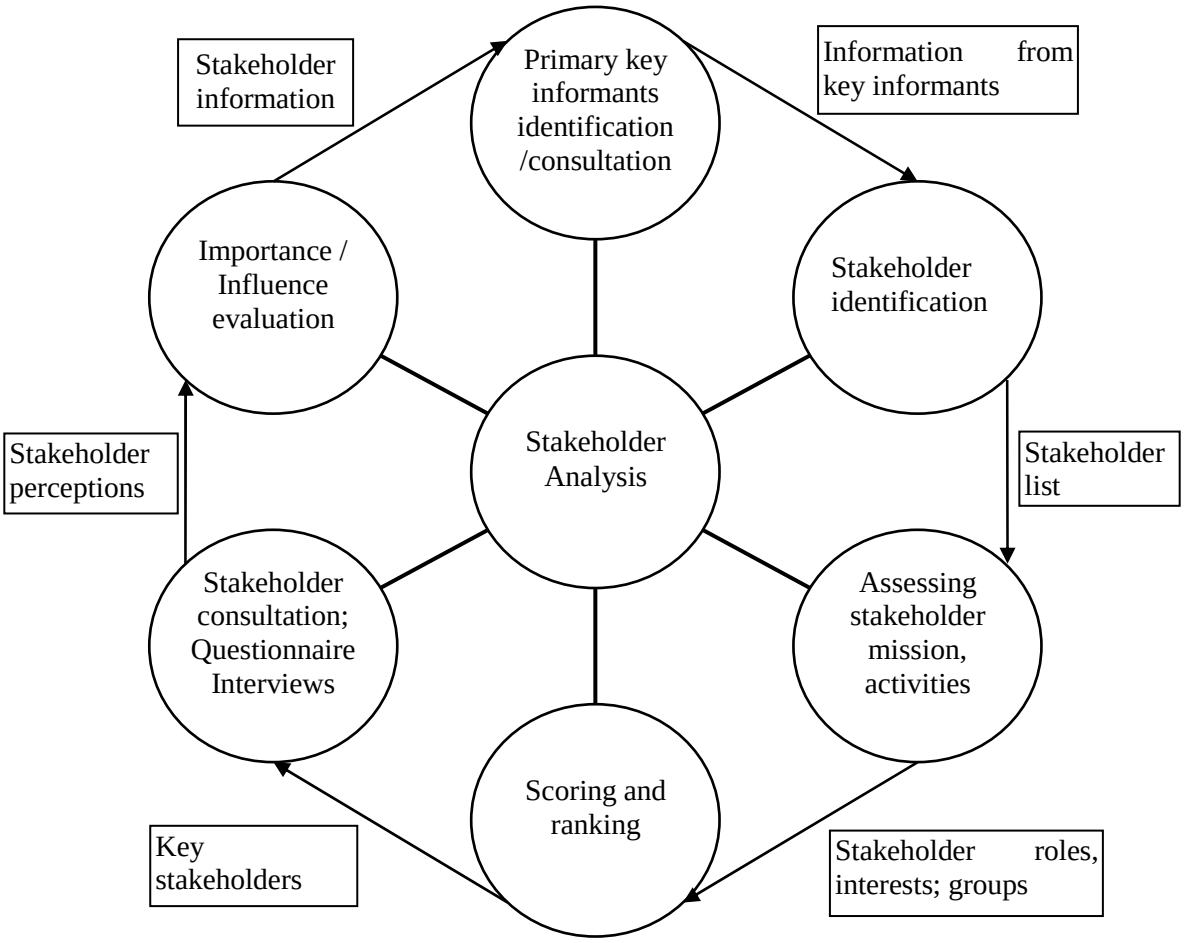

FIGURE 2 Procedures taken during stakeholder analysis process.

RESULTS AND DISCUSSION

Ecoagriculture Stakeholders and their Interests

Institutions with a stake in the socio-economic and biophysical aspects of the MTA were identified as ecoagriculture stakeholders. Table 1 presents a list of all the stakeholders identified, ranked based on total scores assumed. Further information about these stakeholders is provided in Appendix 2.1.

TABLE 1 Stakeholder Analysis Matrix for Mathenjwa Community *(source: survey results)*

	Stakeholder Name	Stakeholder Role / Interests	Biodiversity, nature conservation	Infrastructure Develop.	Education, Literacy, Awareness	Resource management	Social security, welfare, peace	Administration	Poverty relief, Econ. Develop.	Recreation, Tourism	Morals, culture, spiritual matters	Health, water, sanitation	Food security	Communication	Research, information dissemin.	Sell/Buy goods, services	Related Ecoagriculture Goals*	Total Score**	Ranking***
1	Mathenjwa T. Authority		x			x	x	x			x						p,c,l	14	1
2	Ezemvelo KZN Wildlife		x	x	x	x			x	x					x		c,l	14	1
3	Wildlands C. Trust			x					x				x		x		c,l	14	1
4	Communal Farmers		x			x										x	p,c,l	13	2
5	Environmental Affairs		x	x		x			x	x							c	13	2
6	Tourists		x							x						x	c	13	2
7	Jozini Municipal LED		x	x	x		x	x	x	x		x			x		c,l	12	3
8	Health Dpt.				x							x					n	12	3
9	Maputaland DIC			x	x		x		x				x		x		l	12	3
10	Peace Parks Foundation		x	x		x				x					x		c,l	12	3
11	SAPS Ndumo				x		x										n	11	4
12	Agriculture Dpt.			x	x				x				x		x	x	p,l	11	4
13	Elephant Coast									x					x	x	c,l	11	4
14	Transport Dpt.			x										x			n	11	4
15	Housing Dpt.			x			x										n	10	5
16	Telkom, Vodacom, MTN, Cell-C			x										x		x	n	10	5
17	Local Churches			x	x		x				x						n	10	5
18	Education Dpt.				x						x				x		n	10	5
19	Researchers/ Academics				x										x		n	10	5
20	Social Welfare Dpt.						x		x								l	9	6
21	Water Affairs Dpt.			x								x					l	9	6
22	Ingonyama Trust					x	x	x									c,l	9	6
23	WWF		x												x		c	9	6
24	Eskom			x												x	n	9	6
25	Local Entrepreneurs								x							x	p,l	8	7
26	Sport & Recreation Dpt.			x						x							l	8	7
27	Fire fighters		x				x										c	8	7

*p = production, c = biodiversity conservation, l = viable local livelihoods, n = neutral

**Scores to each stakeholder were added up to give a total score.

***1 is the highest rank and corresponds to the highest total score of 14.

Three institutions appear on the highest rank. The Mathenjwa Tribal Authority was the local governing body headed by the *Inkosi* (Chief) and responsible for controlling access to natural resources and the day-to-day running of the community. Ezemvelo KwaZulu-Natal Wildlife was the Provincial Government agency responsible for maintaining wilderness areas and public nature reserves in KwaZulu-Natal province. Its impact was mainly felt through funding development projects like building schools in the community area, besides raising awareness and enforcing provincial conservation policies. The Wildlands Conservation Trust was a non-governmental organisation instrumental in the establishment of the local Usuthu Gorge CCA and it supported the community by providing borehole water, vegetable seed and fencing material. These key stakeholders together with local communal farmers (next in rank) should be expected to have the most decisive influence on ecoagriculture planning and implementation.

In general, stakeholders that were more directly involved in biodiversity conservation and farming ranked higher than those less directly involved. However, there were exceptional cases where stakeholders were rated lower or higher than expected, considering their link with ecoagriculture. Tourists for instance, were rated high most probably because the informants perceived a high tourism potential for the study area. The Department of Agriculture ranked fairly low probably due to limited extension services offered to the community by this department. Interviews revealed a critical shortage of extension officers in the local municipality and the available officers could at most visit the community once a month. The support of the Department of Agriculture would be critical for any ecoagriculture initiative such that a shortage of extension workers is a matter of concern. The Ingonyama Trust which assumed the second-lowest rank was the legal owner of 2.8 million hectares of land in the province, including the MTA (Ingonyama Trust Board, 2004). The general perception in the community was that land belonged to the local *Inkosi,* thus the Trust's influence was not felt in the community. It needs to be noted, however, that stakeholders that were rated low should still be considered significant because of their potential influence on local livelihoods, biodiversity and agricultural production.

Conflict of Interest

Stakeholders can share common concerns about local natural resources but conflicts of interest may exist among them (Bellefontaine et al., 2002). The present study revealed potential conflicts

that would require the attention of ecoagriculture extension agents. Tension existed between conservation authorities (like Ezemvelo KZN Wildlife) and the local community. Locals gave livelihoods the first priority and were not amused with conservation agents whom they perceived as prioritising conservation at the expense of livelihoods. Local traditional healers, for instance, were unhappy about restrictions on the use of medicinal plants that were protected by legislation. Section 57 (1) of the National Environmental Management: Biodiversity Act No. 10 of 2004 states, "A person may not carry out a restricted activity involving a specimen of a listed threatened or protected species without a permit issued in terms of Chapter 7" (Government of South Africa 2004a). The process of obtaining the permit was bureaucratic, cumbersome and therefore disliked by the community.

Conflict of interest also existed between the Ingonyama Trust Board and land users, particularly entrepreneurs and land developers. Private land users wanted title deeds as a form of collateral security for getting loans from financial institutions but the Trust could not issue title deeds but issued renewable land leases of up to 40-years. Interviews with representatives of the Trust revealed that giving title deeds was tantamount to taking land away from the king. In the Zulu culture the king's authority was vested in the land and losing land meant losing authority and power.

The study revealed few and mild cases of conflicts of interest. Table 1 and Appendix 2.1 show that the roles and interests of the stakeholders were complementary to a large extent and mainly aimed to improve the wellbeing of the local people and biodiversity. A harmonious institutional environment is vital for the promotion of ecoagriculture in the area because ecoagriculture planning requires a high degree of institutional coordination involving negotiation, implementation, resource mobilisation and capacity-building in support of ecoagriculture objectives (Buck et al., 2006). The desired coordination may not be possible unless there is harmony among institutions.

Stakeholder Classification

In our analysis we relate each stakeholder's major interests to ecoagriculture goals which include production (p), biodiversity conservation (c) and viable local livelihoods (l) as shown in Table 1.

Stakeholders whose interests are not directly related to an ecoagriculture goal are labelled neutral (n). We find that the largest proportion (36%) of stakeholder interests relate to the livelihood goal implying that stakeholders' efforts were mainly targeted at improving living standards in the community. Almost a third (or 31%) of the interests relate to conservation. This is a considerable proportion and reflects the importance of biodiversity conservation in the TFCA community. Ten percent of the interests relate to production. This is relatively low considering that farming is the primary occupation in communal areas in Southern Africa. A low interest in farming can be interpreted as an indication of the area's low agricultural production potential (Jozini Local Municipality, 2009). Hence there is need for the farmers to diversify livelihoods by investing in non-agricultural enterprises.

The proportion of stakeholders' interests prioritising livelihoods, conservation and production was probably influenced by the composition of the stakeholder institutions that were consulted and analysed. However, these results represent a substantial cross-section of the nature of interests of ecoagriculture stakeholders to the entire TFCA community.

Stakeholder classification is necessary for ecoagriculture planning as it guides facilitators to identify institutions to invite for ideas, skills, equipment, infrastructure development and other contributions. The 'neutral' stakeholders still need to be considered since they can influence ecoagriculture even indirectly. For instance, a good healthcare system is important to support a healthy labour force required for the successful implementation of new initiatives.

Importance-Influence Determination

The determination of stakeholders' importance and influence is a subjective process based on perceptions of the individuals doing the analysis. However, the process is a useful step in ecoagriculture planning which is dependent on the participation of multiple players. Knowing the potential that stakeholders have to influence a development project helps to identify the relative risks posed by these stakeholders and potential coalitions (ICRA, c.2001).

A two-by-two matrix (Figure 3) modelled after the Department of Sustainability and Environment (2008), the International Centre for development oriented Research in Agriculture (ICRA) (c.2001) and Schmeer (2000) is used to determine the importance and influence of each

stakeholder institution identified in this study. 'Importance' is the priority given by projects to satisfy a stakeholder's needs and interests while 'influence' implies the power of a stakeholder to make decisions about a project, to facilitate the implementation process or, to exert influence that affects the project either positively or negatively (ICRA, c.2001). We regard the stakeholders whose interests align with ecoagriculture goals to be of high importance, i.e., those upon which ecoagriculture projects place great priority in satisfying whose needs, interests and expectations. To determine influence we consider the stakeholder's possession of specialist knowledge required in ecoagriculture implementation, potential administrative control, political authority, control of strategic resources and the ability to mobilise these resources for ecoagriculture projects. For instance, possession of required specialist knowledge implies high influence.

In Figure 3, the highest percentage (37%) of the stakeholders are on position D, 30% on C, 22% on A and the least (11%) on B. Stakeholders in position A have a high degree of influence on ecoagriculture and are of a high importance for its success. In the present study, local farmers are of high importance and *high* influence (position A) reflecting the characteristics of a process dependent on participatory decision-making. This is contrary to the mainstream thinking which considers communal or peasant farmers to be of high importance but low influence, i.e. position B (Department of Sustainability and Environment, 2008). Communal farmers are often not consulted in decision making and development of policies that affect natural resources in their locality (Evans et al., 2006). Unlike donor-driven projects, ecoagriculture must be understood as a community-driven programme (CDP) centred upon and run by local farmers. In CDPs communities have much greater freedom and flexibility to make their own decisions in managing and allocating resources than in usual community based natural resource management programmes (CBNRMPs) (World Bank, 2002). The farmers are the intended beneficiaries (high importance) and their interests must be protected. Ecoagriculture planning facilitators should create good working relationships with the stakeholders in position A to ensure their effective engagement and contribution.

Stakeholders in position B are of a high importance to the success of ecoagriculture but they do not have much voice in its development. For instance, the interests of the Department of Transport may not be directly related to ecoagriculture goals but a viable transport service is

crucial to the success of ecoagriculture through facilitating access to inputs and markets for produce or making the community accessible to tourists.

Interests of stakeholders in position C may not necessarily align with ecoagriculture goals but can significantly affect ecoagriculture implementation and thus need to be strategically engaged. For example, ecoagriculture planning in the community might not proceed without the approval of Mathenjwa Tribal Authority, the local traditional leadership. Stakeholders in position D are somewhat distanced from ecoagriculture and may require limited attention. However, their strategic involvement is necessary because institutional coordination is essential for ecoagriculture success. With respect to the Department of Education, for example, facilities at the local schools might be utilised for ecoagriculture skills-training workshops.

Stakeholder importance-influence determination thus helps ecoagriculture facilitators to identify appropriate stakeholders to engage at each stage of the planning process. The facilitators should build good working relationships with stakeholders of high influence and high importance to ensure an effective coalition of support (ICRA, c.2001). Our influence-importance analysis has revealed traits that differ in certain respects from those applying to rural development initiatives without participatory decision making (Grimble, 1998). Different approaches are thus required when dealing with ecoagriculture.

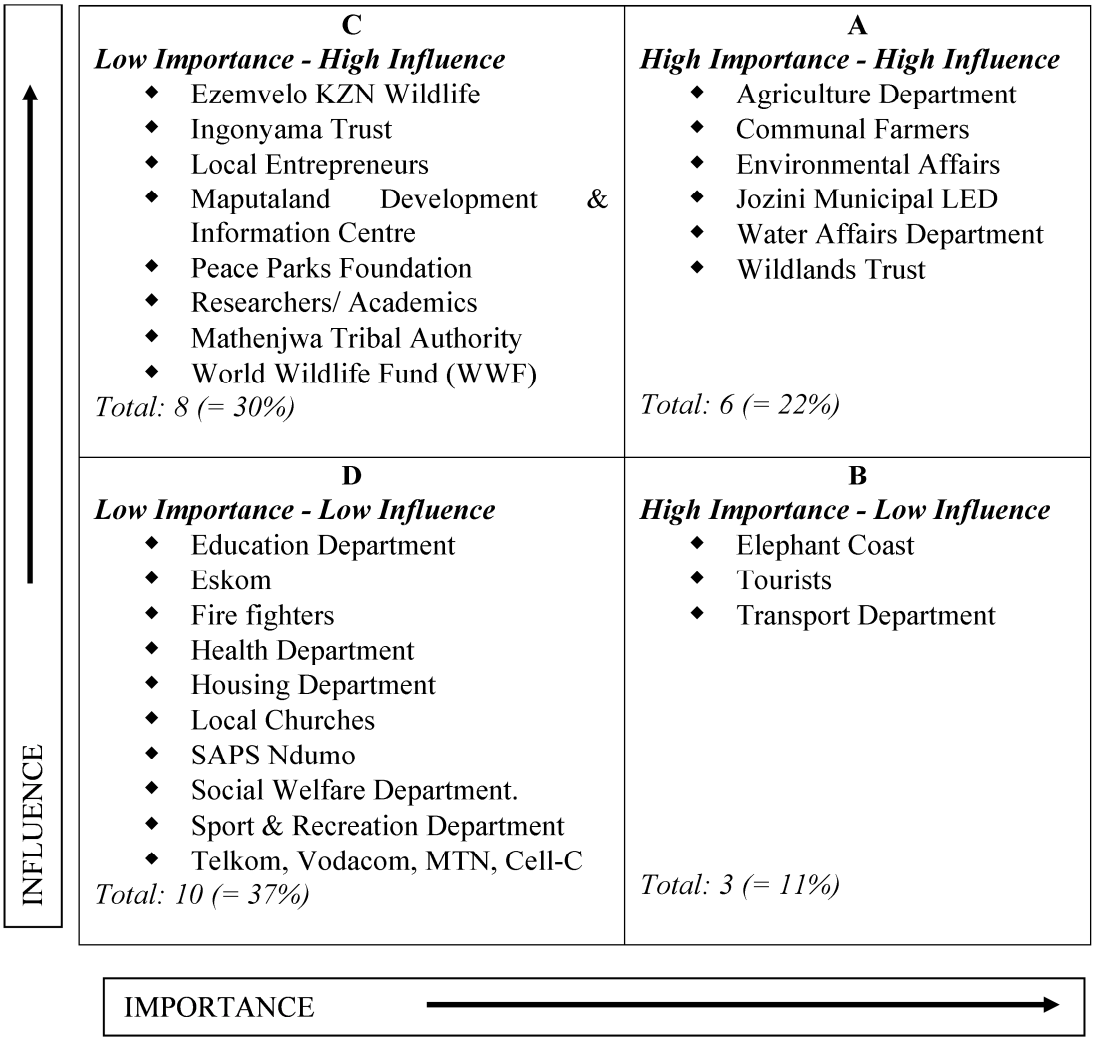

FIGURE 3 Stakeholder positions in importance-influence matrix *(source: survey results).*

Stakeholders' Perceptions

The study sought to evaluate stakeholders' perceptions on the feasibility of planned ecoagriculture in the MTA. Key informants were asked the question, "Considering the existing socio-economic and environmental conditions like policy, land tenure, climate, wildlife, soils, terrain, vegetation and household income levels, how feasible is systematic (or planned) ecoagriculture in the area?" Table 2 summarises the responses obtained.

Responses which indicated that systematic ecoagriculture was feasible are marked positive (+) while those indicating that it was not feasible are labelled negative (-). Some stakeholders were

not sure whether it was feasible or not and these responses are marked neutral (n). Others expressed that the proposed initiative was possible provided certain conditions were met and such responses are marked as positive on condition "+c". Responses marked "+" and "+c" make up 88% of total responses. Thus a greater proportion of interviewed stakeholders perceived that it was possible and appropriate to initiate systematic ecoagriculture in the area. A questionnaire survey revealed that 51% of the farmers perceived that planned ecoagriculture had a good chance of success in the area; 14% perceived the chance as low, while 35% were neutral. Overall, key stakeholders, including local farmers (the intended beneficiaries as well as biodiversity stewards) perceived ecoagriculture being largely feasible and appropriate to the area. Predominant positive perceptions among stakeholders brighten the prospects of promoting the proposed initiative in the community.

TABLE 2 Perceptions of Key Informants *(source: survey results)*

Date	Description of key informant	Response (quote/paraphrased)	Evaluation
6/11/2008	Agricultural officer	"You researchers should tell us, but I think it is possible."	+
27/02/2009	*Ndunankulu* (chief headman)	As we conserve nature, we appeal for assistance in our livelihood problems.	+c
20/02/2009	Conservation Manager	It is very feasible. Many areas still have natural bush. Need to sensitise people on ecoagriculture.	++
21/02/2009	*Induna* (headman)	Planned ecoagriculture is possible in Mathenjwa. Should teach people to conserve biodiversity.	+
3/03/2009	Induna	I like the idea. It's possible. I hope people like it.	++
7/03/2009	Conservation Manager	A very feasible idea. The people and their leaders are conservation minded. Majority will accept it.	++
08/03/2009	Conservation Officer	It's possible provided municipalities help by improving transportation and marketing facilities.	+c
9/03/2009	Environmental Officer	Should ask community what their priorities are before bringing investment. The people are poor; we encourage them to do organic farming.	n
10/03/2009	Local Economic Development Officer	Good idea; only if people get support from organisations willing to support ecoagriculture. Poor roads in the area may discourage tourism.	+c
10/03/2009	Agricultural Officer	Supportive infrastructure need to be developed – roads, water, markets, more extension services.	+c
11/03/2009	Tourism Manager	Several potential tourist attractions in the area could be developed. Project will encourage nature conservation.	+
13/03/2009	Induna	Possible, if we can draw irrigation water from local Usuthu and Pongola rivers.	+c
13/03/2009	Conservation Manager	Mathenjwa people are very cooperative on nature conservation. Area is mountainous and farming difficult. Your project could be appropriate.	+
09/06/2009	Induna	Our people tolerate trees near their crop fields and are conscious to conserve wild animals.	++
15/02/2010	Deputy Director: Agriculture Environ. Affairs & Rural	The people must first realise the benefits of ecoagriculture. We are yet to test if projects like ecoagriculture can work in South Africa.	n
17/02/2010	Legal Practitioner	The existing conditions show great potential exists to develop the area's agriculture and tourism.	++
17/02/2010	Manager: Tourism Development	Infrastructure and support for community tourism development exist. But there are challenges.	+c

Key: + = positive; ++ = strongly positive; n = neutral; -- = negative; +c = positive on condition

The success of a project depends on the consent and participation of its stakeholder community (Bourne, 2008). Based on this premise, the present study investigated the willingness of local farmers to participate in ecoagriculture planning. The question asked was, “Would you be willing to take part in community meetings for planning ecoagriculture?” Possible responses were “yes”, “no” and “not sure / neutral.” An overwhelming 94.7% of the responses were “yes”, 1.2% were “no” and 4.1% “neutral.” This result shows that most farmers were willing to participate in the proposed initiative. This outcome demonstrates communal farmers' eagerness to invest in innovations that aim to improve crop yields, livelihoods, income levels and living standards. The overwhelming positive response may however be reflective of the farmers’ interest in outside help rather than commitment to participation in ecoagriculture *per se*. The farmers were probably eager to participate in projects and programmes perceived as offering some kind of financial benefit or subsidised inputs.

Unique Opportunities Towards Ecoagriculture Within a TFCA

Several conditions largely related to the MTA's geographical location made planned ecoagriculture highly feasible.

i. The location of MTA in a biodiversity hotspot (Van Wyk and Smith, 2001) means that ecoagriculture initiatives are highly likely to attract local and international players prepared to support innovations that promote biodiversity conservation.
ii. "TFCAs are well supported at high political levels, helping to generate much funding for development and conservation projects" (Smith et al., 2008:3). The Governments of South Africa, Mozambique and Swaziland were committed to invest substantially in the Lubombo TFCA. Interviews revealed that considerable technical and material support for community initiatives aimed at improving rural livelihoods as well as promoting biodiversity conservation in the TFCA was available from the local municipality and provincial government. This explains the high priority given to livelihoods and conservation and the lack of interest in agriculture among the stakeholders. The MTA had access to support and resources at local and higher levels that would not be available to a rural community outside of a TFCA.

iii. Mathenjwa community had a positive attitude towards conservation. This attitude was probably induced by awareness campaigns (by governmental and private organisations like the Department of Environmental Affairs and the Wildlands Conservation Trust respectively) when the area became a TFCA. The community set aside land for the Usuthu Gorge CCA towards in-situ conservation of natural vegetation and wildlife which demonstrates its support for biodiversity conservation programmes with livelihood-improving agendas.

iv. The area's biodiversity had not suffered major disturbance from human activity and its natural vegetation was almost pristine (Smith et al., 2008). The natural scenery (rolling landscape, mountains, gorges, and valleys), wildlife and a unique culture (a mix of Zulu, Swati and Tsonga cultures) could attract international and local visitors. Thus, forms of tourism showcasing rural lifestyle, art, culture and heritage at rural locations collectively known as rural tourism (Mader 2009) could be developed.

v. Agriculture alone could not provide adequate livelihoods given the area's dryness and low production potential. Ecoagriculture presents opportunities for alternative income sources and diversified livelihoods. Examples are rural tourism, product or landscape certification and payments for environmental services whereby local farmers are paid in exchange for managing their land to provide ecological services like watershed protection and carbon sinks (Engel et al. 2008).

The combination of a TFCA infrastructure and a relatively arid environment strongly support the implementation of ecoagriculture at a community level. This leaves several ways in which the community can choose to expand ecoagriculture. Despite the above positive conditions, the initiative to develop planned and systematically managed ecoagriculture systems in the MTA faces challenges. A critical shortage of water for household and agricultural uses, poor transport and marketing facilities, lack of relevant knowledge or skills and lack of access to credit facilities, all work against the initiative.

The farmers had no title deeds over the land they occupied, a factor that discourages on-farm investment into non-farm income generating activities (Fraser, 2003). Interviews with local farmers revealed that the farmers wanted title deeds as a form of collateral security when

borrowing capital. However, the farmers generally felt that their access to land was guaranteed and lack of title deeds was not a major barrier against ecoagriculture implementation. A similar finding was made among communal farmers in Zimbabwe and it was concluded that peasant farmers had confidence in the communal land tenure system (Chitakira and Torquebiau, 2010). This situation brightens the prospects of implementing ecoagriculture although there may always be uncertainties relating to the success of any new innovation.

Although ecoagriculture was seen as an appropriate development for the MTA based on stakeholder perceptions, local farmers had their priority needs. Access to clean water, jobs, food, farming equipment, inputs and better health services had higher priority than ecoagriculture *per se*. The farmers' perceptions of systematic ecoagriculture as a possible conduit for satisfying these needs probably contributed to the overwhelming willingness to implement the initiative. One would therefore recommend starting with ecoagriculture strategies likely to have a noticeable effect on local priority needs. For instance, certain agroforestry technologies contribute to soil fertility improvement enabling higher crop yields, important for improved food security. Agroforestry technologies offer many advantages particularly on the plateau where the problems of dwindling soil fertility, woody cover and pastures are more critical. The undulating landscapes and mountainous terrain of the MTA present opportunities for commercial hiking, biking, horse riding, scenic viewing and camping. Bird watching and game viewing in the local Usuthu Gorge CCA present further opportunities for rural tourism. If such activities could be managed by individuals from the community, tourism management would become part of the farmers' calendar. It is recognised that CBNRMPs often experience the problem of elite capture (McGahey et al., 2007) and wealthy groups of villagers that already have assets to support tourism and conservation are more likely to benefit. However, it depends on how the CBNRMPs are organised, particularly how the controlling power is shared. The earlier phases of CAMPFIRE and ADMADE in Zimbabwe and Zambia respectively have shown that under good governance CBNRMPs have the capacity to benefit local communities economically and socially (Rodary, 2009). On the other hand, elite villagers can play key roles in facilitating the success of community-based initiatives. Ecoagriculture innovations involving rural tourism, processing and marketing resources occurring in abundance in the MTA such as *amarula* fruit (*Sclerocarya birrea*), *Aloe marlothii* and some medicinal plants, could generate employment and bring off-farm income to the farmers thereby alleviating poverty. Such developments would require that

the community becomes actively involved in decision-making about the particular strategies of ecoagriculture they would like to pursue.

CONCLUSION

The research establishment in agriculture has focused on a single question about how to maximise production (Perfecto et al., 2009). Attention should shift towards strategies for balancing biodiversity conservation and food production at the landscape level. The present study contributes to this regard through analysing ecoagriculture stakeholders in a TFCA context. Successful implementation of ecoagriculture requires effective stakeholder collaboration and this makes stakeholder analysis on a specific-area basis essential. This study has shown that ecoagriculture stakeholders for a TFCA smallholder community are multiple and diverse. With varying degrees of influence and importance, virtually all individuals or institutions with an interest in a community's biophysical and socio-cultural aspects have a stake in ecoagriculture. Ecoagriculture extension workers and other players who would facilitate ecoagriculture planning and implementation need to be well-informed about key stakeholders in order to make a careful selection of the parties to engage.

The initiative to systematically manage ecoagriculture in smallholder communities was welcomed by stakeholders and appreciated as a sustainable way to address existing environmental challenges. Since ecoagriculture is a broad package that can address both immediate and long term needs, the selection of appropriate strategies is necessary. Ecoagriculture strategies that address urgent local priority needs should be promoted until it becomes viable to invest in strategies that yield economic and environmental returns in the longer term. Potential challenges to the proposed initiative are a cause for concern. However, with enough stakeholder commitment to dealing with the challenges, systematically managed production-with-protection strategies could become a reality in the study area and hopefully in other communities elsewhere under comparable conditions.

Further research could focus on visioning or formulation of future scenarios regarding ecoagriculture innovations, and on possibilities of adding value through initial processing and certification of local resources as livelihood transforming measures.

ACKNOWLEDGEMENTS

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APPENDIX 2.1

Additional information on Mathenjwa community ecoagriculture stakeholders

(Presentation order as in Table 1 of the text)

Mathenjwa Tribal Authority: The local traditional governing body comprising of *izunduna* (headmen) headed by an *Inkosi* (Chief); controls access to resources; responsible for decision-making and the day-to-day running of the community (Oral communication).

Ezemvelo KZN Wildlife: A Provincial Government body with a mandate to maintain wilderness areas and public nature reserves in KwaZulu-Natal (KZN) province (www.kznwildlife.com).

Wildlands Conservation Trust: A non-profit organisation working to conserve bio-diversity in the region. The Trust works closely with Ezemvelo KZN Wildlife and other leading conservation NGO's and partners to achieve this vision (www.wildlands.co.za).

Communal Farmers: People residing in Mathenjwa area and who are involved in farming mainly for subsistence purposes (Oral communication).

Environmental Affairs: A sector under the Department of Agriculture and Environmental Affairs whose main aims are to create a globally competitive agricultural sector and a sustainable environment in KZN Province (Oral Communication).

Tourists: People from within South Africa or other countries who visit Mathenjwa area for leisure.

Jozini Municipality Local Economic Development: Jozini is the local municipality under which Mathenjwa area falls. An extended arm of the KZN Department of Economic Development and Tourism, it plays a key role in social and economic development, including tourism. Municipality provides basic services to community and is expected to create an investor-friendly climate to enable business to expand and to attract new investors (Oral communication).

Health Dpt.: KwaZulu-Natal Department of Health provides health services, including primary health care, emergency services, hospital service delivery systems, immunisation programmes, and health education (Oral communication).

Maputaland DIC: Maputaland Development and Information Centre is a non-Government Organization formally known as Sizumphakathi or Manguzi Community Programme. It operates in Umhlabuyalingana and Jozini Municipalities. It focuses on primary health care issues, small business development, general social welfare, and local economic development (www.mdic.org.za).

Peace Parks Foundation: An organisation that facilitates the establishment of transfrontier conservation areas (peace parks) and develops human resources, thereby supporting sustainable economic development, the conservation of biodiversity and regional peace and stability (www.peaceparks.org).

SAPS Ndumo: Local station of the South African Police Service serving Mathenjwa area (Oral communication).

Agriculture Dpt.: A sector under the Department of Agriculture and Environmental Affairs whose main aims are to create a globally competitive agricultural sector and a sustainable environment in KZN Province (www.kzndae.gov.za).

Elephant Coast: A tourism office, marketing tourist attractions and tourism services in the Elephant Coast area of KZN. The latter stretches from the world heritage site of Lake St Lucia in the south to Kosi Bay, virtually on the Mozambique border, and extends inland across to the Lubombo Mountains in the west (www.elephantcoast.co.za).

Transport Dpt.: KwaZulu-Natal Department of Transport exists to provide the public with as safe, integrated, regulated, affordable and accessible transportation system. Constructs and maintains roads in the area (www.kzntransport.gov.za).

Housing Dpt.: KwaZulu-Natal Department of Human Settlements, primary goal is to promote the achievement of a non-racial, integrated society, through the development of sustainable human settlements and quality housing; to accelerate development of houses in rural areas and to ensure job creation by housing programmes (www.kznhousing.gov.za).

Telkom, Vodacom, MTN, Cell-C: Telkom SA Ltd is a fixed-line telecommunications operator; Vodacom, MTN and Cell-C are competing cellular providers (Oral Communication).

Local Churches: Religious organisations in the Mathenjwa community.

Education Dpt.: KwaZulu-Natal Department of Education exists to provide opportunities for all people to access quality education, which will improve their position in life and contribute to the advancement of a democratic culture in KwaZulu-Natal (www.kzneducation.gov.za).

Researchers/ Academics: Persons from private or public organisations carrying out studies on any aspects of the community; such as students and teachers from universities and colleges.

Social Welfare Dpt.: Department of Welfare and Population Development is striving for a better life for all people in KwaZulu-Natal. Aims to eradicate poverty in the province; gives grants like old age pension, disability, and child support grants (Oral communication).

Water Affairs Dpt.: KwaZulu-Natal Department of Water Affairs is responsible for water and sanitation services; provides free basic water to community through local municipality (Oral communication).

Ingonyama Trust: The landowner-in-law of 2.8 million hectares of land in KZN province. It was created with the aim to administer this land for the benefit, material welfare and social well-being of all members of the tribes and communities living on Ingonyama land (www.ingonyamatrust.org.za/web).

WWF: World Wildlife Fund deals with a range of environmental issues from preventing the loss of species, protecting important ecoregions and biodiversity hotspots in Africa and conserving water to the management of marine resources and promoting sustainability practices within businesses. WWF local conservation projects underway include vegetable gardens in KwaZulu-Natal, the rehabilitation of wetlands and the establishment of reserves for endangered animals (www.wwf.org.za).

Eskom: A South African electricity public utility, established in 1923 as the Electricity Supply Commission (ESCOM) by the government of South Africa in terms of the Electricity Act (1922). The company is divided into Generation, Transmission and Distribution divisions and together Eskom generates approximately 95% of electricity used in South Africa (www.eskom.co.za).

Local Entrepreneurs: People who run business enterprises in the area, e.g. shop owners, taxi operators (Oral communication).

Sport & Recreation Dpt.: KZN Department of Sports and Recreation, tasked with the responsibility of providing access to sport and recreation to all the people of KwaZulu-Natal. Roles in the community include developing sport infrastructure, supplying sports equipment and skills training (Oral communication).

Fire fighters: Working on Fire Programme. Conducts integrated fire management, a series of actions that include: fire awareness activities, fire prevention activities, prescribed burning, and resource sharing (www.workingonfire.org).

CHAPTER THREE: LANDSCAPE PERFORMANCE ASSESSMENT

Landscape performance evaluation in a transfrontier conservation area: the perspective of local and external stakeholders

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Landscape performance assessment concept, i.e., the evaluation of a landscape's capability to provide ecosystem goods and services, occupies an important position in sustainable development thinking. In development planning, stakeholder involvement is gaining popularity as opposed to top-down approaches. The current study aimed to assess landscape performance in a transfrontier conservation area from the perspective of local farmers and other key stakeholders. The landscape was evaluated on agricultural production, biodiversity conservation, livelihoods improvement and institutional coordination, the four dimensions which form the main goals of biodiversity-agriculture integration. Supplementary data were obtained from a questionnaire survey of households. The overall score for the landscape was 2.97 which imply a performance in the middle of the range. There were significant differences in the ratings for the landscape dimensions (p-value < 0.01) but there were no significant differences in ratings across the landscape (p-value = 0.37). The results help to show the effectiveness of existing land management practices in protecting biodiversity and supporting livelihoods and the possible measures to take towards achieving the goals of the transfrontier conservation area.

Key Words: Multifunctional landscapes, biodiversity-agriculture integration, ecoagriculture, peasant farmers, South Africa.

3.1 Introduction

Agriculture is identified among the drivers of recent declines in biodiversity associated with human population growth (Millennium Ecosystem Assessment 2005, Ninan 2007, Rainforest Conservation Fund 2012). There is an increasing demand for the reduction of the impact of farming operations on the environment and for sustainable techniques for managing natural resources (Mollison 1981, Bishop et al. 2008, Brussaard et al. 2010). Land uses that promote biodiversity-agriculture integration with benefits to farming communities are required (Kuncoro et al. 2004, Hole et al. 2005, Jackson et al. 2007, CBD 2011, FAO 2012). The need to conserve wild biodiversity on agricultural landscapes is widely acknowledged but more research is needed on scaling up the adoption of biodiversity-based farming practices (Wood and Lenné 2005).

The concept of multi-functional landscapes - The extent of the mutual relationship between agriculture and biodiversity in a landscape depends on the configuration and composition of the landscape (Wood and Lenné 2005). A landscape is a cluster of local natural ecosystems and agro-ecosystems characterised by a particular configuration of topography, vegetation, land use and settlement, and includes not only the biophysical features of an area but also its socio-cultural and institutional attributes (Scherr et al. 2011, Brussaard et al. 2010, Farina 2006). Landscape function, i.e., the capacity of a landscape to provide goods and services (e.g. agricultural production, biodiversity protection and cultural uses) for meeting human needs, can be maintained through sustainable management practices. Often, a single landscape provides diverse environmental, social and economic functions and services simultaneously. This is known as multi-functionality (Wiggering et al. 2003) and is a useful criterion in designing landscapes for enhanced performance and a tool for influencing policy and sustainable landscape management (Selman 2009, Lovell and Johnston 2009). A multi-functional landscape may perform different functions for different stakeholders and if the functions are incompatible there may be conflict of interest (Heilig 2003, Willemen 2010, Stockdale and Barker 2009). In this way multi-functional landscapes are likely to experience governance challenges which could affect their performance. Since the 1990s, the transfrontier conservation areas (TFCAs)

landscape management approach has gained popularity in Southern Africa (Putz et al. 2001, Shames and Scherr 2009, Duffy 2005). TFCAs are multiple-use landscapes designed to promote biodiversity conservation and the livelihoods of communities living within and around formal conservation areas in neighbouring countries and so constitute a model of multi-functional landscapes. It is of interest to investigate the performance of TFCA landscapes from a stakeholders' perspective.

Landscape performance assessment - Landscape performance assessment (LPA) is a process of evaluating the capability of a landscape to provide ecosystem goods and services to society and of monitoring the balance between various functions performed by the landscape. The LPA concept occupies an important position in sustainable development thinking. LPA can reveal how well or poorly the dimensions of a landscape are performing and thus can guide intervention measures (Ecoagriculture Partners 2007). See Whitford et al. (2001) for an example of LPA within an urban context. The assessment of landscape performance takes a broad perspective and includes the social, economic, institutional and biophysical dimensions (or indicators) of a landscape. This broad perspective and factors like the multiple scales of interaction and response, multiple stakeholders with conflicting goals and a high degree of context specificity make LPA a complex process (Bruce et al. 2003). Indicators are widely used in measuring and monitoring of performance in natural resource systems like forests, fisheries or agriculture (Campbell et al. 2001). Indicators are useful in assessing the current state of such systems, to compare different localities and to monitor changes over time, provided they are easy to understand and usable by local land users (Sayer et al. 2007).

Landscape performance evaluation can be achieved through participatory approaches, i.e., considering how local communities and other key stakeholders perceive the sufficiency of local resources and their effectiveness in promoting their livelihoods. Participatory approaches are widely used by conservation proponents due to the belief that participation results in greater adoption and use of proposed technologies. However, it is possible that a truly participatory process may raise fundamental questions about the legitimacy of the goals that conservation organisations set for a particular landscape (Sayer et al. 2007). Thus, participatory approaches may meet resistance from the targeted stakeholders.

For sustainability reasons it is reasonable for LPA in a TFCA to engage local communities who depend on local resources for livelihoods. The value of local community involvement in landscape planning is gaining recognition while the top-down approach to rural development is receiving increasing criticism (Moseley 2003, Aref 2011, Vallance 2011). The support of local communities is important to achieve development and conservation objectives in TFCA landscapes in Southern Africa (Duffy 2005). Such support can be secured through addressing the communities' livelihood development goals which go beyond income improvement and include the recognition of local identity, effective participation in decision making and secure rights to land and natural resources (Metcalfe 2003). Involving local communities in planning resource utilisation is expected to promote sustainable management, minimise conflict and maximise equitable benefit sharing (Evans et al. 2006). However, literature shows some challenges associated with local community engagement in landscape assessment. In their study, Sayer et al. (2007) experienced difficulty in selecting stakeholders to engage in discussions of phenomena that were manifest at the landscape scale because most local people and officials found it more natural to discuss issues of the units of the landscape for which they were responsible or upon which they were dependent.

The ecoagriculture approach - The simultaneous development of sustainable food production, biodiversity conservation, enhancement of ecosystem services and alleviation of poverty in rural communities can be achieved in multi-functional landscapes and has been coined "ecoagriculture" (McNeely and Scherr 2003, Scherr and McNeely 2007). The ecoagriculture framework recognises a diversity of agricultural systems as well as the whole mosaics of land use (e.g. forests or human settlements) and so has a capacity to reduce the governance challenges of multi-functionality (Buck et al. 2006). Ecoagriculture puts emphasis on active engagement of local farmers as key stewards of natural resources. It adheres to the principles of devolution and empowerment of local communities, such as 'public participation and mobilisation' or 'social capital and collaborative partnerships' (Gruber 2010) and so accords local farmers the opportunity to monitor landscape performance and take intervention measures.

This study aimed to assess landscape performance in a TFCA from the perspective of local farmers and other key stakeholders. The stakeholders evaluated the landscape on four

dimensions, i.e., agricultural production, biodiversity conservation, livelihoods improvement and institutional coordination or support. These dimensions are the main ecoagriculture goals within a TFCA and serve as indicators of a landscape's ecoagriculture potential. The specific objectives were to:

i. Evaluate ecoagriculture dimensions of the MTA landscape and generate performance ratings (or scores) based on stakeholders' (including local peasant farmers) perceptions of their ecological environment.
ii. Compare the perceptions of local peasant farmers with those of external stakeholders.
iii. Investigate the willingness of peasant farmers within a TFCA to engage in biodiversity-agriculture integration initiatives.

3.2 Materials and Methods

3.2.1 Study area

The study was conducted in a peasant farming community within the Usuthu-Tembe-Futi TFCA straddling the boundaries of South Africa, Mozambique and Swaziland. The community, known as the Mathenjwa Tribal Authority (MTA), lies in northern KwaZulu-Natal Province of South Africa within the Jozini Local Municipality and under the Umkhanyakude District Council. The MTA covers 547 km^2, of which 26 percent is protected including the Ndumo Game Reserve and the Usuthu Gorge Community Conservation Area (UGCCA). The MTA lies within the Maputaland Centre, a globally recognised biodiversity hotspot, which harbours many endemic plants and endangered vegetation types (Van Wyk and Smith 2001).The vegetation in the area is classified as subtropical savanna biome (Mucina and Rutherford 2006). The area is dry and warm to hot for most of the year with an annual rainfall between 500 mm in the eastern lowlands (around 50 m ASL) and 800 mm in the western uplands (about 600 m ASL). Most of the rainfall is in summer (November to March) and the mean annual temperature is 21^oC with a maximum of 40^oC in summer. Maputaland is among southern Africa's least developed regions. Its poor people have historically depended on harvesting natural resources, putting the local biodiversity under threat (Sotho et al. 2001).

The study area (Figure 3.1) was divided into three agro-ecological zones: lower zone (low-lying gently sloping plain, about 50m - 250m ASL), middle zone (rugged and mountainous

transitional area between lower and upper zones, about 250m - 450m ASL) and upper zone (dissected plateau, about 450m - 600m ASL). The zoning was intended to capture spacial differences in landscape performance.

Figure 3.1: Map of Mathenjwa Tribal Authority (Note: the vertical and horizontal scales are not the same).

3.2.2 Methods

Participatory landscape performance assessment - Three farmers' meetings were facilitated, one in each zone to evaluate the performance of the local landscape with respect to ecoagriculture. The farmers in each zone were selected at random based on their location and availability. The

number of attendees per meeting ranged between 14 and 35. Each of the meetings was organised into smaller working groups of 3 to 6 participants based on gender, age and home location. Invitations were also sent to key stakeholder organisations to participate in the LPA meetings and a fourth meeting was facilitated for multiple-stakeholders (or 'external' stakeholders) comprising professionals and administrators. In the multiple-stakeholders' meetings grouping was based on fields of expertise and there were three groups in total. Group A comprised a member from each of the following sectors: health, education, community development, local government and religious organisations. In group B were three practitioners in biodiversity conservation, an environmental manager and an agriculture extension officer. Group C comprised of two representatives of the local UGCCA committee, a local business entrepreneur and a practitioner in the tourism industry.

A landscape performance scorecard (LPS) adopted from Buck et al. (2006) but with own interpretation of the range of scores was used in the evaluation process (Appendix E). The LPS was translated into *isiZulu*, the local language for the study area, to ensure effective participation of local stakeholders. The LPS comprises 20 questions grouped into four sections (production, conservation, institutions and livelihoods) based on ecoagriculture goals. Participants evaluated each dimension of the landscape in groups and agreed on a common rating. They also discussed possible reasons for the observed performance. The performance rating was based on a five-point scale ranging from 1 to 5 which respectively corresponded to "very poor", "poor", "fair", "good" and "very good". Scores for each section were averaged across zones/groups to obtain the score for each dimension and scores for the four dimensions were averaged to get the rating for the entire landscape.

Questionnaire survey - A questionnaire was designed to investigate the willingness of local farmers to engage in strategies that integrate agricultural production and natural biodiversity protection, and to establish the levels of household income. A total of 170 local farmers' household heads or their representatives, were selected at random from the three zones. The sampling procedure involved randomly picking a homestead from one edge of the community and thereafter selecting every 6th homestead. If no respondent was found on the 6th homestead then the next one with a potential respondent would be selected. Respondents were asked to

indicate whether or not they were willing to implement ecoagriculture strategies. An example of a question asked was, “Would you be willing to protect existing remnants of natural ecosystems?” Respondents were also asked to indicate the level of their household monthly income. The questionnaire was administered through a face-to-face interview process with the researcher immediately recording the responses onto the questionnaire. The survey complied with the code of ethics for social research (University of Pretoria 1999).

Data processing - Scores from each stakeholder group were captured and analysed using Microsoft Excel 2010, R version 2.13.1 (R Development Core Team 2011) and IBM SPSS Statistics version 20 (IBM Corporation 2011) programmes, to generate descriptive statistics, graphical presentations and statistical tests. In all tests the level of significance was kept at 5%. The mixing of data types or methods of enquiry, known as triangulation, was adopted in consideration of its usefulness in validating research results as well as intensifying one’s understanding of the subject matter (Hussein 2009, Olsen 2004).

3.3 Results

3.3.1 Overall performance rating for MTA landscape

The overall rating for the entire landscape came up to 2.97 or approximately 3 points, the middle of the range and implies a fair performance. The raw scores for each dimension of the landscape and by each participating group are attached as Appendix 3.1.

3.3.2 Performance by ecoagriculture goal

For the conservation and institutions dimensions the ratings were in the top half of the scale with mean scores of 3.44 and 3.23 respectively. Most of the ratings for the livelihoods and production dimensions were below the middle of the range (Figure 3.2). The lowest score was 1.2 in the livelihoods dimension and the highest score was 4.6 in the conservation dimension.

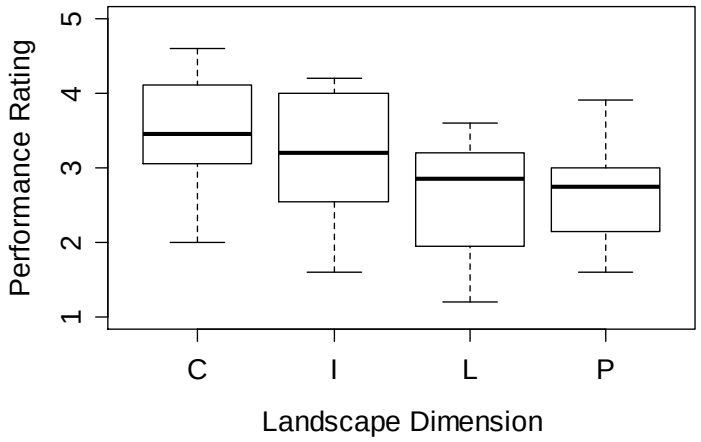

Figure 3.2**:** Performance scores for each dimension of the MTA landscape. Key: C = conservation, I = institutions, L = livelihoods, P = production.

A Kruskal-Wallis rank sum test for difference between the dimensions which indicates signifcant difference between at least two of the dimensions (p = 0.00). Multiple comparisons after Kruskal-Wallis reveals that the ratings for the conservation dimension were significantly different from the production and the livelihoods dimensions.

3.3.3 Comparing performance across zones

The lower zone showed the highest mean rating of 3.24, the upper zone had a rating of 3.16 while the middle zone had the lowest rating of 2.78. Fig. 3.3 presents ratings for each dimension in each zone. There were no significant differences either between the ratings for each dimension across the zones (Kruskal-Wallis rank sum test, chi-squared = 2.02, df = 2, p = 0.36) or for the average ratings for each zone (Kruskal-Wallis rank sum test, chi-squared = 2, df = 2, p = 0.37). That there was no significant difference in performance between the lower, middle and upper zones implies that the zones shared several attributes of the landscape creating some degree of homogeneity.

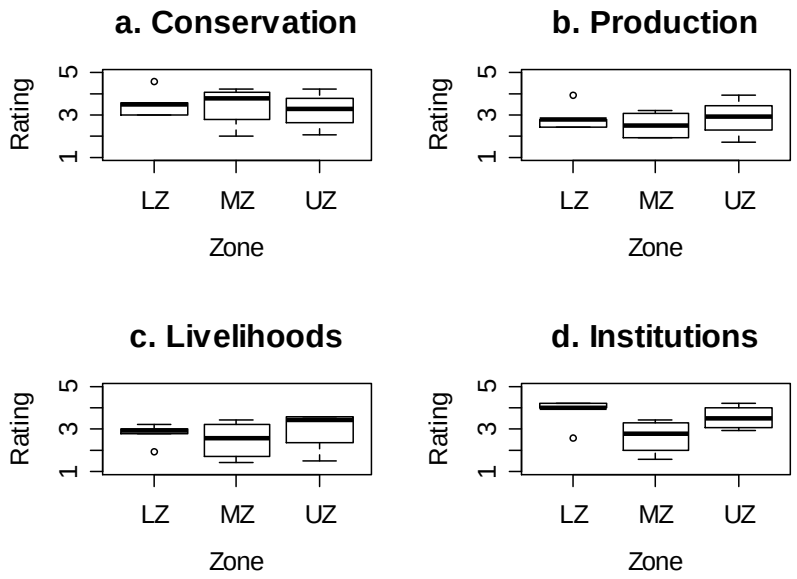

Figure 3.3: Comparison of ratings for each zone by landscape dimension. Key: LZ = lower zone, MZ = middle zone, UP = upper zone

3.3.4 Influence of age and gender on landscape evaluation

There were no significant differences in the ratings of each dimension of the landscape among the youths, men or women (Kruskal-Wallis rank sum test, chi-squared = 0, df = 2, p = 1.00). This implies that age and gender had no significant influence on the participants' perception of landscape performance. However, a general trend can be observed across and within the zones: for each of the social groups, the conservation and institutions dimensions assumed the highest scores while the production and livelihoods dimensions had relatively lower scores (Figure 3.4).

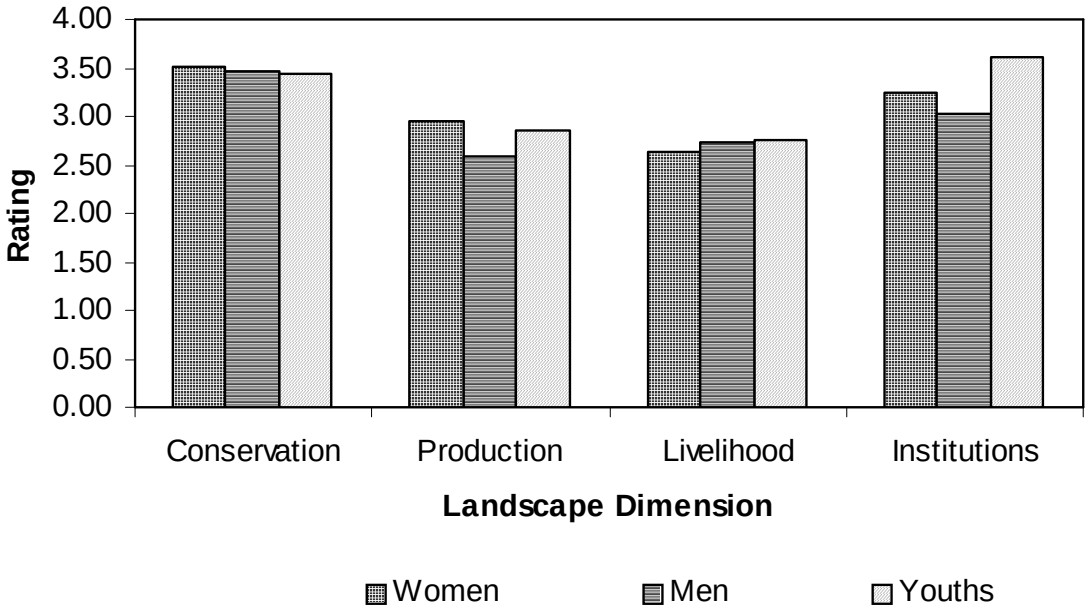

Figure 3.4: Ratings for individual landscape dimensions by age and gender

3.3.5 Assessment by external stakeholders

The overall (average) performance rating for the MTA landscape according to the evaluation by external stakeholders (or multiple stakeholders - professionals and administrators - groups A, B and C) was 2.58. The highest ranked dimension was conservation with an average score of 3.67 and the least ranked dimension was livelihoods with an average score of 1.80 (Figure 3.5).

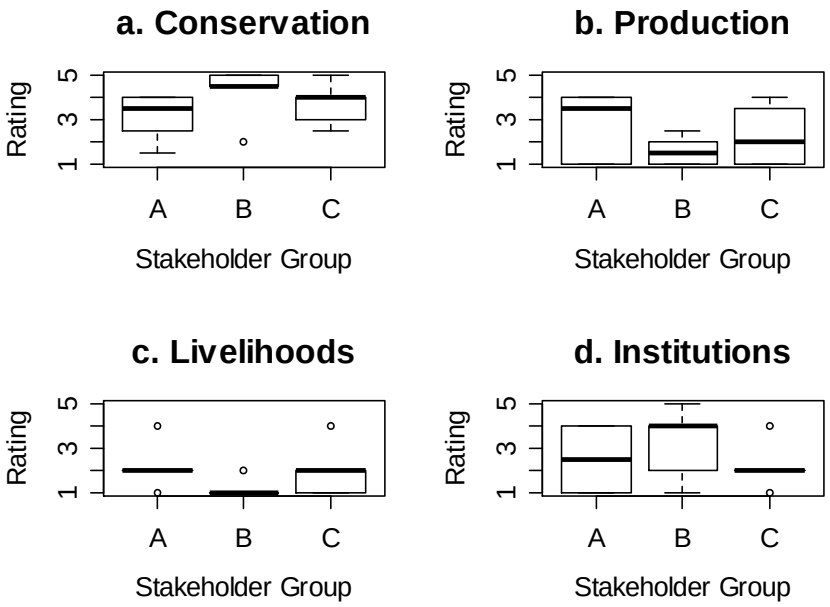

Figure 3.5: Ratings for each dimension by multiple-stakeholder groups. A = health, education, community development, local government, religious; B = biodiversity conservation, environmental management, agricultural extension; C = UGCCA committee, entrepreneurship, tourism.

There were no significant differences in the ratings among the multiple-stakeholder groups A, B and C (Kruskal-Wallis chi-squared = 0.0343, df = 2, p = 0.983). However, there were significant differences among the ratings for landscape dimensions (Kruskal-Wallis chi-squared = 16.1136, df = 3, $p < 0.01$). The significant differences were between the conservation and livelihoods dimensions and between the conservation and production dimensions.

3.3.6 Comparison of ratings by external stakeholders and the local community

Table 3.1: Summary of ratings by professionals and administrators and by local farmers

Stakeholder Group	Landscape Dimension				
	Conservation	Production	Livelihoods	Institutions	Overall
Local farmers	3.42	2.76	2.74	3.36	3.07
External stakeholders	3.67	2.20	1.80	2.63	2.58

The evaluation by the local farmers (i.e., meetings held in lower, middle and upper zones only) shows the overall performance score of the MTA landscape to be 3.07 but according to the external stakeholders it was 2.58. The ranking of means showed that the ratings by professionals and administrators had a relatively lower means compared to the ratings by farmers. But the overall test does not show significant difference across groups (p = 0.12). Thus there was no significant difference between the evaluation by professionals and administrators or between the farmers' groups in the three zones (Figure 3.6).

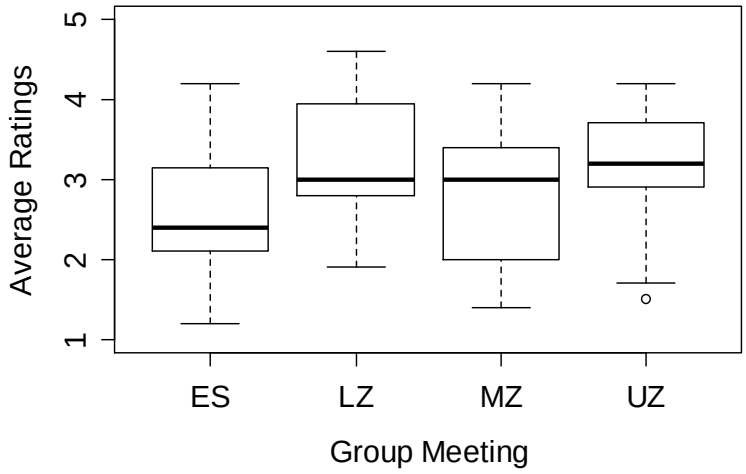

Figure 3.6: Comparison of overall ratings by farmers and external stakeholders. ES = external stakeholders; LZ = lower zone; MZ = middle zone; UP = upper zone.

3.3.7 Willingness to implement biodiversity-agriculture integration

The greater proportion of respondents (92.3%) was willing to plan and manage multi-functional landscapes in which environmental conservation is as highly prioritised as agricultural production (Table 3.4). The strategies preferred by the highest proportions of respondents were "learning how to manage ecoagriculture landscapes" (97.1%) and "teaming up with other community members for ecoagriculture planning" (94.7%). The commonly cited reason for the willingness to integrate farming and biodiversity conservation (in the local Zulu language) was, *"Kubalulekile kimi ukugcina imvelo; impilo yethu inake kwimvelo"* which means, "It is important for me to conserve the natural environment; our lives depend on the environment." This attitude could be the influence of the farmers' interactions with environmental or biodiversity protection agents operating in the locality. Due to its location in a TFCA and a biodiversity hotspot, the area attracts several local and international environmental conservation agents (Chapter Two).

Table 3.2: Survey results on local farmers' willingness to participate in ecoagriculture planning and implementation at the landscape level (n = 170)

Ecoagriculture strategy / initiative	**Yes**	**No**	**Neutral**
Protect existing remnants of natural ecosystems	155 *(91.2%)*	6 *(3.5%)*	9 *(5.3%)*
Restore remnants of natural vegetation in areas not suitable for agriculture	155 *(91.2%)*	6 *(3.5%)*	9 *(5.3%)*
Connect forest/ bush/ veldt fragments with greenways or plant corridors	147 *(86.5%)*	15 *(8.8%)*	8 *(4.7%)*
Promote ecologically friendly farming activities like contour strips, agroforestry, organic farming, planting hedgerows	160 *(94.1%)*	4 *(2.4%)*	6 *(3.5%)*
Avoid the use of fire to clear land or control weeds or pests	155 *(91.2%)*	11 *(6.5%)*	4 *(2.4%)*
Learn how to manage an ecoagriculture landscape	165 *(97.1 %)*	3 *(1.8 %)*	2 *(1.2%)*
Team up with other community members to plan ecoagriculture	161 *(94.7%)*	2 *(1.2%)*	7 *(4.1%)*
Average percentages	*92.3%*	*3.9%*	*3.8%*

3.3.8 Household income levels

The household income levels were generally low. Fifty-seven percent of the respondents indicated monthly earnings below ZAR1599 (equivalent to US$200), and 35% could not say how much they earned because the incomes were very inconsistent. The mean household size was seven members, thus on average an individual member lived on ZAR7.60 (or US$0.95) per day, which is below the international poverty line of $1.25 (Endal 2010). Government social grants, particularly old-age pensions and child-support grants were the main sources of income for 149 (or 87.6%) of the households surveyed. There was a very weak positive correlation between household income and size of household (r = 0.047) implying that an increase in the

number of people in a household was not necessarily matched with an increase in the income for the household.

Table 3.3: Cross-tabulation of household size against monthly income *(n=170)*

		Household Monthly Income in ZAR (Year 2010)						
		0 - 799	800 - 1599	1600 - 2399	2400 - 3199	3200 - 4000	Not sure	Total
Household Size	1 to 4	9	8	2	0	0	12	31
	5 to 8	23	24	2	1	2	24	76
	9 to 12	10	14	3	0	1	14	42
	over 12	4	4	2	1	0	9	20
	not sure	0	1	0	0	0	0	1
	Total	46	51	9	2	3	59	170

3.4 Discussion

3.4.1 MTA landscape performance

There was a high degree of agreement between the ratings by groups of farmers (most closely connected to the natural environment) and by external stakeholders (who often have a different perspective regarding the importance of natural resources) which indicates a high degree of objectivity in the landscape assessment process. The agreement confirms the validity of ratings by communal farmers who have very low levels of conventional education. However, there are important differences that need to be discussed. The ratings by the local farmers were generally higher compared to those by external stakeholders (Figure 3.6) implying that the locals had a more optimistic view of the landscape. The results from this LPA help to show the degree to which the MTA landscape conforms to the main goals of ecoagriculture.

The conservation dimension - The conservation goal is about maintenance of biodiversity and ecosystem services (Buck et al. 2006). Relatively high ratings (with a mean of 3.44) for the MTA landscape on this goal indicate the effectiveness of on-going natural resources conservation and awareness programmes in the community, e.g. by the Ezemvelo KwaZulu-Natal Wildlife, the Wildlands Conservation Trust and the provincial Department of Environmental Affairs. The ratings also reflect the stakeholders' consciousness of their ability to conserve biodiversity, as well as an acknowledgement of the impact of local protected areas, namely the UGCCA and Ndumo Game Reserve. Independent studies in the area confirm the relatively high scores for the biodiversity dimension. Analyses of satellite imagery by Fleury (2011) revealed that the MTA landscape was characterised by 'used' land (e.g. built-up, cultivated or roads) and inter-connected patches of natural forest, woodland and grassland. The greater part (75%) of the land area was under natural vegetation cover, which could support considerable wild and agro-biodiversity. Torquebiau et al. (2012) analysed a series of aerial photographs of the MTA spanning the years 1942 - 2010 and found an increase in tree cover. The cause of this increase remains a matter of speculation. The current study established (through group interviews/discussions) that due to the increasing dryness of the area crop production became less reliable and more fields were left fallow or abandoned. Bush possibly encroached into formerly cultivated land, increasing the area under woody cover. A decrease in the number of

cattle over the years may be another explanatory factor. A national event which possibly contributed towards an increase in vegetative cover was the enactment of the National Veld and Forest Fire Act of 1998 (Government of South Africa 1998a), leading to a significant reduction in the use of fire as an agent for clearing land for cultivation in the MTA.

The institutions dimension - The thrust of the institutions goal is to establish and maintain institutions for integrated, on-going planning, negotiation, implementation, resource mobilisation and capacity building in support of ecoagriculture. A well-coordinated institutional set-up is crucial to ecoagriculture planning since institutions and supporting organisations play key roles in promoting ecoagriculture knowledge and skills (Buck et al. 2006). The interests of stakeholder institutions may conflict thus hampering stakeholder collaboration (Bellefontaine et al. 2002). Stakeholder analysis in the MTA (Chapter Two and Chapter Five) revealed few cases of conflicts of interest mainly between traditional authorities and municipal/provincial government officials. Otherwise, the roles and interests of the stakeholders (e.g. tribal authority, provincial government, game reserves) were largely complementary, aimed at conserving biodiversity while improving local livelihoods. Such conditions are conducive to ecoagriculture implementation.

The production dimension - The production dimension is about providing for sustainable, productive and ecologically compatible agricultural production systems (Buck et al. 2006). Production systems in the MTA were predominantly traditional and supported mutual interdependence of agricultural, natural and semi-natural ecosystems with minimal negative impacts on biodiversity. Existence of rich natural pastures, particularly in the middle and lower zones, offered opportunities for organic livestock production with a potential to fetch competitive prices at the local and international markets. However, a number of factors limited agricultural production. Lack of water for livestock and irrigation was a critical limiting factor. As such, many households could not maintain a vegetable garden. During the study a community garden in the lower zone was found abandoned after the source of water dried up before the crops matured. Another factor was lack of support for farmers. Little had been done to empower

the local farmers to afford inputs like seeds and draft power or to produce for sale. Interviews with extension officers revealed that agricultural extension services were limited due to lack of personnel. At most, a famer could expect a one-day visit by an extension officer over two months. Farming was not providing sufficient food security for the farmers and was becoming a less reliable source of livelihood due to recurrent droughts and deteriorating soil conditions. Discussions with the farmers revealed that droughts and associated crop failure were more frequent than ever before: a possible indication of the impact of climate change. Heterogeneity in a landscape can increase function and resilience leading to improved ecosystem services (Lovell and Johnston 2009). A possible way to improve the quality of agricultural systems in the MTA is to increase heterogeneity and plant biodiversity through agroforestry, woodlots, riparian habitats and live fences.

The livelihoods dimension - The livelihoods goal is about enhancing the livelihoods and well-being of all social groups in the landscape. A relatively low rating for the landscape in this goal is consistent with observed and reported high levels of poverty, food shortages, unemployment, poor housing conditions and limited access to clean water, healthcare and other basic services (Cooperative Governance and Traditional Affairs 2011). A poor road system limited accessibility especially in the middle zone and the predominantly mountainous terrain posed farming challenges, increased soil erodibility and made it difficult to access the few water sources in the area. Access to piped water (community taps) or electricity was limited to few households mainly in the lower zone. Some of the community members had to travel for 10 to 15km to the nearest clinic or high school. Such factors contributed to the low rating for the livelihoods dimension. Low scores for this dimension indicate a need for action in order to improve the situation. Ecoagriculture can play a positive role in this regard (see below).

3.4.2 Local farmers' consent to biodiversity-agriculture integration

The willingness of local farmers to implement ecoagriculture can give an indication of the expected level of adoption of ecoagriculture innovations. The survey results suggest that the expected level of adoption would be very high in the MTA. The high level of appreciation of the

value of biodiversity protection was probably due to the influence of many organisations promoting conservation in the community because of its location in a TFCA. The appreciation and willingness of the farmers provides a foundation for promoting TFCA objectives (see SADC 1999, Sandwith et al. 2001). TFCA objectives overlap with ecoagriculture goals such that implementing ecoagriculture simultaneously promotes TFCA objectives in the area.

3.4.3 Strategies for improving household income levels

The main source of household income in the MTA, i.e., public grants, were not a sustainable source of livelihood. Grants promoted a dependency syndrome, apart from making the community very vulnerable to possible changes in Government policies. Due to high levels of poverty the MTA was designated an "intervention area", i.e., one requiring poverty alleviation measures (Jozini Local Municipality 2009). Development interventions that economically empower local farmers through diversifying their income sources are necessary. Multi-functional ecoagriculture landscapes support sustainable off-farm income sources for the smallholder farmers. Practices like agroforestry, payment for ecosystem services and rural tourism in the TFCA communities can improve self-reliance and alleviate poverty. Ecoagriculture in the area can support certification and marketing of agricultural products and of natural resources such as marula (*Sclerocarya birrea*). The local farmers can earn money from the sale of ecosystem services, e.g. carbon credits (Ghazoul et al. 2009). Organic production of poultry, livestock, fruits, vegetables, cereal crops and other produce can lead to product certification and landscape eco-labelling. It is noted that research shows limited impacts of certification on smallholder household livelihoods (Cohn and O'rourke 2011, Blackman and Rivera 2011). However, this not to refute that certification and eco-labelling processes can promote better product quality and higher market value and enable better returns for the farmers.

A feasibility study by Gumede and Sutton (2010) showed a strong potential for thriving adventure tourism in the Usuthu Gorge made possible by the area's biodiversity which is in a near-pristine condition, attractive scenery and a unique cultural heritage: a mix of Zulu, Swati and Tsonga cultures that straddle the borders of Swaziland, South Africa and Mozambique. The scenery comprises of rolling landscapes, mountains, cliffs, gorges, forested valleys and streams attractive for viewing and the development of hiking, mountain biking, horse riding, bungee

jumping and cable sliding / zip lining. Nature-based tourism and the sustainable use of natural resources are economically competitive in the MTA given the low agricultural potential. Local communities would have to manage the tourism operations to maximise benefits to the members.

3.4.4 Ecoagriculture potential of the MTA landscape

The MTA is an unplanned ecoagriculture landscape managed by peasant farmers (Figure 3.7). Jozini is the most populated municipality within the Umkhanyakude District and the sustainability of *ad hoc* biodiversity-agriculture integrating systems is under threat from increasing human population density and demand for food and ecosystem services (Jozini Local Municipality 2012, Statistics South Africa 2008). To transform the area into planned landscape-level management systems could enhance its potential to provide ecosystem services and habitat for biodiversity. Systematic biodiversity-agriculture integration approaches allow coordinated landscape level management and monitoring of landscape performance which may not be possible with *ad hoc* practices.

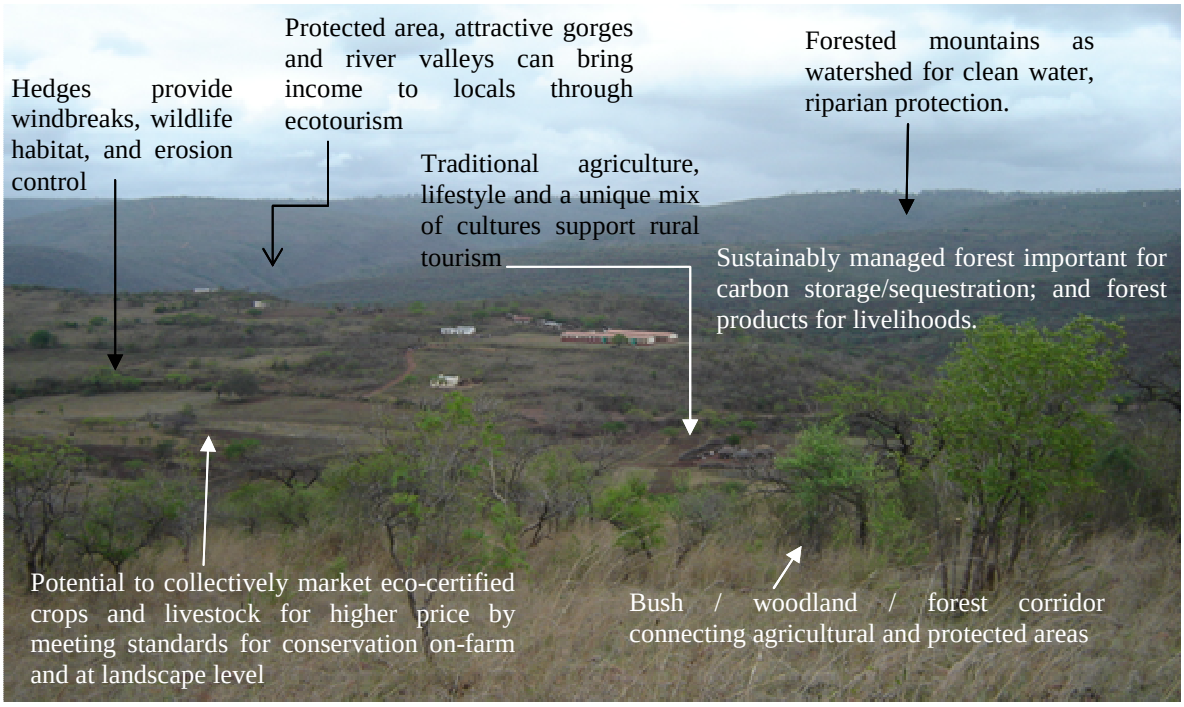

Figure 3.7: Current and potential ecoagriculture in the Mathenjwa landscape *(Source: survey results).*

3.4.5 Can communal farmers' potential to monitor landscape performance be enhanced?

Despite their low levels of education, communal farmers can assess performance of the local landscape in a consistent way. This capability is most probably based on knowledge of the area, as noted by Napolitano and MacLennan (2008) that indigenous people know their territory better than outsiders. Sustainable management of multi-functional landscapes requires consistent monitoring and taking measures to enhance performance. Given the communal farmers' potential to assess landscape performance and willingness to integrate production and natural biodiversity conservation, it remains to promote the development of skills for systematic landscape performance monitoring. Development of such skills could be achieved through provision of environmental education and farmer-training programmes with a focus on the management of integrated production and conservation landscapes. If farmers cannot perceive immediate benefits of a new technology or a conservation measure they are less likely to adopt it (Tarawali et al. 2002, Demeke 2003, FAO 2012a). Awareness of such benefits can be raised through well targeted extension efforts or farmer-to-farmer based knowledge dissemination strategies taking cognisance of the unique circumstances of individual farmers (Chitakira and Torquebiau 2010). In view of this, for biodiversity-agriculture integration to gain acceptance in the MTA the farmers' awareness of the benefits must be raised.

3.4.6 Policy implications

Landscape performance assessment reveals the dimensions of a landscape requiring intervention measures and so guide development planning and extension effort. The results of a LPA can inform policy, e.g., in terms of allocation of resources across the landscape. For instance, the MTA landscape was performing lowly in production and livelihoods goals such that there was a need for conservation initiatives compatible with farming and consistent with livelihood improvement. Policy adjustments to ensure that efforts of local farmers are rewarded are necessary to foster responsible stewardship of the local ecosystems and scenery. Conservation could be designed from an ecoagriculture perspective to bring about synergies that benefit agricultural production and local livelihoods. In this regard, policies that promote agriculture-biodiversity integration are appropriate.

3.5 Conclusion

Participatory landscape evaluation in this study presented a forum for stakeholders to reflect on landscapes that can conserve biodiversity, deliver ecosystem services, sustain agricultural production and improve local livelihoods, simultaneously. The MTA landscape performance ratings were in the middle to top half of the scale with no significant spatial differences. Performance differed significantly among some of the landscape dimensions being strongest in the conservation dimension. The results give insights into the ecoagriculture status of a Southern African community within a TFCA set-up. The results help to understand the effectiveness of existing land uses and management practices in protecting biodiversity and supporting livelihoods, and the possible measures to take towards achieving TFCA goals. The 20 questions used in the evaluation represent standard goals for a successful ecoagriculture landscape and provide reference points when planning, implementing and monitoring ecoagriculture projects. The use of indicators (production, livelihoods, biodiversity and institutions) facilitates comparison of different rural landscapes.

This study has demonstrated the potential of communal farmers to evaluate local landscape mosaics in a consistent way regardless of their low levels of education or illiteracy. This positively confirms the feasibility of taking decision-making and landscape-level planning (including ecoagriculture planning) to the lowest levels. Further studies could analyse existing policies that affect the utilisation and governance of natural resources to see how they impact on ecoagriculture implementation. Further studies could investigate the policy adjustments required to make stakeholder-based ecoagriculture planning and implementation feasible, as well as examine the benefits of systematic biodiversity-agriculture integration approaches in relation to unplanned ecoagriculture practices.

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Note:

This manuscript is a modified and reorganised version of a paper presented at the *Innovation and Sustainable Development in Agriculture and Food* (*ISDA) Conference*, on 28-30 June 2010 in Montpellier, France and published in the conference proceedings referenced as: Chitakira, M and Torquebiau, E. 2010. Towards Balancing Production and Protection: Participatory Landscape Performance Assessment in KwaZulu-Natal, South Africa. *In:* E. Coudel, H. Devautour, C. Soulard and B. Hubert, eds. *Proceedings of the symposium innovation and sustainable development in agriculture and food - ISDA 2010*. Montpellier, June 28-July 1. Montpellier: Cirad, Inra, SupAgro. [ISBN - 978-2-7380-1284-5]. Available at http://hal.cirad.fr/view_by_stamp.php?&halsid=e99r9q61ussj7s913v3ctsoee0&label=CIRAD&langue=en&action_todo=view&id=hal-00520875&version=1&view=extended_view.

Appendix 3.1

Performance scores for the MTA landscape per each ecoagriculture goal and according to participating groups *(Source: survey results).*

Group Meeting	Stakeholder Group Name	Conservation	Production	Livelihoods	Institutions	Mean Score
1	Magwanga Youths	3.5	2.8	1.9	4	3.05
1	Magwanga Women	4.6	3.9	2.9	4.2	3.9
1	Magwanga Men	3.6	2.4	3	2.6	2.9
1	Mbadleni (W,M,Y)	3	2.4	3.2	4.2	3.2
1	Madeya (W,M,Y)	3	2.8	2.8	4.0	3.15
2	Mabona Women	3.6	1.9	2.1	1.6	2.3
2	Mabona Men	4.2	3.2	3	3.4	3.45
2	Khume Women	2	2	1.4	2.4	1.95
2	Khume Men	4	3	3.4	3.2	3.4
3	Plateau Youths	3.4	2.9	3.6	3.2	3.28
3	Plateau Younger Women	3.2	3	3.6	3.8	3.4
3	Plateau Elderly Women	4.2	3.9	3.2	4.2	3.88
3	Plateau Men	2.1	1.7	1.5	2.9	2.05
4	Multiple Group A	3.1	2.7	2.2	2.5	2.63
4	Multiple Group B	4.2	1.6	1.2	3.2	2.55
4	Multiple Group C	3.3	2.3	2	2.2	2.45
	Mean score/rating	3.44	2.66	2.56	3.23	**2.97**
	Std Deviation	0.70	0.66	0.78	0.78	

CHAPTER FOUR: COMMUNITY VISIONING

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Community visioning in a transfrontier conservation area in southern Africa paves way towards landscapes combining agricultural production and biodiversity conservation

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This study employed participatory approaches to establish ways of engaging local communities within a transfrontier conservation area, towards achieving the goals of integrated agricultural production and biodiversity conservation at a landscape level, known as ecoagriculture. We facilitated farmers' meetings to create charts of local environmental and livelihood concerns and of their vision of the future. Water scarcity, bad road condition, unemployment, and low harvests emerged among the most prevalent concerns. Through a visioning process, participants arrived at a desired future that was largely inclined towards improved livelihoods with comparatively little attention on biodiversity enhancement. We conclude that stakeholder-driven ecoagriculture could be a sustainable strategy to simultaneously achieve the community's vision and the goals of transfrontier conservation areas, provided biodiversity management strategies are linked to infrastructure improvement and income generating activities. We recommend community visioning process as an effective approach to encourage collective action and to support local ownership of development programmes.

Keywords: community visioning, landscape, ecoagriculture, biodiversity conservation, South Africa.

1. Introduction

Biodiversity conservation approaches across the globe have changed dramatically, shifting emphasis from exclusionary protected areas (PAs) where human use of land and resources was prohibited, to more inclusive strategies where utilisation is considered an integral aspect of conservation (Lele et al. 2010, Büscher and Dressler 2010). In Southern Africa, one major development of the 1990's was the emergence of transfrontier conservation areas (TFCAs). TFCAs are large areas that cross political boundaries between two or more countries, and include one or more protected areas as well as multiple resource use areas (SADC 1999). The main purpose of TFCAs is conservation and sustainable use of biological and cultural resources, whilst promoting regional peace, co-operation and socio-economic development (Sandwith et al. 2001, Smith et al. 2008). The TFCAs vision explores the possibility that changing land-use practices from subsistence farming on marginal land to community participation in ecotourism-based or other enterprises may have sustainable economic and ecological benefits for all (Bengis 2005). TFCAs are expected to provide jobs and revenue generating opportunities for people living within and around them. It is anticipated that by demonstrating the economic and social advantages that can be achieved through natural resources conservation and by improving the lives of rural communities, biodiversity conservation will be fostered (Department of Environmental Affairs and Tourism 2010).

The continued degradation of natural biodiversity on a global scale (Convention on Biological Diversity 2008, Williams et al. 2001, Bishop et al. 2008) is a cause for concern and there is need to reverse this trend. Efforts to rehabilitate biodiversity could focus on promoting mosaic landscapes that optimise the environmental and production functions by managing different landscape units in a complementary way (Sayer and Campbell 2004). Local patch-based management ignores the spatial context of biota, water and nutrients as well as interactions among elements of a mosaic. A single patch may be subjected to a state-of-the-art conservation, but that management can fail if the surrounding landscape continues to degrade, impacting adversely on the patch (Lindenmayer et al. 2008). Perfecto et al. (2009) emphasise the need for landscape scale biodiversity-friendly agricultural methods that encourage high quality-matrices enabling conservation of biodiversity and food sovereignty.

TFCAs present a window of opportunity for communities to collaborate in localised conservation and tourism projects through some form of “Community Based Natural Resources Management” (CBNRM). The CBNRM concept represents a paradigm shift from the traditional management of natural resources where local communities are excluded from decision-making processes and equitable sharing of benefits towards one where local communities actively participate in the planning, management and utilisation of resources in recognition of opportunity costs incurred by those that live in or adjacent to conservation areas (Kessler 2007). However, several case studies revealed gross limitations of the CBNRM concept and some scholars and some practitioners consider the CBNRM strategy to be in crisis, while others see a future for this approach (World Bank 2002, Rodary 2009, Dressler et al. 2010).

Ecoagriculture is a strategy that involves local communities and that could promote the Millennium Development Goals regarding poverty, food security, water, sanitation and environmental sustainability at relatively low costs (Scherr and Rhodes 2005) and at a landscape scale within TFCAs. Ecoagriculture (Figure 1) is a broad framework that calls for land use transformations that enhance rural livelihoods and agricultural (crops, livestock, fish and forest) production systems and also conserve or restore ecosystem services and biodiversity at a meaningful landscape scale.

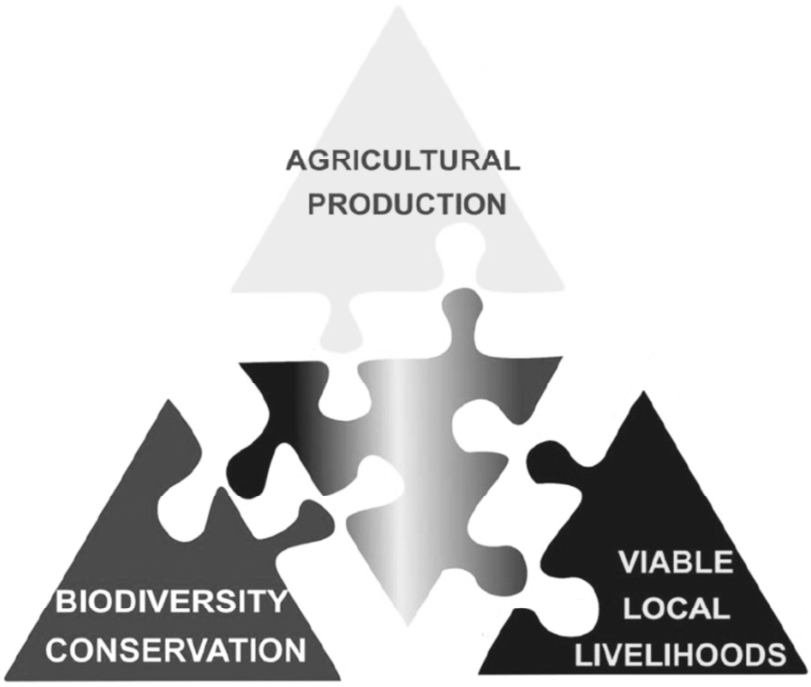


Figure 1: The ecoagriculture concept **(***after Scherr and Buck, 2007)*

The ecoagriculture framework promotes the management of farming mosaics that are balanced in terms of food production, environmental protection and improved human livelihoods, through the planned collaboration of different stakeholders. Ecoagriculture is a conservation and rural development strategy which recognizes agricultural producers and communities as key stewards of ecosystems and biodiversity and allows them to play these roles effectively (Ecoagriculture Partners 2008). Ecoagriculture is based on the ecosystem concept which recognises that ecosystems, including biological, physical and socio-economic components, must be managed as a whole (McNeely and Scherr 2003). Agroforestry, vegetation corridors, forest patches and related features play a key role in biodiversity conservation on ecoagriculture landscapes.

The success of biodiversity conservation in TFCAs is dependent on local community empowerment through their active involvement in planning resource utilisation and

management. Empowerment is crucial to the sustainability of projects because participation leads locals to do their own analysis, take command, gain confidence and make decisions (Nemarundwe et al. 2003). However, because of little formal education or isolation, poor rural communities rarely get opportunities to contribute to decision-making and development of policies affecting local natural resources. As a result their concerns remain unaddressed (Evans et al. 2006). Such an anomaly requires policy adjustments for achieving community participation.

A useful technique to ensure local community involvement in development planning is community visioning (CV). This is a process involving a group of people coming together to develop common ideas about what they would like their community ideally to be like and to plan how to achieve it. Visioning builds local collective capacity and competence, encouraging ownership and creating an opportunity for the community and other stakeholdres to collaborate in developing shared priorities and actions (Sanginga and Chitsike 2004, Communities Scotland 2007).

The CV strategy was used in the 1980s in Chattanooga Tennessee City, USA, for city-wide planning to restore air quality becoming a model of sustainability (Sustainable Communities Network Partnership 1996). One of the "best-practice case studies" on how to create community plans for the future was the Maroochy 2025 Community Visioning Project in the South East Queensland Region of Australia (Gould 2005) that capitalised on the inherent capacity of various stakeholders and the community to create alternatives regarding the definition of issues, images or visions, and finding solutions for local problems. Eventually, the outcomes of the Maroochy vision were incorporated into the Council's corporate plan.

The present work is part of a broader study that investigates the feasibility of planning and implementing ecoagriculture in smallholder farming communities, recognising communal farmers as key stakeholders and biodiversity stewards in the TFCAs and seeking to establish the role they could play towards the achievement of TFCA goals. This paper reports on a CV exercise conducted with the aim to establish aspirations and planning capabilities of local communities rather than coming up with a vision for implementation. We present a community vision evaluated against ecoagriculture goals and the TFCA objectives. We also assess the relevance of ecoagriculture as a strategy towards simultaneously achieving both the community's

aspirations and the TFCAs goals. The paper is organised into an introduction presenting the background and theoretical framework, a description of the study area, methodology, the findings, discussion and a conclusion.

2. Study area

The study was conducted in the Mathenjwa Tribal Authority (MTA), a communal farming area in northern KwaZulu-Natal Province of South Africa (26°48'S to 26°57'S and 32°00'E to 32°10'E), covering approximately 547 km^2 of which 19% is within the Ndumo Game Reserve managed by a provincial nature conservation authority, Ezemvelo KwaZulu-Natal Wildlife (Figure 2). A further 6.4% is allocated to the Usuthu Gorge Community Conservation Area (CCA), managed by the local community.

The MTA falls into the subtropical savanna biome (Mucina and Rutherford 2006) with an annual rainfall between 500 mm in the eastern lowlands (around 100 m ASL) and 800 mm in the western plateau (about 600 m ASL), mostly in summer (November - March) but with occasional light rains during winter. The mean annual temperature is around 21^{o}C with summer maximum reaching 40^{o}C. The area is generally dry and warm to hot throughout the year.

The MTA lies in Maputaland Centre of endemism, an ecological region characterised by high endemicity and a globally recognised biodiversity hotspot (Van Wyk and Smith 2001). It includes some of the most endangered vegetation types in South Africa, classified as vulnerable (Mucina and Rutherford 2006). The MTA became part of the Lubombo TFCA after South Africa, Mozambique and Swaziland signed a trilateral protocol in 2000 (SADC, 2006).

The inhabitants of Maputaland are among southern Africa's poorest people who have traditionally depended significantly on harvesting natural resources (Sotho et al. 2001). The MTA is one of the many rural areas of South Africa that lack access to basic services and infrastructure essential for economic growth and development (Herselman 2003, Jozini Local Municipality 2009). Unemployment and poverty levels in the area are high. The poor community members put biodiversity under threat as they strive to make a living. In order to achieve the aims of the TFCA there is therefore a need to foster conservation strategies in the area but without compromising local livelihoods.

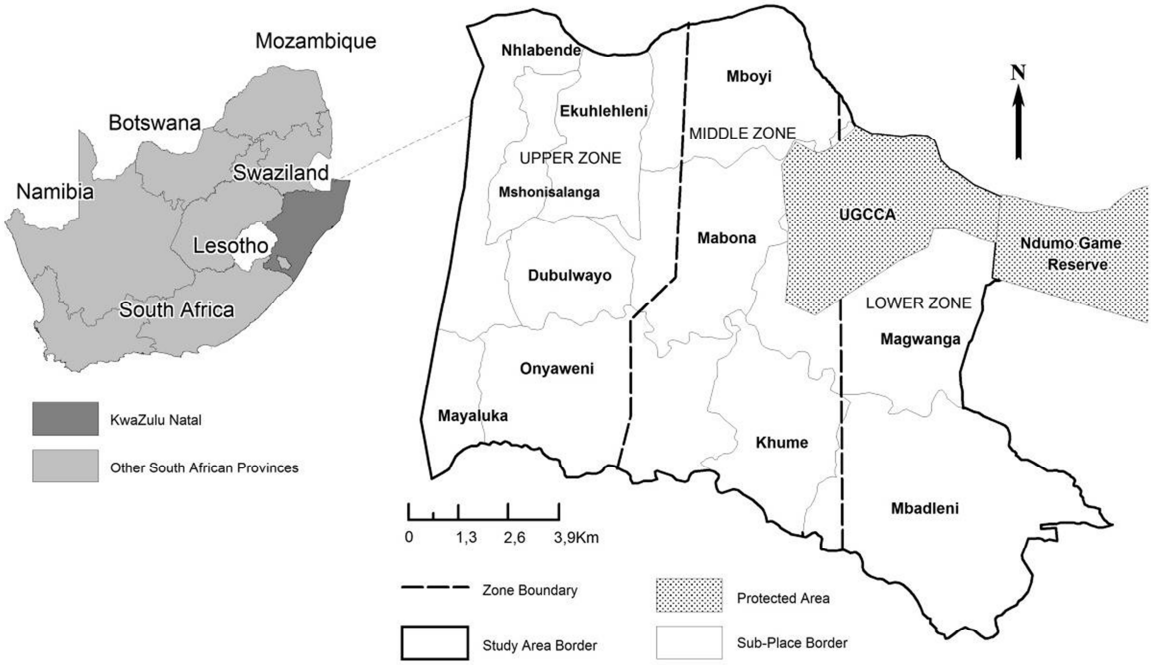


Figure 2: Study area location

3. Methodology

In order to capture social and biophysical variability, the study area was divided into three zones: lower zone (low-lying gently sloping coastal plain, around 150m ASL), middle zone (rugged and mountainous area around 350m ASL, transitional between lower and upper zones) and upper zone (dissected plateau, about 550m). We facilitated farmers' meetings during which the participants assessed the community's environmental and livelihood concerns and conducted a CV process to define a desired future community. In each zone we facilitated one group meeting, organised into three smaller working groups of three to six participants based on gender, age and

home area, i.e. a total of nine sub-groups for the entire study. Each sub-group created a chart of local environmental and livelihood concerns and a map of its desired future local landscape. Figure 3 shows the organisation of the CV process. The concerns and visions were presented in form of annotated diagrams and statements which we analyse and categorise to produce tables and figures in this paper.

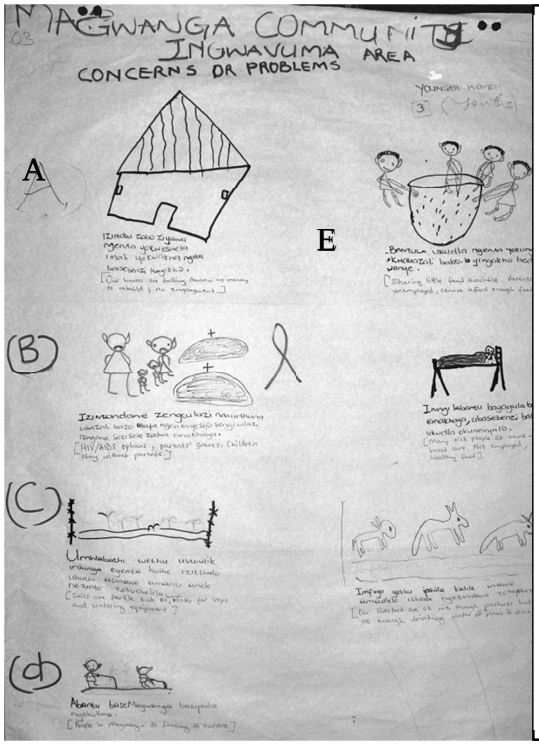
Figure 3: Grouped participants during a community visioning process

The CV involved interaction (verbal and body language) of participants at two levels: 1) within each group and 2) among members across the groups via a facilitator. A high degree of imagination and mapping were involved in the visioning process. Participants could discuss opinions of individual members and agree on a common idea. The facilitation process was conducted in a way not to influence participants' responses (Groot 2002). Care was taken to explain the exercise in the local language to ensure effective participation of illiterate community members. Participants were given time to think, discuss, express or revise their opinions before making a final decision (Figure 3).

4. Results

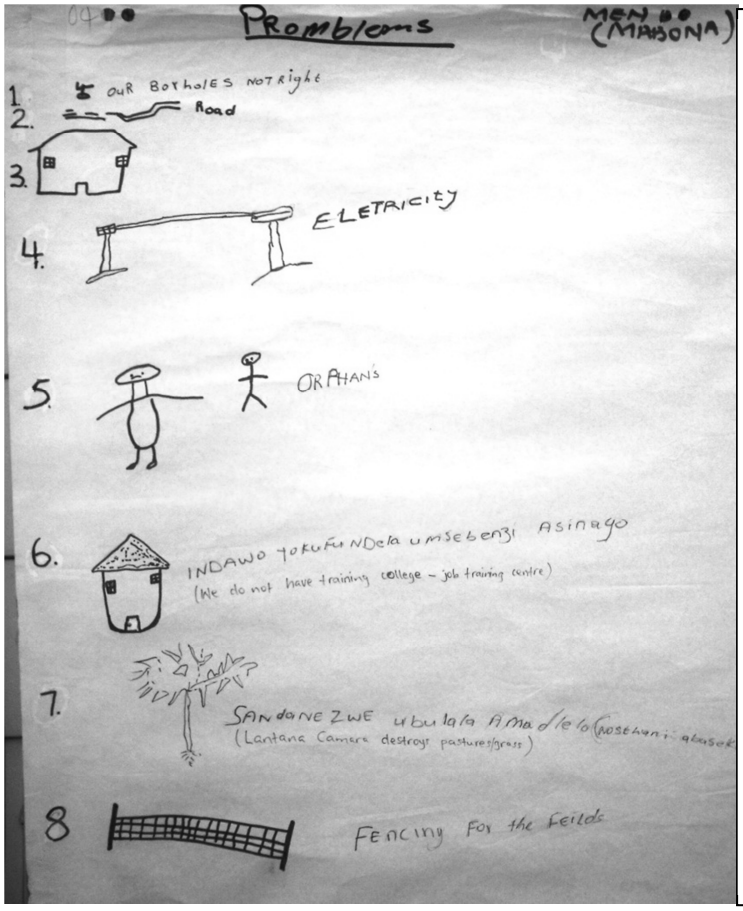
4.1 Socio-environmental concerns

As a background to the CV process, participants made an inventory of the local community's environmental and livelihood concerns. Major concerns about the existing socio-economic and biophysical situation were identified and presented in the form of diagrams such as Figures 4a, 4b and 4c.



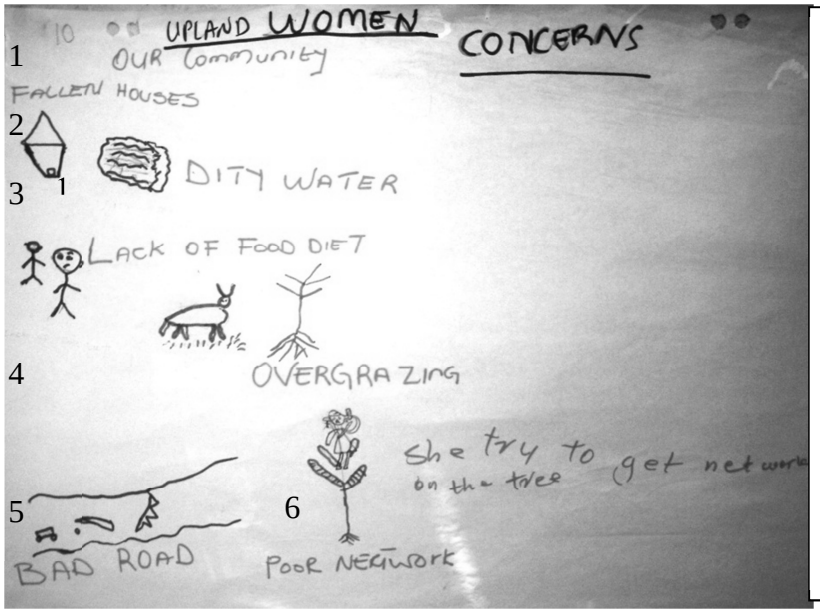
A. Our houses are crumbling.
B. Child-headed households. Parents died from HIV/AIDS.
C. Frequent droughts and crop failure.
D. Poor harvests; yet farming is our major livelihood.
E. Not enough food available.
F. Sick people under home-based care and on poor diet.
G. Good pastures, healthy livestock, but lack drinking

Figure 4(a): Concerns raised by lower zone women



1. Dry boreholes.
2. Bad road conditions.
3. Poor houses.
4. No access to electricity.
5. Orphan households.
6. No skills training colleges.
7. Invasive alien plants colonised pastures.
8. No fences around fields, animals destroy crops.

Figure 4(b): Concerns raised by middle zone men



1. Dilapidated houses
2. River water polluted by factory in Swaziland
3. Poor diet
4. Lack of pastures; overgrazing
5. Bad road condition
6. Poor cellular signals. One need to climb up a tree to get signals

Figure 4(c): Concerns raised by upper zone women

From all the zones, a total of 33 major concerns were raised, categorised based on their nature into 'biodiversity conservation', 'livelihoods' (i.e. services and socio-economic conditions that support the means of making a living as well as access to material and social resources), 'agricultural production', 'basic infrastructure' and 'others' (Figure 5). Details of the concerns under each category are available in Appendix 4A.

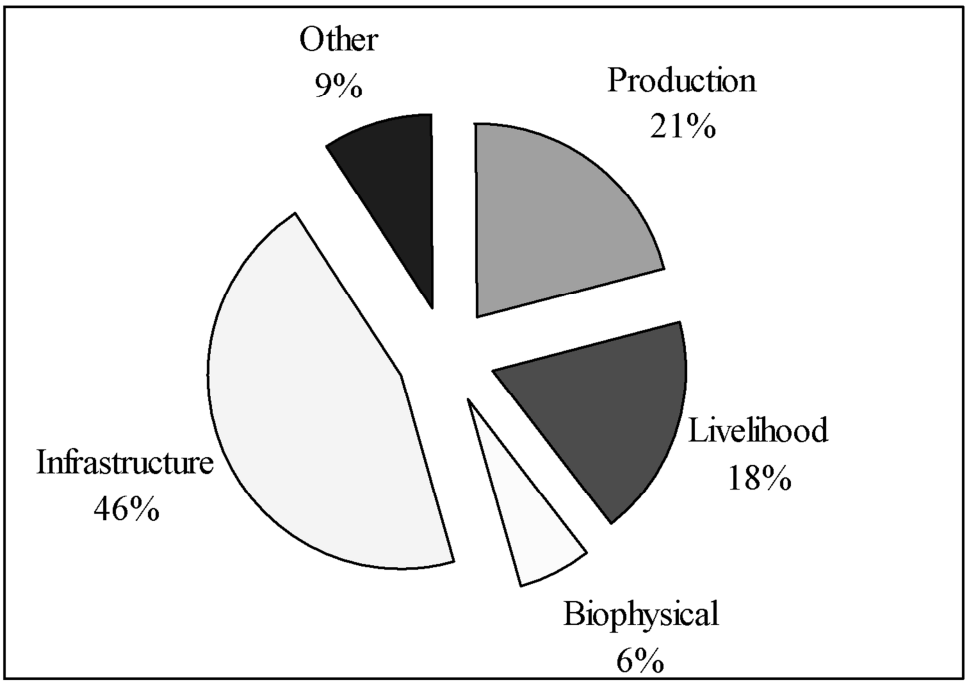


Figure 5: Analysis of the Mathenjwa community's concerns

The concerns were unevenly distributed across the categories with most relating to basic infrastructure, particularly roads, electricity, schools and sport facilities. A lack of access to basic infrastructure can hinder the undertaking and viability of possible livelihoods-improving and biodiversity-caring projects in the community. Agricultural production concerns (21%) were less prevalent than expected of a predominantly farming community. There were no concerns unique to a particular zone or social group. Based on the number of times mentioned and on the outcome of ranking exercises by the participants, the prevalence of the concerns shows slight variation across the zones (Table 1).

The most common concerns (problems) in all three zones included water scarcity, bad roads, poor communication systems, unemployment, and low harvests. During the CV process, participants could suggest mechanisms to deal with the concerns identified (Table 2). Some of which were unfortunately not technically feasible. For instance, the use of tractors was not possible in much of the middle zone given the predominantly steep terrain. Some of the suggestions provide useful hints to policy makers and intervention agents.

Table 1: Spatial variation of concerns

Concern	Where Prevalent	Possible Explanation
Poor housing conditions	Lower and middle zone	Higher poverty levels compared to upper zone. The people expect the national Government to build them houses under the Reconstruction and Development Programme (RDP).
Bad roads	Middle zone	Rough mountainous terrain
Invasive alien plants	Middle zone	Less effort made to remove the plants compared to other zones
Sicknesses, HIV/AIDs	Middle zone	Healthcare was poorest in this zone with neither local clinic nor efficient transport to the nearest health centre.
Poor harvest	Lower zone	Driest of the three zones
Inadequate pastures	Upper zone	Most densely populated of the three zones; Much land cultivated or built-up

Table 2 Community-suggested coping measures

Prioritised Concerns	Community-Suggested Measures
Water shortage	Municipality to draw water from Jozini Dam or Usuthu River
Drought and crop failure	Construct dams and do irrigation
Lack of job opportunities	Public or private organisations to help create jobs in the locality or nearby cities
HIV/AIDS impacts	Government to provide antiretroviral drugs.
Biodiversity and water conservation skills	Department of Environmental Affairs to educate/train community members
Poor housing conditions	Government Reconstruction and Development Programme housing scheme
Security against robbers	Establish sub-Police stations and neighbourhood watch programme
Invasive alien plants	Public or private organisations to fund removal of these species thereby creating jobs for locals
Farming inputs	Government to provide tractors, seed and fertiliser
Poor soils	Government to assist with fertilisers; Farmers to utilise organic waste and litter

4.2 Shared vision of the desired future

Participants first decided on a period over which the vision would be achieved. In each of the zones, the agreed time frame was five years. Although some participants preferred longer time frames, these were less popular, possibly reflecting the urgent need to achieve the desired status. A period of five years is too short for the development of major projects proposed in the vision such as irrigation schemes or tourism facilities and much longer time frames ought to be considered.

The participants presented their vision by means of annotated diagrams (e.g. Figure 6a, 6b and 6c). A full list of components compiled from the visions of all participating groups is given in Appendix 4B.

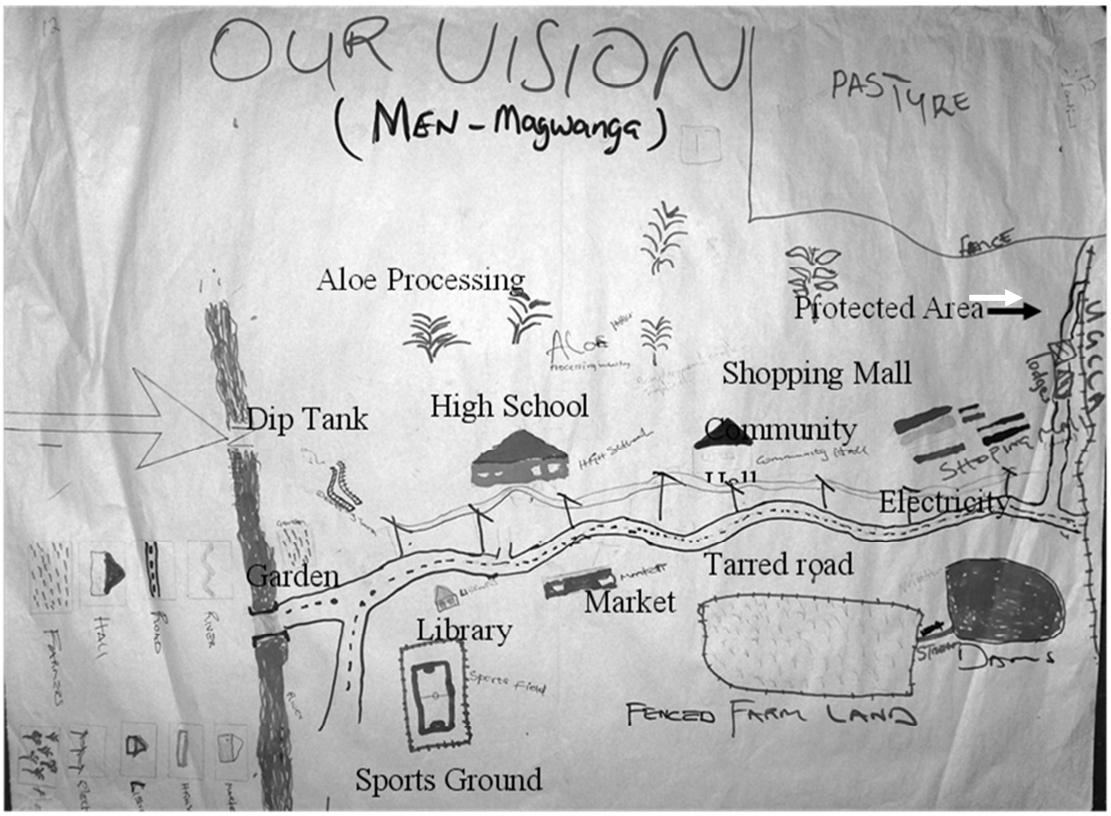


Figure 6(a): Vision of lower zone men

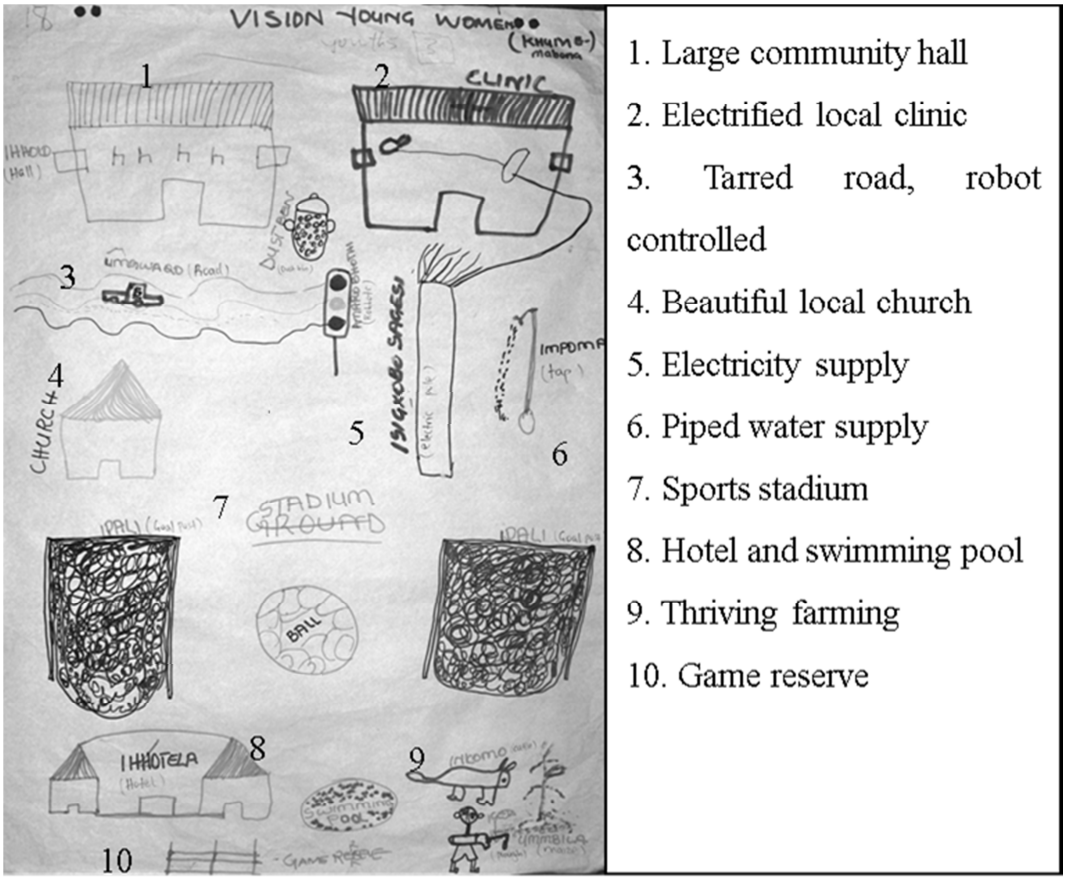


Figure 6(b): Vision of middle zone young women

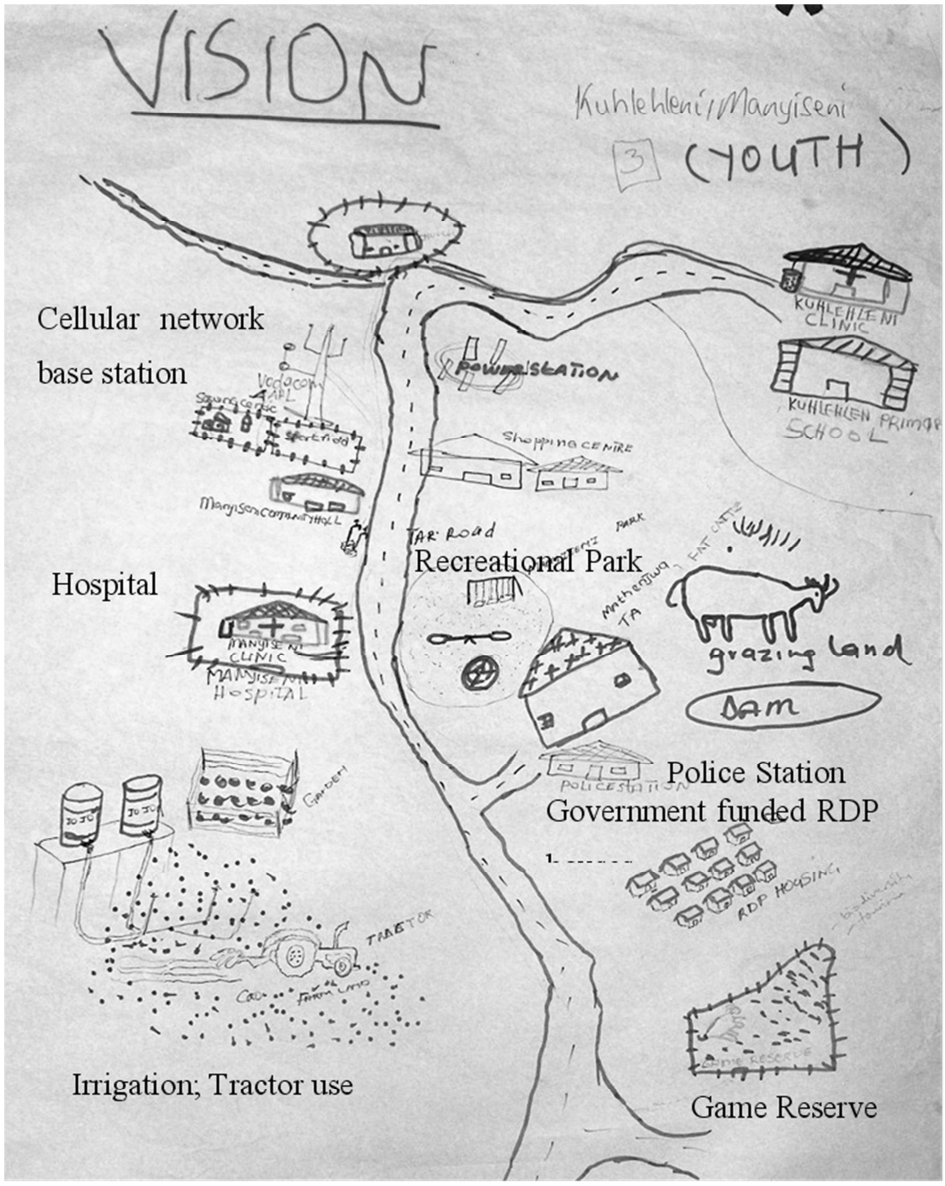


Figure 6(c): Vision of upper zone youths

The visions from all three zones had much in common, allowing a vision of the Mathenjwa community as a whole to be drawn. This overall community vision, extracted from the diagrams and presented as a statement, would be formulated as ‘to achieve better living standards

supported by improved farming and non-farming activities based on locally available natural resources which enable diversified livelihoods.'

In an attempt to establish the relevance of ecoagriculture as a strategy towards achieving the community's vision, we analyse the vision from an ecoagriculture perspective. The full range of the elements reflected in the vision of each participating group from all the zones are categorised according to ecoagriculture goals to produce Figure 7. The community vision was largely inclined towards improving livelihoods with comparatively little attention on biodiversity enhancement. Below, we discuss the reasons for this, as well as the corresponding planning implications.

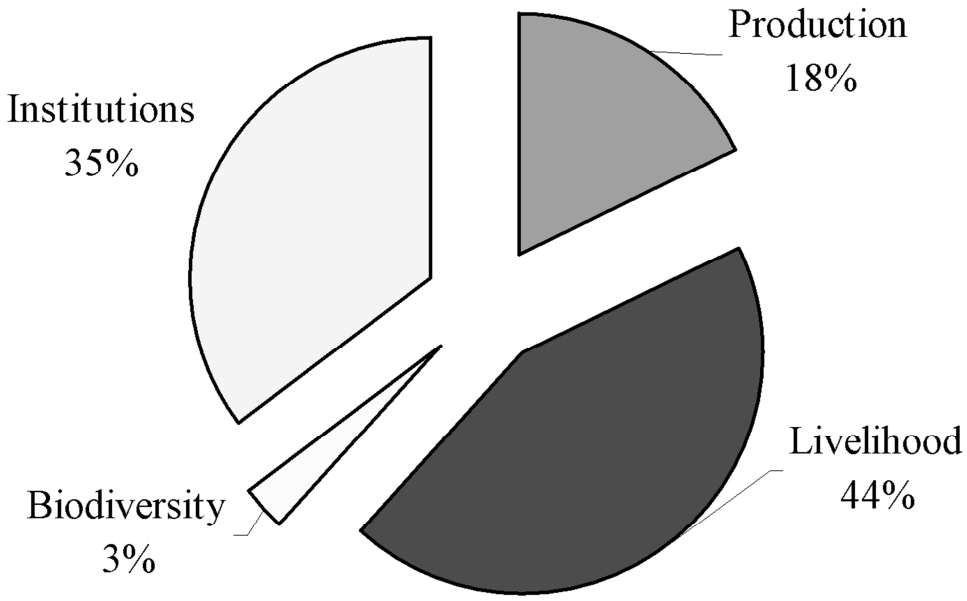


Figure 7: Mathenjwa community vision related to ecoagriculture goals

5. Discussion

5.1 Communal problems identified and solutions towards these.

Our results confirm an observation by Hemson et al. (2004) that the rural poor of South Africa do not see agriculture as an answer to their plight since it generates only 4% of their income. The MTA had a low agricultural potential particularly due to inadequate rainfall and a high mean annual potential evaporation of 1800 to 1900 mm (Jozini Local Municipality 2009, Mucina and Rutherford 2006). It is probable that the local farmers realised the need for alternative non-farm sources of livelihood and thus emphasised less on farming. Earlier research revealed that agricultural activities in the MTA barely satisfied basic needs and the farmers relied heavily on government social welfare grants and natural resources utilisation (Chitakira and Torquebiau 2010a, Torquebiau et al. 2010).

The community-suggested remedies reflect a bias on assistance expected from the government, perhaps due to an awareness of the constitution of the Republic of South Africa declaring that the provision of basic infrastructure and social services is a fundamental responsibility of the government at national, provincial and local levels (Republic of South Africa 2009, Josie 2008). For the provision of such services to be sustainable, consumers need to pay taxes or fees (Hemson et al. 2004). But without an increase in rural livelihoods and income generating activities the residents might not afford this. There is therefore a strong need to promote self-reliance among the local community members and CV facilitators should prompt participants to think about what they could do for themselves using the available resources and thus get rid of the dependency syndrome.

5.2 Effective engagement of local communities

Development workers from various parts of the world realised that active stakeholder involvement creates a sense of ownership and greater local commitment to project goals (Nemarundwe et al. 2003). Jones (2006) observes that a number of community nature-based tourism projects existed in Maputaland Region, but these did not achieve long-term sustainability. Goodman et al. (2002) attribute this failure to the indigenous socio-cultural and economic organisation, resentment prompted by historical discrimination, and lack of trust by local people perceiving that the government was concerned more with biodiversity protection

than their livelihoods. The needs and perceptions of remote communities remain hidden to outsiders unless special efforts are made to uncover them (Sheil et al. 2003). The probable reason for resentment by local communities is failure to effectively engage them particularly at the project planning phases.

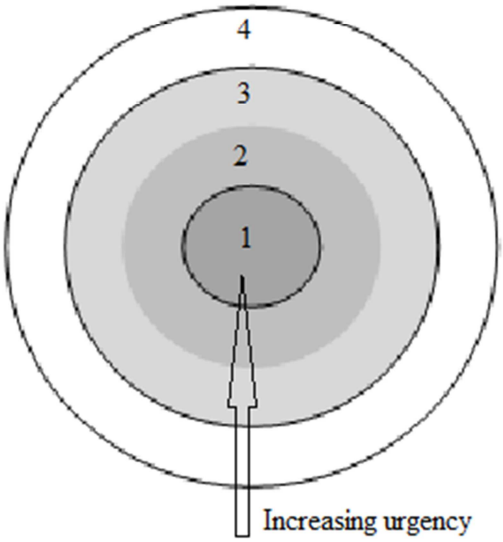
Our study recognises local communal farmers as key stakeholders and biodiversity stewards in the TFCAs scheme and acknowledges that their role is critical to the achievement of TFCAs goals. The challenge is how to make community-managed projects sustainable, considering the problems that have emerged in the implementation of CBNRM schemes (Dressler et al. 2010, Rodary 2009). Perhaps the solution lies in refocusing on the original aims of ensuring social justice, material wellbeing and environmental integrity (Dressler et al. 2010). A 'second generation' CBNRM programmes which emphasise on good governance, business-driven processes and integrated resources management are emerging in southern Africa (Rodary, 2009).

The use of CV strategies to facilitate the development of community-managed projects could significantly enhance the revitalisation and sustainability of CBNRM initiatives because it allows a greater understanding of local communities' virtues and priority goals and accords the consideration of aspirations and input from locals in decision making and policy formulation. This requirement is crucial to the success of rural development projects. Apart from motivating local conservation efforts, CV potentially raises conservation awareness in communal areas and encourages locals to assume ownership of conservation programmes. In this way, CV can be a strategy to avoid conflicts between conservation agents and local community members commonly reported around protected areas in southern Africa and other parts of the world (Hill et al. 2002, Ferraro 2002, Hayes 2006, Andrew-Essien and Bisong 2009).

5.3 Hierarchy of concerns

Concerns in the MTA community largely determined the community's vision. To help relate the vision to the concerns we develop a model related to Clayton Alderfer's ERG (existence, relatedness and growth) theory of human motivation (Figure 8). Alderfer (1972) who developed Abraham Maslow's theory of needs hierarchy argued that satisfied lower-order needs lead to the

desire to satisfy higher-order needs and that several needs can be operating simultaneously as motivators. However if people are frustrated in meeting their higher order needs they may regress to lower order needs even though these are already satisfied (Simons et al. 1987, Huitt 2007).



Scenario A: Without 'Adequate' Environmental Education

1. Livelihoods
2. Infrastructure
3. Production
4. Biodiversity and Other

Scenario B: With 'Adequate' Environmental Education

1. Livelihoods
2. Infrastructure
3. Production and Biodiversity
4. Other

Figure 8: Hierarchy of concerns

The hierarchy in Figure 8 is based on the urgency to get a concern addressed. Livelihood matters require the most urgent attention and occupy the inner ring. Infrastructure appears in the next ring due to its pivotal role in supporting the means of survival (e.g. food and water procurement, shelter or health). The content of the third ring is likely to vary depending on the level of environmental awareness. When the farmers have a high level of awareness, they are likely to realise the interdependency between agricultural production and the wellness of the biophysical environment, and thus the two would appear at the same level. In the absence of such awareness production concerns occupy a higher priority than conservation matters. The more urgent a concern is the closer its position to the centre of the ring. In the light of this observation, the relatively small proportion of biodiversity component in the community's vision (Figure 7) therefore does not imply lack of concern for biodiversity. A complementary study of the communal farmers in the MTA established that 95% of questionnaire respondents were willing to conserve biodiversity due to perceived benefits (Chitakira et al. 2012). Thus the small biodiversity component in the vision was a matter of prioritisation of existing concerns, but it also shows that the farmers cared about conservation even though the more prioritised needs were not fully met.

5.4 The community vision and ecoagriculture

South Africa needs initiatives that bring the rural poor into modern services, through new forms of non-farm activities and a revival of agriculture (Hemson et al. 2004). Ecoagriculture embodies diverse livelihood-improving opportunities and, as such, is a competitive means to poverty reduction in rural communities. If rural communities become aware that ecoagriculture places local livelihood concerns at the centre of its conservation strategies (McNeely and Scherr 2003) such awareness could motivate them to plan and manage locally adapted ecoagriculture innovations eventually leading to a realisation of their vision. Ecoagriculture practices possible in the MTA landscape include planning and managing protected areas together with local farming; linking uncultivated areas, wetlands, and forest patches within agricultural landscapes to create habitat networks and green corridors that support wildlife; integrating trees, shrubs, and grasses into farming systems to improve ecosystem services; avoiding the use of fire to clear

land or control weeds and pests; and practising conservation tillage, improved fallowing, inter-cropping, and livestock diversification.

The MTA has been identified as a low agriculture and high tourism potential area (Jozini Local Municipality 2009). The integration of ecoagriculture and enterprises that generate employment and bring off-farm income to the locals can be highly advantageous. Examples include the eco-labelling of local agricultural produce and adding value before marketing of natural resources that are abundant in the area such as marula (*Sclerocarya birrea*) fruit, mountain aloe (*Aloe marlothii),* common thatching grass (*Hyparrhenia hirta)* and medicinal plants.

Rural tourism management by the local community is a potential source of employment and increased income to the MTA. A unique cultural mix at the borders of three countries and the scenic attractions of the area (cliffs, gorges, rivers, wildlife, etc.) could support sustainable eco-tourism. Although rural tourism can generate benefits to local communities, in reality the development of rural tourism is littered with obstacles (McAreavey and McDonagh 2011, Briedenhann and Wickens 2004). Challenges likely to be encountered by communal tourism enterprises in the MTA include funding, ensuring quality standards, competition from established operators, marketing, business management skills, and accountability. Expand domestic tourism, for example, by attracting middle and low income urban dwellers who normally do not travel for pleasure could help avoid dependence on the erratic international tourist market.

Another strategy that alleviates poverty while promoting environmental conservation is ‘payments for environmental services’ whereby local farmers are paid for managing their land to provide ecological services such as watershed protection and carbon sinks (Engel et al. 2008). As the hierarchy of concerns (Figure 8) suggests, after livelihood needs have been satisfied, more of the community’s attention is expected to flow towards caring for biodiversity.

5.5 The community vision and TFCAs objectives

In assessing the Mathenjwa community vision the following questions arise: "Does the vision reflect local consciousness of TFCAs objectives and did the locals see the TFCAs being part of

their future?" The TFCA concept is regarded by its proponents as a strategic spatial development programme aimed at consolidating biodiversity and natural resources, integrating management procedures and thereby expanding opportunities for both conservation and rural development in communities around borders (Munthali 2007). The Mathenjwa community vision shows evidence of simultaneous utilisation and conservation of biodiversity and water resources. The vision also includes the development of off-farm sources of income like rural tourism and aloe processing, in line with TFCAs' economic development and poverty alleviation objective. This reflects that the community is aware of its future in the TFCA. This awareness is an important foundation for programmes that aim to promote the management of integrated production-and-conservation landscapes in communal areas.

Another question is: "How can the contribution of local farmers to the achievement of TFCAs purpose be enhanced?" Figure 9 is a proposed framework for the achievement of TFCAs' goals through effective engagement of local communities in the planning and management of TFCAs.

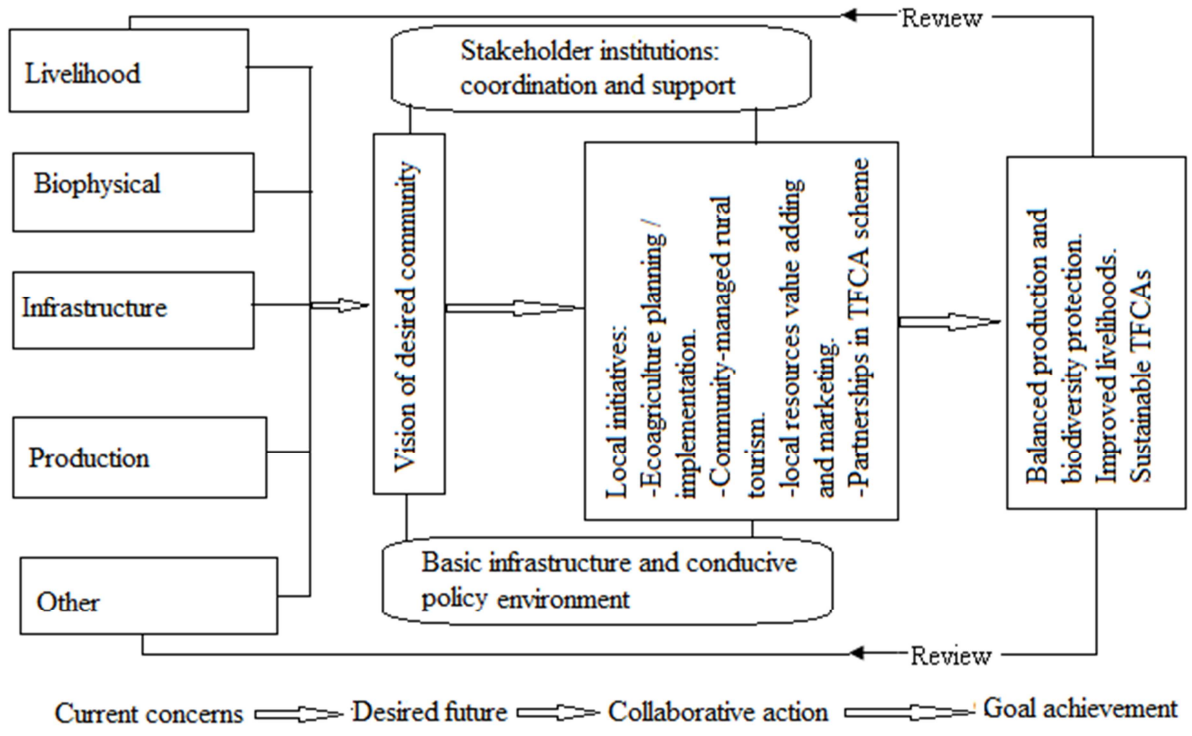


Figure 9: Framework for effective community involvement in TFCAs

Four basic steps are involved in the process, to be facilitated by an extension worker or rural development agent:

i. *Participatory diagnosis.* Meetings of stakeholder groups are organised to identify main socio-environmental concerns prevailing in the community. The facilitator is expected to stimulate self and collective awareness of development approaches among the local community members (Sanginga and Chitsike 2005, Evans et al. 2006).

ii. *Developing a vision of the desired future.* Participants imagine, discuss, and outline what developments or changes they want to see in their community in an agreed time period, e.g. 20 years, and consider strategies of achieving these. It is important not to be constrained by either political or economic realities when developing a community vision (Okubo 2000).

iii. *Collective action.* All key stakeholder groups need to be involved in planning and implementing agreed strategies. The framework (Figure 9) suggests that ecoagriculture projects, rural tourism and initial processing of local resources to add value can be managed by local communities in collaboration with other players including private entrepreneurs and public institutions responsible for managing infrastructure, water, wetlands, wildlife, forests, and related resources. The goal to achieve food security, watershed restoration, biodiversity conservation, and market development requires more than the effort of an individual farmer (Buck and Scherr 2011). Collective action requires a supportive policy environment, sound basic infrastructure, coordination, and material and technical support from key stakeholders.

iv. *Goal achievement.* Local farmers are actively engaged in the management of landscapes balanced in terms of agricultural production and biodiversity protection and capable of supporting better livelihoods. At this stage improved livelihoods is an incentive for the prioritisation of biodiversity protection by local communities. Through this way, the TFCAs concept becomes sustainable. Periodic audits of the whole process are required to ensure consideration of new concerns, refining of strategies as may be appropriate and evaluation of progress to check the achievement of desired goals.

5.6 Limitations of community visioning

Defining a common vision implies reaching a consensus among people with different interests and views and this is a challenge. There is a possibility that a supposed community vision actually represents the views and interests of the more powerful social groups in the community or the more vocal and influential individuals. A well-balanced team of participants including representatives from all sectors of the community is a key ingredient in the success of visioning programs (Walzer, et al. 1995). A failure to include some sectors of the community may result in a limited perspective of the team and may imply the preclusion of interesting and productive views.

6. Conclusion

The CV process facilitated during the current study presented a forum for farmers to think and talk about a landscape in which it is desirable to conserve biodiversity, deliver ecosystem services, sustain agricultural production and enhance livelihoods. We recommend CV for extension and development personnel as a strategy that does not only promote effective involvement of locals in proposed development projects but also stimulates local cooperation, enthusiasm and a sense of ownership of the projects. To planners and policy makers, CV is a tool that provides useful insights into the wishes and expectations of communities, and a way of incorporating their views in policy and decision making processes.

This study indicates the possibility of simultaneously and sustainably achieving biodiversity and livelihood goals in TFCAs. Ecoagriculture presents the much needed opportunities for effective community involvement in the management of TFCAs and the achievement of livelihood and biodiversity goals. However, public policies that support local governance of natural resources towards reconciling conservation and livelihood goals are required (Torquebiau and Taylor 2009). Further research should focus on the policy gaps that need to be addressed to empower local community members towards the attainment of integrated production and conservation landscapes.

Acknowledgements

We are thankful to the International Foundation for Science (IFS), the National Research Foundation (South Africa), CIRAD (France) and the University of Pretoria for funding this research. We acknowledge logistical support received from Ezemvelo KwaZulu-Natal Wildlife and Wildlands Conservation Trust and, the cooperation of Mathenjwa community members and all organisations and individuals who availed themselves for interviews and meetings.

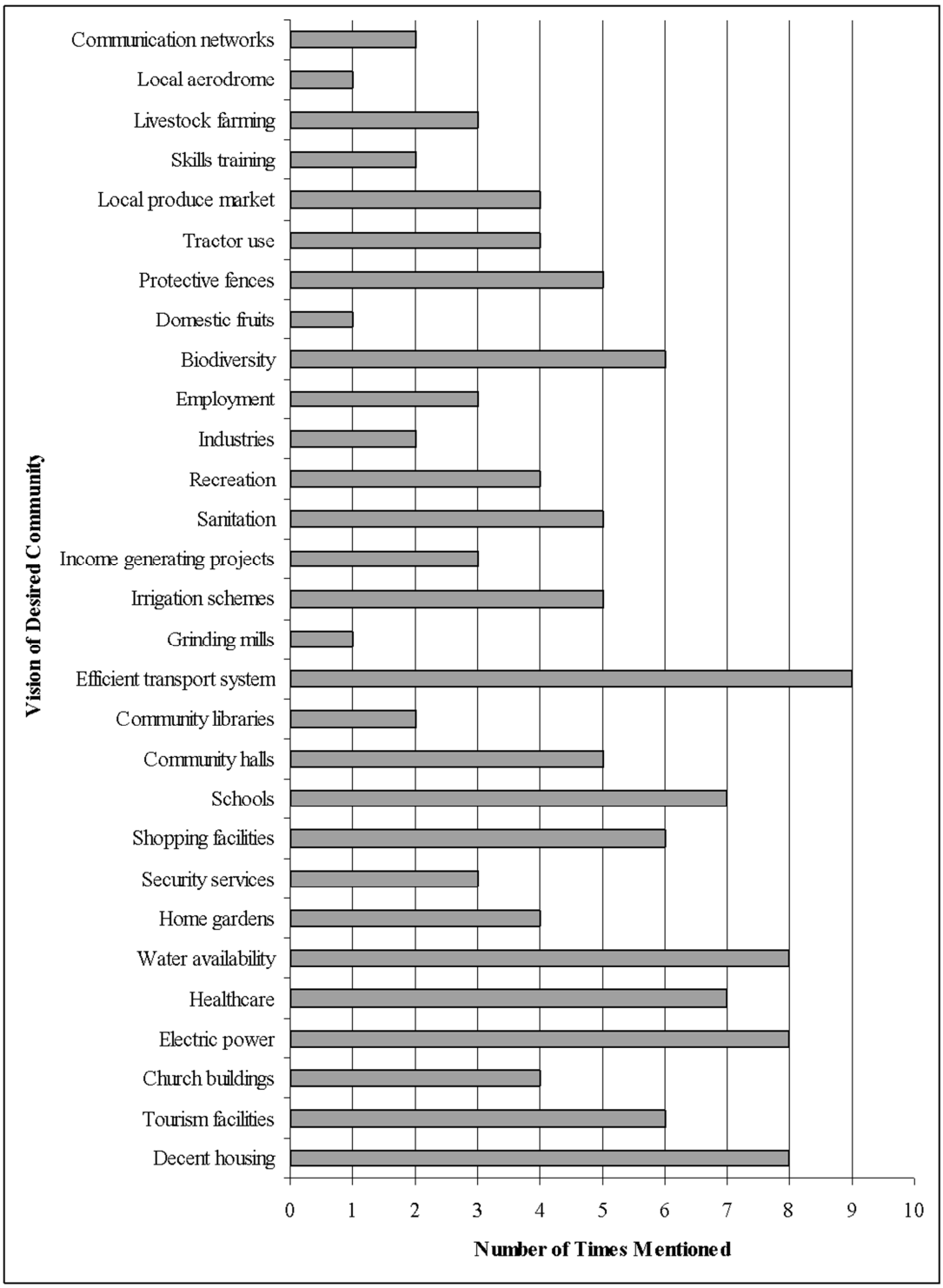
Appendix 4

Appendix 4A: Mathenjwa community socio-environmental concerns

Production	Livelihood	Biophysical	Infrastructure	Other
Lack of pastures	Lack of job skills	Invasive alien plants	Bad roads	Orphanage care problems
Frequent crop failure	Lack of employment	Soil erosion	Poor cellular phone network	Poor church buildings
Lack of vegetable gardens	Poor housing		Lack of fencing	Poor sanitation
Lack of draft power	Sicknesses		Few, poor shops	
Lack of agricultural inputs	Food shortage		No banks	
Poor Soils	Water scarcity		No garages	
Livestock diseases			No Post Office	
			Few sport facilities	
			No high school	
			No clinic	
			No community hall	
			Poor transport service	
			No electricity	
			No crèche	
			No market facilities	
Total: 7	Total: 6	Total: 2	Total: 15	Total: 3

Appendix 4B: Components of Mathenjwa community's vision

The maximum possible number of times a vision component could be mentioned was nine (since there were nine participating groups).



CHAPTER FIVE: POLICY AND GOVERNANCE

Effect of policies and governance mechanisms on the implementation of ecoagriculture in a transfrontier conservation area

Transfrontier conservation areas (TFCAs) aim to achieve conservation and sustainable use of biological and cultural resources while promoting regional peace, co-operation and socio-economic development. Biodiversity-agriculture integration at the landscape scale, known as ecoagriculture, is a way to enhance TFCA goals. This study assessed the potential impact of legislation and governance on ecoagriculture implementation in the Lubombo TFCA. Methods involved document review, key informant interviews, community interviews, questionnaires, direct observation and review of oral customary norms. There is no explicit ecoagriculture policy in any of the countries under focus although ecoagriculture aspects are implied in existing legislation. South Africa has the broadest and most detailed legislation relating to environmental protection, farming and livelihoods. Mozambique's legislation is most explicit on emphasising equity and involvement of disadvantaged social groups while that of Swaziland is most explicit on making it the responsibility of each citizen to protect and safeguard the environment. A lack of transboundary collaboration on conservation, tourism and agricultural development makes the Lubombo TFCA to exist as a treaty on paper rather than in real life. Several inconsistencies between customary norms and public legislation create policy implementation challenges and pose a potential barrier to ecoagriculture in the TFCA. To promote implementation, the national policies need to harmonise with customary law. Local traditional leadership, shown to have a greater influence on the daily life in the communities, should be the mechanism for policy enforcement.

Key words: legislation, Lubombo TFCA, Mozambique, South Africa, Swaziland

5.1 Introduction

The emergence of the transfrontier conservation areas (TFCAs) scheme in southern Africa in the late 1990's in response to environmental challenges was a policy shift from top-down

exclusionary conservation approaches that restrict human use of resources to those that regard utilisation as an integral aspect of conservation (Putz et al. 2001, Shames and Scherr 2009). TFCAs include both formal conservation areas on both sides of an international border, as well as the local communities that live in the areas around these conservation areas. Environmental problems are transboundary in nature since ecosystems straddle national borders. As such, transnational level management is becoming more popular than national level management (Duffy 2005). TFCAs are a form of transnational management receiving significant support from global actors like the World Bank or non-governmental organisations (Duffy 2005). The main goal of TFCAs is conservation and sustainable use of biological and cultural resources whilst promoting regional peace, co-operation and socio-economic development (Sandwith et al. 2001, Smith et al. 2008). TFCAs require landscape management approaches that enhance ecosystem services and maximise the benefits of biodiversity conservation to local communities. A potential way to achieve TFCA goals is to implement ecoagriculture, a framework that integrates agricultural development and conservation of biodiversity as explicit objectives on the same landscapes to improve livelihoods (Chapter Two, Chitakira et al. 2012, Scherr and Buck 2007). The implementation of ecoagriculture can be influenced significantly by policy at different levels (Buck and Scherr 2011) and the present study is interested in investigating such influence.

5.1.1 Defining policy and governance

Policies, laws, and regulations provide the framework and context in which people make decisions (USAID 2005). Policy and governance are important considerations to biodiversity and landscape management since they determine the roles stakeholders can play, the kinds of investments to make and how benefits are shared. Policy implies a commitment or statement of intent which does not prescribe how to achieve the goal. Unlike legislation (laws and regulations), policy does not enforce or prohibit behaviour. Policies can be categorised into substantive, administrative, vertical, horizontal, reactive, proactive, current, and future policies (Smith 2003, Torjman 2005). Ecoagriculture policy may fall into the horizontal or integrated category considering that the objectives of ecoagriculture are complex and relate to the mandates, effort and expertise of various stakeholders. It may as well be regarded a proactive or

future policy since ecoagriculture is a potential climate change adaptation and mitigation strategy (Ecoagriculture Partners 2008b).

Governance is a multi-dimensional concept consisting of economic, political, social and cultural variables that determine whether public policy can achieve the intended goals and improve the welfare of its people (Sumarto et al. 2004). The term is used in several contexts such as corporate, international, national and local governance (UNESCAP 2011) and is applicable in three different dimensions: 1) the type of political regime, 2) the processes by which authority is exercised in the management of a country's socio-economic resources and 3) the capacity of the government to design, formulate and implement policies and to discharge functions (World Bank 1992). The second and third dimensions are most appropriate to ecoagriculture implementation. In this study, governance is the manner in which access to resources is regulated or monitored and it encompasses the roles of the local authority (traditional, municipal or provincial) as well as of national and international players. Of particular interest is the relationship between the local customary norms and applicable public laws and their enforcement.

The management of ecoagriculture landscapes falls within the context of "environmental governance", defined as the formal and informal institutions, policies, rules, and practices that shape how humans interact with the environment at all levels of social organization (Environmental Governance Working Group 2011). Paavola (2007) suggests that environmental governance is best understood as the establishment, affirmation, or change of institutions in order to resolve environmental conflicts. Appropriate legal frameworks on the global, regional, national and local level are considered a prerequisite for good environmental governance (IUCN 2008). Advocates of effective environmental management regard communities and local institutions as important actors to involve in governance (Lemos and Agrawal 2006).

5.1.2 Governance complexities of TFCAs

The regulation and management of locally held resources according to globally accepted conservation norms and practices, known as global environmental governance, is associated with significant challenges posed by complex networks of actors (Duffy 2005). TFCAs are a model of global environmental governance characterised by diverse players at the global, regional,

national and local levels, including international financial institutions, non-governmental conservation agencies, private investors, national governments and indigenous communities. Most TFCAs in the SADC region were established through a top-down approach, spearheaded by high-level non-local actors while communities were mere recipients rather than full partners in the process (Ron 2007). The State tends to play a dominant role and there is a high potential to exclude local communities in decision-making which may further marginalise and isolate the border communities and create tensions (Hammill and Besançon 2003). In some instances the establishment of TFCAs worsened land disputes with communities when new national parks were gazetted, e.g. the Limpopo National Park in Mozambique (IUCN-ROSA, 2002).

Every area or resource straddling the borders of more than one country has governance dilemmas unique to itself but there are general conflicts which include radical bioregionalism versus scientific ecoregionalism, ecoregionalism versus neoliberalism, TFCA planning versus national sovereignty and top-down versus bottom-up managerial processes (Wolmer 2003). Bioregionalism argues for political autonomy, decentralised governance, grassroots empowerment, social equity and self-sufficiency and rejects any centralised authority (Fall 2003). In contrary, ecoregionalism upholds top-down approaches and advocates for power to scientists and technocrats (Wolmer 2003). As a large-scale regional planning and investment initiative involving different institutions and varying degrees of collaboration between them, a TFCA is an extremely complex system. The TFCA scenario raises governance questions regarding power, control, accountability and legitimacy at a variety of scales (Wolmer 2003). In view of the above observations, one would like to determine the nature of governance issues surrounding TFCAs in Southern Africa.

5.1.3. The policy barrier and study rationale

The potential of integrated production and conservation systems to improve food security, poverty reduction and biodiversity protection is strongly limited by policy and institutional frameworks historically designed to separate conservation from production land uses, and to emphasise short-term productivity goals for agricultural systems (McNeely and Scherr 2003). Throughout the world the existence of policy barriers hampers the implementation of ecoagriculture (Mattison and Norris 2005, Scherr and Rhodes 2005, Robertson and Swinton

2005). There is need for research on policy and institutional changes that are needed to allow widespread transition to integrated production and conservation landscape management. Ecoagriculture contributes towards achieving TFCA objectives but the success of ecoagriculture in a TFCA is dependent on the effective functioning of the TFCA. In order to promote ecoagriculture and sustainable regional development as foreseen by the establishment of TFCAs, one needs to understand where the problem areas in governance are located. Given the growing recognition of TFCAs' contribution to solving the environmental and social challenges facing the world, research towards improving the efficiency of these systems is essential.

5.1.4 Objectives

The study assesses the impact of policies and governance regimes on ecoagriculture planning and implementation by communities in the Lubombo TFCA. The study evaluates applicable public policies and legislation across the local, national and tri-national levels, as well as local customary norms. The study attempts to answer the following questions: 1) Which policy statements or legislative clauses promote or hamper biodiversity-agriculture integration? 2) How do traditional or customary practices affect biodiversity-agriculture integration initiatives? 3) Are there any loopholes or conflicting effects in the present governance systems that can affect ecoagriculture in the Lubombo TFCA and how can these be solved? 4) What are the priority needs for adaptation in governance measures that would be required at the international level to promote ecoagriculture in the TFCA?

5.1.5 Study Environment

The Lubombo TFCA (Figure 5.1) spans over 4,195 km^2 distributed over South Africa (66%), Mozambique (26%) and Swaziland (8%). It is a complex trilateral conservation area comprising of five separate units namely, Ponta do Ouro-Kosi Bay (South Africa / Mozambique), Usuthu-Tembe-Futi (Swaziland / South Africa / Mozambique), Lubombo Coservancy-Goba (Swaziland / Mozambique), Nsubane-Pongola (Swaziland / South Africa), and Songimvelo Malolotja (South Africa / Swaziland). The current study focused on the Usuthu-Tembe-Futi unit. This is the largest of the above areas and comprises of the Tembe Elephant Park, Ndumo Game Reserve,

and Tshaneni and Usuthu Gorge Community Conservation Areas (South Africa); the Usuthu area (Swaziland); the Maputo Special Reserve *(Reserve Especial de Maputo)* and the Futi-corridor (Mozambique). The Futi-corridor is a swamp system that links the Maputo Special Reserve to Tembe Elephant Park, restoring ancient elephant foraging routes and reuniting the population that used to move freely between Mozambique and South Africa before being separated by game reserves and international fences (Peace Parks Foundation 2011a) and the community areas between these different reserves.

Adjacent to Ndumo Game Reserve and the Usuthu Gorge Community Conservation Area (UGCCA) is the Mathenjwa Tribal Authority (MTA), a smallholder peasant farming community in the northern part of South Africa's KwaZulu-Natal province. The community falls within Maputaland region which is recognised for its large numbers of endemic plant species and endangered vegetation types (Van Wyk and Smith 2001). In this study the MTA was divided into three zones based on topographical and agro-ecological conditions: (i) lower zone – a low-lying gently sloping coastal plain, around 150m ASL; (ii) middle zone – a rugged and mountainous area around 350m ASL, transitional between lower and upper zones; and (iii) upper zone – a dissected plateau, around 550m ASL. Annual rainfall ranges between 500mm and 800mm and increases from the lower to the upper zone. The zoning captured possible variations in socio-economic and biophysical aspects of the landscape.

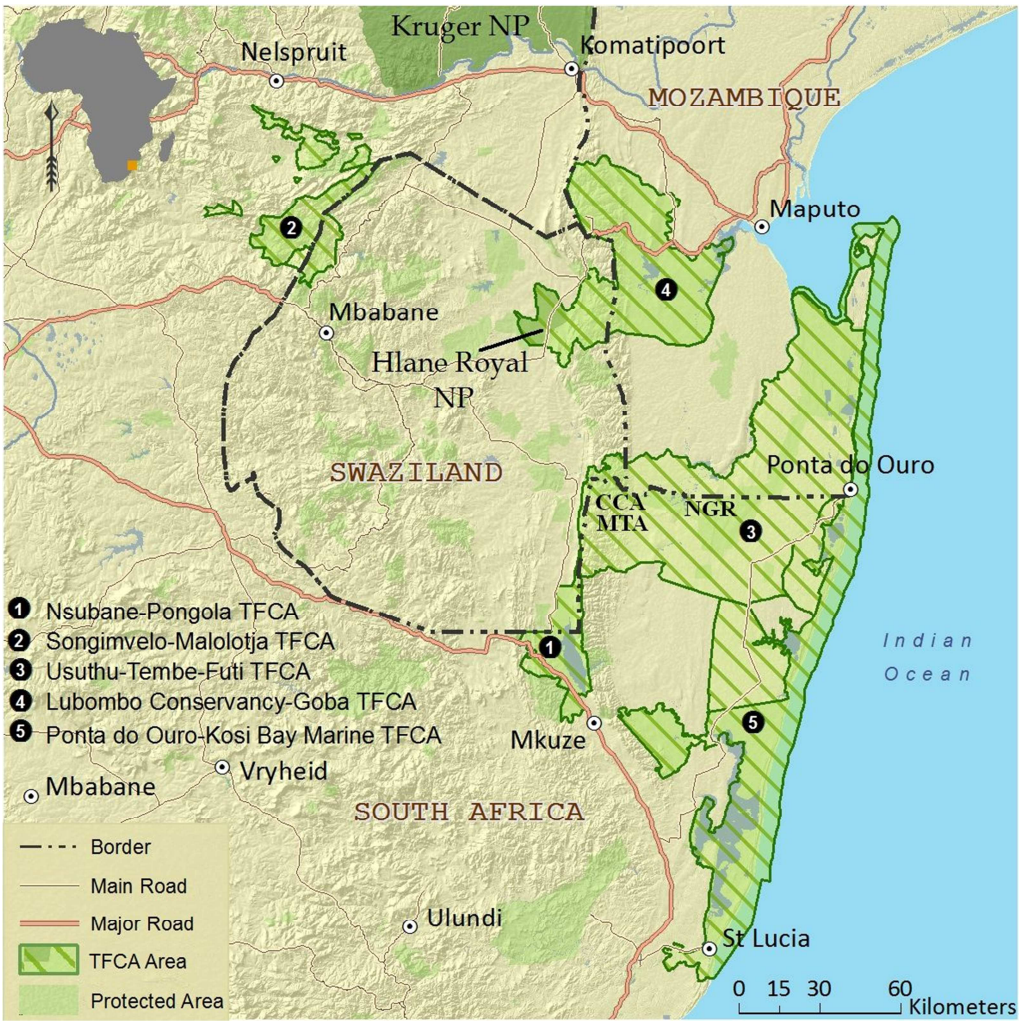


Figure 5.1: Location of Usuthu-Tembe-Futi TFCA within the Lubombo TFCA. MTA = Mathenjwa Tribal Authority; CCA = Usuthu Gorge Community Conservation Area; NGR = Ndumo Game Reserve. *(Source:* Peace Parks Foundation 2011a, with modifications).

5.2 Methodology

This study involves the review of public policy documents, legislative documents and oral customary norms as well as interviews and observations. The following activities were performed.

(a) *Document review*. The documents consulted included the General (Lubombo) TFCA Protocol; the Ndumo-Tembe-Futi Trans-Frontier Conservation and Resource Area Protocol; (Governments of South Africa, Mozambique and Swaziland. 2000, 2000a) and policy and legislative instruments relating to environmental, social or economic issues for the three Lubombo TFCA countries (Swaziland, Mozambique and South Africa). These documents were obtained from web pages, the respective departments and the University of Pretoria Law Library. The documents were mainly at the national level but in the case of South Africa some policies formulated at the provincial level were accessed and analysed. Appendix 5.1 shows the documents cited by country and level of government.

(b) *Key informant (KI) interviews*. Ten semi-structured KI interviews were conducted in South Africa and seven in Mozambique to gather expert opinion on policy and governance issues impacting on biodiversity-agriculture integration initiatives. The interviewees were managers or representatives of key stakeholder organisations identified in a preceding study (Chitakira et al. 2012 or Chapter Two of this thesis), as well as local traditional leadership of the Mathenjwa community. Interviewees were selected to include, where possible, all tiers of government involved, i.e. tribal/traditional, local municipal, provincial, national and TFCA (i.e., inter-governmental) levels. Interviews were not conducted in Swaziland due to budgetary constraints so the assessment for this country was solely based on policy documents review. The schedule of the interviews is attached as Appendix 5.2.

(c) *Group interviews: Brainstorming customary practices.* A case study of the Mathenjwa community was conducted to investigate the influence of customary norms and public laws on the management of natural resources. Six group interviews, two from each zone, were organised for the local farmers. Issues discussed included customary practices and rules governing access to natural resources, awareness of applicable public (provincial/national) environmental policies and the level of compliance with the legislation. Each group meeting had an average of 12 participants of mixed gender and

age. A schedule for the group interviews conducted is given in Appendix 5.2. A more focused study of a particular community was intended to reveal how legislation and governance regimes affected resource management.

(d) *Direct observation.* Supplementary information was gathered by direct observations of daily-life activities in the community, such as natural resources harvesting. The observations were conducted where it was necessary to verify findings from surveys. Activities of interest encountered during the surveys were also noted.

5.3 Results and discussion

5.3.1 Policies and governance regimes impacting on ecoagriculture

Diverse policies and legislative instruments were found to have a direct or indirect impact on ecoagriculture implementation in the Lubombo TFCA, due to the multi-sectoral nature of ecoagriculture (see Chapter Six). Examples include legislation relating to agriculture, forestry, wildlife management, biodiversity conservation, rural development, tourism and trade. Policies relating to poverty alleviation, sustainable farming, sustainable natural resources utilisation, stakeholder participation, gender equity and reward for biodiversity conservation, are applicable to ecoagriculture since these issues fall within the goals of ecoagriculture. Extracts of policies and legislative clauses with a potential impact on ecoagriculture, together with comments on the impact are presented in Appendix 5.2.

South Africa - South Africa developed various tools for working in different production sectors which can be utilised towards the management of integrated farming and biodiversity conservation landscapes. The tools include best practice guidelines, biodiversity stewardship agreements and extension services, agricultural extension to promote sustainable farming, guidelines for sustainable harvesting of resources, training, eco-labelling and certification (Cadman et al. 2010). However, the tools are scarcely put to use and their existence on paper does not reflect reality. Three key pieces of legislation collectively define the principles and procedures governing biodiversity management in the country, i.e., the National Environmental Management Act (NEMA) of 1998, the Protected Areas Act of 2003, and the Biodiversity Act of 2004.

Several other acts relating to water, forests, marine resources and coastal management also potentially impact on biodiversity-agriculture integration in the TFCA. For instance, the Constitution of the Republic of South Africa outlines the basic environmental rights and assigns powers and functions towards environmental management. The NEMA is the overarching framework setting out principles and procedures for environmental management, assessment and governance. The National Environmental Management: Protected Areas Act (NEMPA) of 2003 provides for the establishment and management of protected areas (PAs) while the National Environmental Management: Biodiversity Act (NEMBA) of 2004 brings out the tools for biodiversity planning and the management of biodiversity outside of PAs. The adoption of the NEMBA was a significant milestone in South Africa's legislative reform process since this was the first time the systems approach to environmental management was incorporated into national legislation (Cadman et al. 2010). South Africa also developed a Climate Change Response Strategy in 2004 which focuses largely on mitigation, but also considers the threats to biodiversity posed by climate change. Key informant interviews during the study confirmed that these and other modern environmental legislation were very sound but barely enforced. Reasons for the lack of enforcement include unavailability of human or financial resources as well as lack of political commitment.

Mozambique - The Constitution of the Republic of Mozambique addresses matters relating to the environment and quality of life. With respect to economic, social and cultural rights and duties, the constitution accords people the right to live in a balanced environment. It commits the State and local authorities, in collaboration with other appropriate partners, to adopt policies for environmental protection and care for the rational utilisation of all natural resources (Walmsley and Tshipala 2007). The Environment Law *(Lei do Ambiente*, Law number 20/97) is the basis for all legal instruments relating to environmental conservation in Mozambique. Article 4 of the law establishes basic principles for environmental management including: a) Rational utilisation and management of the environment aimed to promote improved quality of life of citizens and the maintenance of biodiversity and ecosystems and; b) Recognition of traditions and local knowledge which might contribute to the conservation and preservation of natural resources and the environment. The law recognises the interdependence between conservation and livelihood

improvement and upholds indigenous knowledge systems compatible with biodiversity, thus promoting the achievement of TFCA objectives. The land and all natural resources in Mozambique are State property and cannot be sold or otherwise alienated, mortgaged or encumbered (Land Law, Law No.57/2003). That the land cannot be privately owned might discourage long-term investment on the land. Since national individuals or corporate persons can obtain the right of land use and benefit, including passing on to descendants, a lack of title deeds might not necessarily prevent investment in biodiversity-agriculture integration by the citizens. However, this assumption might not apply to foreign investment because this is more sensitive to land tenure regimes.

The policies and laws of Mozambique provide a firm basis for improving environmental planning and natural resource management in the country. The policies encourage awareness campaigns in communities. For example, meetings held along the Futi corridor to discuss and seek the consent of the locals with regards to issues such as proclaiming the land a protected area, proposed compensation mechanisms and involvement of local communities in the management of the area (Peace Parks Foundation 2011). Key informant interviews in Mozambique confirmed that there were sound environmental and livelihood policies in the country but which were barely implemented. It was a challenge to implement the policies due to inaccessibility of many rural communities, reluctance to comply with 'imposed' public legislation and lack of capacity on the part of the Government departments concerned.

Swaziland - The constitution of the Kingdom of Swaziland of 2005 provides for environmental management activities in the country. The Environmental Management Act, Act Number 5 of 2002 (Kingdom of Swaziland 2002) is central to the environmental laws as it establishes a framework for environmental protection and the integrated management of natural resources on a sustainable basis. The Act promotes the enhancement, protection and conservation of the environment and it provides for the sustainable management of natural resources. Acts relating to agriculture (i.e., production of crops, fruits and animals) do not make reference to biodiversity protection or biodiversity-agriculture integration neither is this concept implied in the agriculture laws. Examples include the Plant Control Act of 1981, the Land Agricultural Loan Fund Act of 1929, the Cattle Routes Act of 1918, the Great Stock Brands Act of 1937 and the Seeds and Plant

Varieties Act of 2000 (Kingdom of Swaziland 1981; 1929; 1918; 1937; 2000). The agriculture and related laws of the country are generally old. The study could not establish why the laws have not been revised and modernised. The responsible authorities may want to consider revising the laws to incorporate biodiversity and ecosystem management aspects.

The constitution recognises gender equity in terms of access to land and environmental resources and assigns every citizen the duty to protect and safeguard the environment for the present and future generations. The means by which the citizens can use to protect the environment are however not suggested in the legislation. This leaves room for citizens to be proactive and identify strategies appropriate to local circumstances. Improving the policies in order to empower the citizens to protect the environment and to be explicit on the benefits entitled to the citizens in this regard could encourage investment in biodiversity-agriculture integration.

Country-level comparison - There are no explicit ecoagriculture policies in South Africa, Swaziland or Mozambique and the study did not establish any plans to formulate such policies. Each country has made considerable efforts towards integrating environmental laws. In terms of biodiversity-agriculture integration, the countries are at different levels. South Africa's Conservation of Agricultural Resources Act (CARA) of 1983 in particular explicitly provides for biodiversity-agriculture integration. Swaziland and Mozambique do not have laws similar to CARA. Development of similar legislation could enhance biodiversity-agriculture integration in the TFCA. A comparison of legislation applicable to environmental protection, farming and livelihoods in the three nations reveals South Africa's legislation as the broadest and most detailed in its scope. Swaziland has the least comprehensive legislation, but it emphasises environmental protection as a responsibility for every citizen more explicitly than South Africa or Mozambique. Some of Swaziland's environmental Acts are very old and their revision would be necessary to capture current topical issues. Policies in all the three countries recognise social matters of global concern like gender equity. The Mozambican constitution is the most explicit on emphasising equity and involvement of disadvantaged social groups including women, the youths and local communities. A common phenomenon emerging in these three countries is,

however, a general lack of implementation of the existing environmental policies and acts and this issue needs attention.

5.3.2 Does the transfrontier policy environment support ecoagriculture implementation?

Environmental and livelihood policies of South Africa, Mozambique and Swaziland explicitly provide for assistance to local communities by the central or local governments, including the development of basic infrastructure, service provision and technical support. For instance, Sections 36 and 37 of Chapter 10 of the South African Communal Land Rights Act of 2004, Articles 88 to 91 of the Mozambican Constitution, and Chapter V Section 60 of the Constitution of Swaziland (Government of South Africa 2004, Government of Mozambique 2004, Kingdom of Swaziland 2005). Giving support to communities can empower them to play their role along with other stakeholders in the TFCAs. Policy however fails to provide for the facilitation of stakeholder collective action by making it attractive or mandatory. The Mozambican legislation is very explicit on encouraging stakeholder cooperation, particularly involving local communities, the State and private investors. The Law on Forestry and Wildlife, Law No.10/99 Article 3b, for instance, states, “Economic and social development policies on the preservation and conservation of biodiversity should involve local communities, the private sector and civil society in general, with the objective of achieving sustainable development in the present and for generations to come” (Government of Mozambique 1999). Enhancing collaborative work among government departments, development partners and research institutions, and encouraging sharing experiences and approaches for agriculture and natural resources management could promote balanced landscape management and the realisation of synergies.

Policies need to promote multi-stakeholder processes aiming to involve local communities as part of a broader network towards managing sustainable ecosystems. Conservationists, agriculturalists and social workers operating in an ecoagriculture landscape could be the vehicle driving multi-stakeholder activities. Respectively, these groups can promote biodiversity conservation, agricultural production and livelihood improvement. Collectively, they can offer a wide range of support to local farmers such as advocating for the lowering of marketing costs, assistance in transportation of inputs or produce and giving guidance regarding access to loans or technologies required.

To a great extent, the existing policies provide for the ecosystem management concept which recognises that ecosystems must be managed as a whole, which is central to ecoagriculture. An example is Article 2(2) of the General TFCA Protocol and Article 2(1b) of the former Ndumo-Tembe-Futi (now the Usuthu-Tembe-Futi) Transfrontier Conservation and Resource Area Protocol. Where agricultural lands occur in proximity to protected areas, pro-ecoagriculture policies can provide for the full integration of conservation areas and cultivated lands within participatory planning frameworks (Ecoagriculture Partners, 2008). Practitioners, local community members and other stakeholders in the TFCA need to maximise effort to apply the ecosystem approach in these areas and to enable the management of local communal areas as part of ecological matrices including surrounding protected areas. For example, the Mathenjwa communal area should be managed together with the UGCCA and Ndumo Game Reserve, or the Mapisa communal area in Mozambique managed jointly with the Futi Corridor.

Environmental legislation that embraces the potentials and rights of farming communities as conservators of biodiversity is a major policy need across the world (McNeely and Scherr 2003). Peasant communities can successfully direct ecoagriculture landscape management if they get support to build strong local institutions (Ecoagriculture Partners 2008). Policy can provide for building farming communities' landscape management capacity including land use planning. The Mozambican Law on Forestry and Wildlife, Law No.10/99, article 3(h), for instance, is explicit on this matter. There is however a need to mobilise stakeholders and resources towards implementing this policy. Providing more secure land tenure arrangements to communal farmers (to ensure security of investment) could strengthen their position in making decisions regarding environmental management and possibly encourage the farmers to make long term investments which are important for sustainable landscape management. Coordinated regional development policies, e.g. relating to development of transport, tourism, or biodiversity-agriculture integration, need to be developed and implemented. This calls for effective transboundary coordination among all stakeholders involved.

Practical effort is needed in transnational planning and development of infrastructure (water supply and roads), conservation development, poaching management, tourism development, agricultural development and law enforcement. The opening up of the Futi Corridor as an extension of the Maputo Special Reserve in 2011, the translocation of game from

South Africa to Maputo Special Reserve, and the approval of an integrated development plan and joint operational strategy by the TFCA's joint management board are significant moves towards TFCA goals (Peace Parks Foundation 2011). Other developments that have taken place in the area which the TFCA forms part (e.g. asphalt road development between Durban and Maputo or installation of a new border post) were due to the Maputo Development Corridor (Maputo Corridor Logistics Initiative 2004). There has been limited development of the potential of a TFCA by facilitating cross-border access or transport for either local communities or tourists. There is also no consistent application of policy with respect to issues such as biodiversity conservation within the TFCA, affecting the conservation of endangered wildlife such as rhinos. This means that the original aims of the TFCA (Sandwith et al. 2001) have largely not been reached. There tends to be more talks and proposals (of joint management frameworks) than implementation which makes the TFCA concept to exist more on paper than on the ground.

5.3.3 Agricultural development and conservation policies need harmonisation

A lack of coordination between conservationists and agricultural extension workers is a stumbling block against the harmonisation of conservation and production objectives in the Lubombo TFCA. South Africa's CARA opened way for the integration of agriculture and natural resources conservation but for the integration to become practical, conservation agents and agriculturalists require training in agriculture and conservation respectively. Retraining of field and extension workers could enable them to appreciate harmonisation and to assist the farmers to integrate production and conservation activities. This signifies a departure from the traditional policies that have kept conservation and agriculture apart. Appointing officers with a background in environmental training to key positions in the departments of agriculture could foster the harmonisation of agricultural development and biodiversity conservation policies. Customary rules need to be practically recognised and applied in regulating access to natural resources and landscape management in accordance with the provisions of Article 24(2) of the Land Law of Mozambique or Chapter 12 Section 211(3) of the constitution of South Africa. In Swaziland, the application of customary law is sanctioned by section 252(1) (c) and subsection (3) of the Constitution. These make provision for the principles of Swazi law and custom to be recognised, adopted, applied and enforced as part of the law of Swaziland, provided that they are not

inconsistent with the provisions of the Constitution or other laws of the nation (Dube and Magagula 2012).

5.3.4 Funding opportunities for ecoagriculture projects

One of the major barriers to technology adoption in African smallholder communities is lack of capital (Chitakira and Torquebiau 2010). The development of national policies and taking of action toward climate change adaptation and mitigation can obtain financial and technical support at the international level (Bockel and Smit 2009, Metz et al. 2007). Ecoagriculture is a cost-effective climate change adaptation and mitigation strategy (Ecoagriculture Partners 2008b) and has the potential to provide solutions to issues of poverty, food security and environmental degradation facing the world today (Scherr and Rhodes 2005). National policies needed to recognise the role of biodiversity-agriculture integration in mitigating the impact of climate change/variability, to allow ecoagriculture initiatives by local communities to attract development assistance or funding from international stakeholders and national governments.

5.3.5. Case study of governance challenges: Mathenjwa community

5.3.5.1 Lack of capacity to enforce legislation

Interviews with Mathenjwa community members confirmed that access to indigenous tree and forest resources in the area is loosely controlled. National and provincial legislation provide for the protection of specified tree species (see Department of Water Affairs and Forestry 2006). Several herbal and medicinal plants in the area, e.g. cycads (*Encephalartos spp.* Zamiaceae), are also protected. In terms of section 15(1) of the National Forests Act (NFA) of 1998, no person might cut, disturb, damage or destroy any protected tree or possess, collect, remove, transport, export, purchase, sell, donate or acquire or dispose of any protected tree or forest product from a protected tree, except under a license granted by the Minister and subject to stipulated period and conditions. This policy has the potential to protect certain endemic species against unsustainable harvesting. However, the enforcement of this and other environmental legislation is slack or lacking. There are no effective monitoring mechanisms and offenders and free riders can get away unnoticed and unpunished. Field observations revealed certain products that had been

harvested for sale locally or to buyers from outside the community (Appendix 5.3). Some trade pattern exists whereby residents from the upper zone buy firewood, timber, thatching grass and marula (*Sclerocarya birrea*) fruit products from the middle zone, and handicrafts and livestock from the lower zone while residents from the middle and lower zones obtain grain and domestic fruits from the upper zone. Some locals harvest medicinal plant products (study could not establish quantities) for sale to dealers from large cities like Johannesburg (about 600 km away) implying an almost unlimited demand.

Unlicensed harvesting of medicinal plants for commercial purposes is illegal in terms of Section 57(1) of the NEMBA of 2004. It poses a threat to the sustainability of the species and the ecosystems. That this illegal activity was going on indicates a lack of enforcement of the legislation. Interviews with an official of the Department of Water Affairs and Forestry responsible for enforcing the National Forest Act revealed a challenge of insufficient manpower and impracticality of having to monitor every part of the natural forests and woodlands at every moment, or carry out campaigns in all rural communities in the province to improve awareness of the National Forest Act and other environmental policies.

5.3.5.2 Conflict between tribal and national governments hamper law enforcement

The enforcement of legislation is further complicated by customary norms that conflict with public environmental laws. In terms of customary norms, access to natural resources is free and open for local residents and there are no restrictions on the amounts an individual or household can harvest or the harvesting method to use. Group interviews revealed that the local farmers are more familiar with customary norms (relating to property rights and access to natural resources) than the documented national or provincial laws to which they have virtually no access. The day-to-day life of the Mathenjwa people is governed by local traditional leadership on behalf of the Ingonyama Trust Board, the lawful owner of rural land in KwaZulu-Natal province, representing the Zulu King, in terms of the Traditional Leadership and Governance Act (KwaZulu-Natal Provincial Government 2008). Regarding the harvesting of natural resources such as medicinal plants, the traditional governance system does not put any restrictions and individuals can harvest as much as they can using any means available to them. On the contrary, public policy

enforced by the provincial conservation authority, Ezemvelo KZN Wildlife, puts restrictions ranging across harvesting seasons, methods, amounts and species.

Enforcement of municipal or provincial legislation is hampered by conflict between the municipal/provincial authorities and local tribal leadership. The tribal leaders are reluctant to adopt instructions or advice from the local municipality or conservation agents as they feel this undermines their authority. Some traditional healers and other locals are reluctant to comply with legislation that protects medicinal plants or restricts their utilisation. They perceive such restriction as prioritisation of conservation at the expense of livelihoods. Instituting neighbourhood-watch programmes in which trained local community members monitor the resources and harvesting activities in their neighbourhood could help to reduce illegal and unsustainable harvesting activities.

5.3.5.3 Legal pluralism effect

A scenario where the conduct of the Mathenjwa people is determined by customary norms while the municipal by-laws or provincial and national legislation has a secondary impact is normal according to the legal pluralism school of thought. Law is much more than state (or public) law and it is therefore possible for some communities to observe other legal orderings which are totally independent from State law (Dupret 2007). In the Mathenjwa community, customary laws are a form of ‘other legal orderings’. This scenario shows the need to integrate customary norms with municipal by-laws and State laws, not merely in theory but in practice.

5.3.5.4 Community participation in policy making process

During group interviews members of the Mathenjwa community were asked to give their opinions about who should formulate laws governing access to natural resources in their area. The following are typical of the responses:

- "The local municipal officers must make rules for their respective departments because they work closely with the communities. Also, the *Inkosi* (king) with his tribal council since they know in detail the way of life in the communities."
- "Since the *Inkosi* is a link between the central government and local communities, he should take up locally generated policies to higher forums."
- "The central Government must recognise the local communities' wishes. We (the people) are the Government and must be responsible for making our own laws."
- "Community members should form a committee that formulates laws through consultation with the *Inkosi;* we have many educated people in the community and can make our own laws."

These opinions and sentiments generally reflect a desire to exercise the right to make policies pertaining access to natural resources in the locality or to determine the governance mechanisms. They provide hints when deciding who should participate in the formulation of sustainable biodiversity-agriculture policies within a TFCA.

5.3.6 Ecoagriculture policy development considerations

The development of national ecoagriculture policies is a matter of public interest in that ecoagriculture concerns public policy matters such as biodiversity conservation, agriculture, ecosystem services and livelihoods. The objectives of ecoagriculture are complex and relate to the mandates, effort and expertise of various stakeholders. It might be a challenge to get the different stakeholders (including public, private, local and international institutions) whose interests may conflict, to work together. This challenge could be the reason why no country has developed an explicit ecoagriculture policy so far despite the widespread recognition of the ecoagriculture framework (Shames and Scherr 2009, Buck and Scherr 2011) and despite a publication of proposals and guidelines promoting ecoagriculture policy development (Ecoagriculture Partners 2008b).

One might also argue that an explicit ecoagriculture policy is not a prerequisite but a set of governance measures (from the local to the international level) that have the effect of encouraging ecoagriculture. In this regard, the need to coordinate environmental and agricultural policies for more effective landscape planning requires further attention. Policy, legal and

institutional frameworks in South Africa, Swaziland and Mozambique tend to separate action on conservation, agricultural production and rural livelihoods. Local, national and international policy processes operational at least in the Lubombo TFCAs need to encourage coordinated effort which is essential for scaling up ecoagriculture initiatives.

Biodiversity-agriculture policies need to address gender concerns and this requires that both genders be effectively engaged in policy development. In a survey of 170 households from the Mathenjwa community (Chitakira et al. 2012), almost half (or 47%) of the households were found to be headed by women. One quarter of the households headed by men were run by women in the absence of their husbands who lived and worked in cities. Thus two-thirds of the households in the community were practically women-headed. Literature shows that women continue to make essential and enormous contributions to the environment at the household, local and community levels, but the benefits they receive are not commensurate with their contributions (UNEP 2010). Policy must be developed from a gender perspective to incorporate gender concerns and benefit a greater proportion of households. Current global environmental and food production concerns testify for the need to develop creative alternatives for transforming human-inhabited landscapes to improve overall performance and sustainability (Hazell and Wood 2008, Lovell and Johnston 2009). As the ecoagriculture approach gains increasing recognition across the world, many countries are likely to consider developing national ecoagriculture policies.

The foregoing discussion has revealed a general lack of implementation of existing policies in the three nations under focus. A potential challenge for ecoagriculture policy in these nations is lack of implementation, hence a need for strategies to foster implementation. A suggested strategy is to integrate the goals of various government departments in order to encourage collaborated effort during the policy-making and implementation processes. Biodiversity-agriculture policies must consider ensuring equity, the integration of customary norms, as well as devolution towards empowerment of the locals, in order to appeal to peasant farming communities. Greater political will is required to achieve extensive and effective implementation of laws that harmonize customary and statutory systems (Knight 2010). National governments of Mozambique, South Africa and Swaziland are expected to facilitate the enjoyment of appropriate rights by the local communities in accordance with Article 2(9) of the

General Transfrontier Conservation and Resource Area Protocol. Human rights and the environment are inextricably linked such that recognition of the rights is not only important for sustainable community-based resource management (Child 2009) but is fundamental to effective enforcement of environmental protection (Bosselmann 2008).

5.4 Conclusions and recommendations

This chapter evaluated public policies and customary norms that impact on ecoagriculture planning and implementation in the Lubombo TFCA. A wide range of policies and legislative clauses (at different levels) were identified as having either a supportive or suppressive effect on biodiversity-agriculture integration. The analysis of the implications of key clauses in national legislation in terms of possible implications for ecoagriculture (in Appendix 5) could be useful to the relevant government agencies in Mozambique, Swaziland and South Africa to develop new international cooperation approaches in implementing international agreements and conventions.

A major loop-hole observed in the existing governance systems is that customary norms do not harmonise with public environmental legislation. This anomaly is a significant challenge that compromises policy implementation and law enforcement and poses a threat to ecoagriculture implementation. Given the foregoing discussion, the shortcomings of existing environmental and livelihood legislation in the TFCA are abundantly clear. The legislation is top-down and lacks input from rural communities. It is rarely enforced mostly because of lack of expertise, political will and financial resources. Literature shows that the widely acknowledged benefits of TFCAs such as its contribution to biodiversity conservation and economic development may not be realised unless certain conditions are satisfied (Ron 2007). Some priority needs for adaptation and enabling mechanisms required to promote ecoagriculture in TFCAs are suggested here:

- *Transboundary coordination should be scaled up.* The structures established for the implementation of the TFCA project (the Trilateral Ministerial Committee, the Trilateral Commission and TFCA Task Groups) must step up coordination and cooperation between the several players involved. Such coordination is important for achieving combined effort towards TFCA goals.

- *Enhancing infrastructure* in the communities within the TFCA could help resolve the inaccessibility challenge. However the new infrastructure will need to be designed thoughtfully to ensure that it does not threaten biodiversity and ecosystem services but rather support them. At the national scale, addressing the prevailing low literacy levels could improve the communities' appreciation of public legislation and sustainable development principles. Improved infrastructure, literacy rates and environmental awareness could significantly promote agricultural production as well as biodiversity conservation.
- *Coordination of traditional leadership and government authorities is required.* A lack of coordination between tribal and local government authorities makes it almost impossible to monitor and control unsustainable harvesting of natural resources or land uses such as encroachment and over-grazing. Such activities lead to habitat destruction and biodiversity degradation and therefore are not compatible with TFCA goals. There is a clear need for the governments involved to agree on a plan for coordinating, monitoring and controlling land uses and access to natural resources within the TFCA. The Lubombo TFCA Committee responsible for administering the TFCA activities may consider investing in capacity building requirements for local communities towards sustainable management of local resources. Skills-building and awareness-raising on various aspects and at various levels need to be considered a priority area, together with dissemination of information on legal rights and facilitation of cross-border movements and information sharing.
- *Harmonisation of policy and governance mechanisms.* Gaps in policies, legal and institutional frameworks exist between Mozambique, South Africa and Swaziland, and these derail the successful functioning of the Lubombo TFCA. The process of harmonising the legislation and policies of more than two countries is very complex considering that the sovereignty of each country must be maintained and respected (Ron 2007). Key policy areas requiring harmonisation and coordination include land tenure regimes, land-use planning, and biodiversity conservation and management. The local customary governance and access regimes need harmonisation with statutory governance regimes to facilitate sustainable resource utilisation.

- *Create conditions conducive for involvement of local communities.* Policies at all levels need to include a significant bottom-up approach in order to allow communities to take the initiative in sustainable natural resource management. The TFCA administrative structures should engage rural communities and other stakeholders in the harmonisation of policies and governance mechanisms and in decision making. Participation is essential for gaining support of local communities towards the achievement of ecoagriculture and TFCA goals. The study of the Mathenjwa community showed that effective policy implementation is impossible without involvement of the local community. Public environmental and agricultural policies must incorporate customary norms as much as possible if they are to make a positive impact in the community. The traditional leadership which has the greater influence on the daily conduct of rural community members should become the mechanism for policy implementation in collaboration with government departments, civil societies and other stakeholders.

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Appendix 5

Appendix 5.1 Legislative clauses which effect ecoagriculture implementation in the Lubombo TFCA.

The implications of each clause are discussed in the rightmost column.

SOUTH AFRICA

Legal instrument-Policy/Act	Chapter /Section	Applicable Clauses	Implications for Ecoagriculture
Conservation of Agricultural Resources, Act (CARA) 43 of 1983 (Amended 1991, 1994, 1996)	Section 8(1)(a)	The Minister may, with the concurrence of the Minister of Finance, by notice in the Gazette establish a scheme in terms of which assistance, out of moneys appropriated by Parliament for this purpose, may be granted to land users by means of- *(a)* the payment of subsidies in respect of- (i) the construction of soil conservation works; (ii) the reparation of damage to the natural agricultural resources or soil conservation works which has been caused by a flood or any other disaster caused by natural forces; (iv) the restoration or reclamation of eroded, disturbed, denuded or damaged land; (v) the planting and cultivation of particular crops which improve soil fertility or counteract the vulnerability of soil to erosion; (vi) the combating of weeds or invader plants;	The communal/ peasant farmers can obtain financial subsidies from the central government for soil conservation works and strategies like various types of agroforestry and land rehabilitation which are some of the activities that ecoagriculture entails.
Conservation of Agricultural Resources Act, 1983. Act No 43 of 1983 (CARA)		The Act makes provision for the conservation of natural agricultural resources of South Africa through: maintaining the production potential of land; combating and preventing erosion; preventing destruction of water sources;	Farmers have legislative support to implement ecoagriculture strategies that improve soil fertility

		protecting the vegetation; and combating weeds and invading plants.	or prevent soil erosion. For instance, creating green corridors of natural vegetation.
Constitution of The Republic of South Africa, No. 108 of 1996	Chap 2, Sect 24	Everyone has the right- *(a)* to an environment that *is* not harmful to their health or well-being; and *(b)* to have the environment protected, for the benefit of present and future generations, through reasonable legislative and other measures that- (i) prevent pollution and ecological degradation; (ii) promote conservation; and (iii) secure ecologically sustainable development and use of natural resources while promoting justifiable economic and social development.	Ecoagriculture is implied in the provisions of the constitution since it concerns biodiversity conservation, sustainable management of ecosystems and ecosystem services, and livelihoods enhancement through sustainable resource utilisation.
Constitution of The Republic of South Africa No. 108 of 1996	Chap 12, Sect 211	(3) The courts must apply customary law when that law is applicable, subject to the Constitution and any legislation that specifically deals with customary law. National legislation may provide for a role for traditional leadership as an institution at local level on matters affecting local communities.	Customary laws have great influence in daily life in communal areas, and can be applied in the planning and management of integrated production and conservation landscapes.
Act No. 84 of 1998. National Forests Act, 1998	Chap 1	(1). The purposes of this Act are to- a) promote the sustainable management and development of forests for the benefit of all; c) provide special measures for the protection of certain forests and trees: d) promote the sustainable use of forests for environmental, economic, educational, recreational, cultural, health and spiritual purposes; e) promote community forestry; f) promote greater participation in all aspects of forestry and the forest products industry by persons disadvantaged by unfair discrimination.	Communal farmers have legal support to participate in the management of natural forests for environmental, economic and other benefits; and can participate in initial processing of local resources to add value before marketing, and thus diversified

			livelihoods.
Act No. 10 of 2004. National Environmental Management: Biodiversity Act, 2004	Chap 3, Sect 43	(1) Any person, organisation or organ of State desiring to contribute to biodiversity management may submit to the Minister for his or her approval a draft management plan for- *(a)* an ecosystem-(i) listed in terms of section 52; or (ii) which is not listed in terms of section 52 but which does warrant special conservation attention; *(b)* an indigenous species- (i) listed in terms of section 56; or (ii) which is not listed in terms of section 56 but which does warrant special conservation attention;	Ecosystems in the TFCAs warrant special conservation attention. The policy provides for local communities to propose biodiversity management strategies which may include ecoagriculture.
	Chap 4, Sect 51,	(a) provide for the protection of ecosystems that are threatened or in need of protection to ensure the maintenance of their ecological integrity; (b) provide for the protection of species that are threatened or in need of protection to ensure their survival in the wild; *(d)* ensure that the utilisation of biodiversity is managed in an ecologically sustainable way.	It is within the provisions of the environmental laws for local communities to plan ecoagriculture projects as an initiative to ensure that the ecological integrity of TFCAs is maintained.

SWAZILAND

Legal instrument-Policy/Act	Chapter /Section	Applicable Clauses	Implications for Ecoagriculture
The Constitution of the Kingdom of Swaziland Act 2005	Chapt V Sect 63, Chapt XII Sect 216 Sect 217	It shall be the duty of every citizen to - (i) protect and safeguard the environment. (1) Every person shall promote the protection of the environment for the present and future generations. Parliament may make laws – (d) for the protection of the environment including management of natural resources on a sustainable basis.	It is within the provisions of the Constitution for citizens, if they become aware of the associated benefits, to identify ecoagriculture as a strategy to protect the environment.
The Constitution of the Kingdom of Swaziland Act 2005	Sect 211	(2) Save as may be required by the exigencies of any particular situation, a citizen of Swaziland, without regard to gender, shall have equal access to land for normal domestic purposes.	Women-headed households have equal chance to land implement ecoagriculture if they so wish, provided ecoagriculture is officially recognised as a "normal domestic purpose" land use.
The Flora Protection Act, 2000. Legal Notice No.10 of 2000	Sect 5	(2) Any owner or occupier of land may pick, pluck, gather, cut, uproot, process or destroy:- b). protected flora that is growing on land which is bonafide required for agriculture, building or other development and who has at least eight weeks prior to commencement of such operations applied in writing with full particulars of his intentions to the Minister for permission to do so.	The clause implies that flora conservation may not be integrated into agricultural land. Policy would need to explicitly provide for the integration of biodiversity conservation and farming.

The Wild Birds Protection Act, 1914	Section 3	Provides for the protection of wild birds (i.e., non-domestic bird) which inhabits either permanently or temporarily any part of the country - which includes PAs and non-PAs, and Section 3(c) provides for the utilisation for subsistence purposes.	Communal farmers can undertake to integrate the protection of wild biodiversity in their locality, including birds. Provision for utilisation for subsistence purposes can encourage conservation in rural communities.
The Protection of Freshwater Fish Act, 1938	Sect 8	No person shall use for the capturing of fish any kraal or contrivance of sacking, canvas, wicker, cane, wire, net or other material not being a net or implement of fishing provided for by this Act.	Ecoagriculture communities are urged to refrain from unsustainable methods of harvesting fresh water fish or other natural resources.
	Sect 9	No person shall wilfully kill or destroy fish in any waters by means of dynamite or other explosives, or chemical, or poisonous other injurious substance.	

MOZAMBIQUE

Legal instrument-Policy/Act	Chapter /Section	Applicable Clauses	Implications for Ecoagriculture
Land Law. Law No.57/2003	Chap III Article 10.	(1). National individual and corporate persons, men and women, as well as local communities may be holders of the right of land use and benefit. 2. National individual and corporate persons may obtain the right of land use and benefit individually or jointly with other individual and corporate persons by way of joint title holding. 3. The right of land use and benefit of local communities adheres to the principles of joint title holding for all the purposes of this Law.	Provides for communal farmers to invest in ecoagriculture as individuals or as a community or as a joint venture with some private organisation.
	Article 13	(1). A title shall be issued by the general or urban Public Cadastre Services. (2). The absence of title shall not prejudice the right of land use and benefit acquired through occupancy	Close 2 provides for communal farmers to invest in the land they occupy and reap the benefits without necessarily having to acquire title deeds over the land – can have positive impact on investment in ecoagriculture.
	Article 16	(1). The right of land use and benefit may be transferred by inheritance, without distinction by gender;	Gives both male and female household heads confidence to invest in long-term projects (like ecoagriculture) with the realisation that this would benefit one's descendants.
		(1). In rural areas the local communities shall participate in: a) The management of natural resources; b) The resolution of conflicts; c) The process of titling, as established in paragraph 3 of article 13 of this Law; d) The identification and definition of boundaries of the land that	Explicitly provides for the precise roles of local communities, and ecoagriculture promotes this; recognises customary norms and practices

		the communities occupy. (2). In exercising the competences listed in a) and b) in paragraph 1 of the present article, the local communities shall use, among others, customary norms and practices.	in exercising their roles. Customary rules can be carefully integrated with the TFCA protocols and other transboundary laws for the efficient management of TFCAs.
	Article 24		
Law on Forestry and Wildlife, Law No.10/99 of the 7th of July.	Article 3	b) Economic and social development policies on the preservation and conservation of biodiversity should involve local communities, the private sector and civil society in general, with the objective of achieving sustainable development in the present and for generations to come e) Harmony with local communities and local State bodies: Promotion of conservation, management and use of forest and wildlife resources in a way that is not detrimental to customary practices and conforms with the principles of conservation and sustainable use of forest and wildlife resources, within the framework of decentralisation; h) education and exchange of experiences between local communities in order to build their capacity to manage and conserve forest and wildlife resources;	The law is explicit on the involvement of local communities in biodiversity management. It also promotes stakeholder collective action; provides for building the capacity of local communities towards environmental resources conservation and management. All these conditions are essential for making ecoagriculture implementation possible and effective.
	Article 9	Title holders of the right to use and benefit from the land, whether the right is acquired by occupancy or by authorisation of an application, require a licence to exploit natural forest and wildlife resources in their respective areas, except where the exploitation is for their own consumption.	Provision by this article and also by Article 21, for the need to utilise forest and wildlife resources for meeting subsistence needs without having to obtain a licence can encourage conservation in rural communities.

Regulations on the Law on Forestry and Wildlife Decree No.12/2002 of the 06th of June	Sect IV Article 35	1. Local communities shall be heard in the presence of the applicant or his representative, by the organs of local State administration, by means of actions to be taken by the Provincial Forestry and Wildlife Services, the cost of which is carried by the applicant.	Gives local communities a say in the granting of concessions to hunt in their locality. Implies the empowerment of local communities in decision making. Ecoagriculture planning involves empowerment of locals.

PROTOCOLS

Legal instrument-Policy/Act	Chapter /Section	Applicable Clauses	Implications for Ecoagriculture
General TFCA Protocol	Article 2	Trans-Frontier Conservation and Resource Area Objectives: (2) to create an enabling framework to facilitate the following: economic development through appropriate optimisation of opportunities presented by the Parties' natural assets; ecologically and financially sustainable development, the sustainable utilisation of the natural resource base, and the maintenance of ecosystem function through holistic and integrated environmental planning and management; (9) the involvement of communities in and adjacent to TFCAs through consultation, representation and participation in TFCA management.	Objectives of ecoagriculture qualify ecoagriculture implementation as sustainable economic development, and holistic and integrated environmental planning and management. A bottom-up approach need to be adopted to get local communities involved in ecoagriculture.
Ndumo-Tembe-Futi Trans-Frontier Conservation and Resource Area Protocol	Article 2	The TFCA objectives of the Parties: 1(b) to address the needs and aspirations of local communities by ensuring their direct participation in and/or ownership of and/or derivation or benefit from any programmes or initiatives that are undertaken in the Area and encouraging or empowering them to do so in whatever way is possible and appropriate; to accommodate within appropriate management regimes for the Area a broad spectrum of human activities compatible with the protection and management of the terrestrial and aquatic ecosystems in the Area.	Provides for the implementation of ecoagriculture on the basis that ecoagriculture presents opportunities for direct involvement of local communities in TFCAs, and for sustainable management of local natural ecosystems.

Appendix 5.2 Schedule for policy and governance interviews

Date	Place	Type	Organisation / Institution	Interviewee Designation
3/09/2011	Maputo	KI	Maputo Special Reserve	Ecologist
2/09/2011	Maputo	KI	Ministry Tourism	National Director
2/09/2011	Maputo	KI	State Administration Ministry	Head: Community Development & Management Department
31/08/2011	Maputo	KI	Eduardo Mondlane University	Scientist: Department of Biological Science
31/08/2011	Maputo	KI	Ministry Tourism	Community Specialist: TFCA Coordination Unit
31/08/2011	Maputo	KI	Tourism Ministry	Advisor: TFCA Coordination Unit
30/08/2011	Maputo	KI	Eduardo Mondlane University	Professor: Department of Forestry
22/08/2011	Pretoria	KI	Peace Parks Foundation	International Coordinator: Lubombo TFCA
19/04/2011	Pietermaritzburg	KI	Wildlands Conservation Trust	Wildlands Initiatives Director
19/04/2011	Pietermaritzburg	KI	Provincial Department of Agriculture, Environmental Affairs & Tourism	District Deputy Director Environmental Management
18/04/2011	Durban - Umhlanga	KI	Manje Isikhathi Trading CC	Chief Executive Officer
3/03/2010	Mathenjwa area	Group	Upper zone	Manyiseni community
3/03/2010	Mathenjwa area	Group	Upper zone	Manyiseni community
25/02/2010	Mathenjwa area	Group	Upper zone	Kuhlehleni community
25/02/2010	Mathenjwa area	Group	Upper zone	Kuhlehleni community
23/02/2010	Mathenjwa area	Group	Middle zone	Khume community
23/02/2010	Mathenjwa area	Group	Middle zone	Mabona community

Date	Place	Type	Organisation / Institution	Interviewee Designation
17/02/2010	Pietermaritzburg	KI	Provincial Department of Arts, Culture and Tourism	Research Policy & Planning Unit Representative
16/02/2010	Pietermaritzburg	KI	Ezemvelo KZN Wildlife	Regional Ecologist Resource Use Zululand Region
16/02/2010	Pietermaritzburg	KI	Provincial Department of Corporative Governance & Traditional Affairs	Directorator – Traditional Councils' Land Admin Support
16/02/2010	Pietermaritzburg	KI	Ingonyama Trust Board	Board Representative
15/02/2010	Pietermaritzburg	KI	Provincial Department of Agric, Environ Affairs & Rural Development	Assistant Manager – Municipal Support & governance
15/02/2010	Pietermaritzburg	KI	Provincial Department of Agric, Environ Affairs & Rural Development	Deputy Director – Planning, Governance & Information
11/02/2010	Mathenjwa area	Group	Lower zone	Magwanga community
9/02/2010	Mathenjwa area	Group	Lower zone	Mbadleni community
19/06/2009	Mathenjwa area	KI	Tribal Authority	*Induna* (Headman)
27/02/2009	Mathenjwa area	KI	Tribal Authority	Acting Chief

Appendix 5.3: Forest products harvested for sale

Key: (a) - road-side firewood stalk; (b) – local research assistant shows tree bark harvested for medicine; (c) - thatching grass; (d) - construction wood.

CHAPTER SIX: GENERAL DISCUSSION AND CONCLUSION

6.1 Introduction

The current chapter wraps up this thesis on the feasibility of ecoagriculture planning and implementation in the Lubombo transfrontier conservation area (TFCA). This chapter summarises preceding chapters and reflects on the initial hypotheses and objectives of the study. The chapter discusses the key issues emerging from the study and advances recommendations for policy and planning response.

6.2 Chapter summaries

In *Chapter One*, the conceptual background to this study, it was noted that human-inhabited landscapes are extremely important for biodiversity conservation. In order to protect the full range of global biodiversity, conservation efforts therefore need to go beyond protected areas into the areas inhabited and utilised by human beings. Ecoagriculture was identified as a potential strategy to simultaneously achieve production, livelihood and conservation goals. One of the objectives of this study was stakeholder identification and consultation and *Chapter Two* discussed the procedure taken. It showed that farming communities in TFCAs enjoy unique combinations of stakeholders and a good potential to attract technical, financial and other support important for ecoagriculture promotion. *Chapter Three* reported on the procedure and outcome of a participatory landscape performance assessment facilitated for various stakeholder groups. It was shown that the study area is a mosaic of unsystematically managed ecoagriculture practices with a performance rating in the middle of the range. It was recommended that the mosaic landscapes be transformed into planned and better managed ecoagriculture systems with more benefits for the farmers and the ecological environment. The assessment results showed that despite their low levels of education, communal farmers have the willingness and capability to evaluate performance of local landscapes. This indicates the farmers' potential to manage planned ecosystems, provided supportive policies are operational.

Chapter Four explored the role of local communities towards sustainable TFCAs. It compared the community's vision of the future against ecoagriculture and TFCAs' goals. It

showed that stakeholder-driven ecoagriculture is a potential strategy to sustainably achieve the community's vision and TFCAs' goals simultaneously provided biodiversity management strategies are supported by infrastructure improvements and income generating enterprises that raise local living standards. The policies and governance mechanisms relating to ecoagriculture implementation in the Lubombo TFCA were reviewed in *Chapter Five.* The objective was to evaluate the influence of existing public and customary policies and governance regimes on ecoagriculture implementation. It concluded that public environmental legislation in South Africa, Mozambique and Swaziland is top-down and lack input from rural communities. The legislation is also poorly enforced largely due to the central governments' lack of capacity to do so, minimal political will and reluctance on the part of the locals to comply with state regulations particularly when they conflicted with customary norms. The case study of tree resources utilisation and management in the Mathenjwa community of South Africa showed that sound policies were operational but their effectiveness was limited by poor enforcement.

The findings in Chapters Two to Five demonstrate a wide range of (biophysical, social, economic and policy-related) opportunities and constraints associated with the planning and implementation of ecoagriculture in smallholder farming communities in the TFCA under focus. This provides answers to the first research question posed in Chapter One of this thesis. The preceding chapters have also shown how biodiversity-agriculture integrated landscape management can be achieved in the study area. An overall assessment of this issue is made later in the current chapter in answer to the second major research question of the study, posed in Chapter One.

6.3 Key emerging issues

A number of issues emerge from this study: What benefits could systematically managed ecoagriculture bring to the Lubombo TFCA and other communities elsewhere under similar conditions? In what ways can ecoagriculture practices meet the local livelihood and ecological needs? Can the feasibility of systematic ecoagriculture implementation in a given area be quantified in a way that communal farmers can appreciate and adopt? There are also questions regarding capitalising on opportunities and dealing with challenges associated with the interdisciplinary nature of ecoagriculture under given circumstances. Building ecoagriculture

landscapes is demanding and this raises the issue of availability of enough commitment to implement the changes it involves.

6.3.1 What Benefits can planned ecoagriculture strategies bring to the area?

The study area comprises of mosaics of unplanned ecoagriculture involving spontaneous practices such as traditional tree-crop combinations, grass strip contours and hedgerows (refer to Figure 7 in Chapter Three). The sustainability of these practices is not guaranteed given increasing human population density and greater demand for food and ecosystem services amid climate change and variability threats. As such, systematic approaches which are better-managed are recommendable. The area's potential to produce food, conserve wild biodiversity and sustain ecosystem services can be enhanced by transforming the *ad hoc* biodiversity-agriculture integration practices into planned and monitored systems, which stakeholders (including local farmers) can evaluate from time to time and take the necessary regulative measures. Studies in West Africa identified several positive impacts of integrated production and conservation systems (Asaah et al 2011). The impacts include a feeling of empowerment from increased knowledge and success; recognition of a pathway out of poverty; retention of youths in the villages due to new career opportunities; improved nutrition, better health, increased income and opportunities for home improvements. Ecoagriculture in the Lubombo TFCA is expected to make similar impacts and to provide skills that create resilience and self-sufficiency in the communities, important for addressing local livelihood and poverty problems. Examples include:

- Addressing production problems: improving yields through careful selection of crops or livestock combinations and adopting strategies to reduce production costs. The communities become resilient the living standards are improved when the farmers can produce more food for themselves.
- Organic production of poultry, livestock, fruits, vegetables, cereals and other produce can lead to product certification and possibly landscape eco-labelling. Certification and eco-labelling processes are associated with better product quality and higher market value and enable better returns for the farmers. Certification process is defined as the indication, through labelling, that a commodity complies with a set of regulations that govern the production process (Ghazoul et al. 2009). Research assessing the feasibility of labelling

the Mathenjwa area as an ecoagriculture landscape showed that the area's rating was 0.66 on a scale ranging from 0 to 1 (Cholet 2010). This score implies that the landscape's performance was on the high side although it seemed to perform better on the ecosystem services aspect compared to the ecoagriculture one (Cholet 2010). Product certification and eco-labelling in the current study area thus stand a good chance. Landscape labelling, whereby the ecoagriculture attributes of an area can generate added-value to a range of commodities (e.g. crops, animals) and services (e.g. ecotourism, lodging, biodiversity management), appears to be more holistic than conventional product labelling and has potential in the Lubombo TFCA (Torquebiau et al. 2012a). A leading international retailer, Woolworths, has been promoting the production and marketing of organic products by small scale farmers in South Africa and facilitating access to global markets for organic products like cotton, with benefits to farmers and the environment (SAinfo reporter 2008, Liquidlingo Communications 2009). One must be careful not to over-emphasise the effectiveness of agricultural certification given that, so far, research shows limited evidence to support the hypothesis that certification has benefits to the environment or producers (Blackman and Rivera 2011). Cohn and O'rourke (2011) argue that certification is a poor substitute for strong government policies and that, consumers and other influential supply chain actors scarcely care about conservation outcomes.

- Enhanced quality of life through conserving ecosystem services that are important for local livelihoods.
- Employment creation and income generation leading to poverty reduction such as through operating rural tourism projects, the sale of surplus agricultural produce and of sustainably managed forest products.
- Farmers can earn extra income from the sale of ecosystem services, e.g. carbon credits and payments for environmental services from consumers or carbon emitting organisations beyond the area. Payments for environmental services compensate landowners for management strategies that provide ecosystem benefits to other parties but which in some way constrain their own opportunities for generating revenue (Ghazoul et al. 2009). Such income can be used to purchase agricultural inputs, supplementary food and clothing, or pay for medical services and educational needs, which contribute to better living standards.

Ecoagriculture also provides opportunities to address the TFCA's conservation problems through:

- Encouraging compliance with environmental regulations, particularly as local farmers realise the benefits of conserving biodiversity.
- Protecting the rights to collect products from neighbouring protected areas (PAs) such as the Ndumo Game Reserve and Usuthu Gorge Community Conservation Areas (in South Africa), the Usuthu area (in Swaziland) and the Maputo Special Reserve and the Futi-corridor (in Mozambique). Poaching problems are expected to reduce drastically when local communities realise that they have access to resources in adjacent PAs (Lele et al. 2010).
- Reduced conflicts between local communities and conservation authorities made possible by the preceding conditions and perceived benefits, creating a win-win situation.
- Protecting areas valued for their cultural or spiritual importance particularly to the local communities.

Associated challenges. The benefits outlined above come with challenges. A challenge revealed during interview and questionnaire surveys was the lack of viable markets for rural produce. For instance, the farmers in the upper zone of the Mathenjwa community can produce surplus crops during years of good rainfall which can be sold to provide income for the households. A lack of good transport and marketing infrastructure made it difficult for the farmers to take their produce to urban or export markets. With regards to rural tourism, the Lubombo TFCA communities like many communal areas in Southern Africa, do not have the capacity to run tourism enterprises. This situation can be improved through capacity building but the necessary financial, technical and other resources are not available locally. Intervention by central governments or external agencies becomes the way out provided this is a priority of the central government. If the local farmers acquire the necessary skills and awareness, rural tourism can be feasible in the area given that small entrepreneurial projects that build on local resources (e.g. culture and handcrafts) do not need substantial sums of capital to operationalise (Briedenhann and Wickens 2004).

The process of eco-labelling involves the technical side of developing voluntary standards and the operational and marketing side of developing consumer awareness but such capacity is lacking in rural communities. Besides this, the forces promoting eco-labelling have not yet achieved enough momentum in society and eco-labelling has an image problem which prevents it from becoming mainstream or *status quo* in consumer society (Williams 2004). The national poverty ratio for South Africa is 22.0% which is relatively low by developing world standard, while those for Swaziland (69.2%) and Mozambique (55.2%) are among the highest in the world (World Bank 2011). The failure of eco-labelling to attract the consumer is expected to be aggravated in the developing economies of Southern Africa where the majority of consumers are poor and find eco-labelled goods to be unaffordable luxuries. However consumer demand has a chance to growparticularly in South Africa given a growing urban population (62% of total population in 2010) and increasing at 1.2% annually (Central Intelligence Agency 2012). Wealthy urban dwellers may be prepared to pay for certified products.

Natural resources in communal areas including the Lubombo TFCA are not open access resources (i.e., freely accessible to anybody) but common property resources (i.e., owned by defined member groups) and it is these groups that have access rights (Ostrom 1990, McKean and Ostrom 1995). The ‘free rider’ problem (i.e., some members consuming more than their fair share of a publicly owned resource, or carrying less than a fair share of the costs of its production) is often associated with common property resources. Free riding may lead to excessive use and degradation of a resource owned by the community. Effort is needed to deal with this problem. Granting property rights can help in this regard, but this in itself does not provide adequate incentives and conditions for sustainable management of natural resources (Adhikari 2001). Other essential measures include ensuring appropriate cost-benefit sharing arrangements, empowering the community members as resource users (e.g. by allowing them to formulate their own access rules), providing training and technical assistance to develop and strengthen local organizational capacities, and supporting sustainable management and conservation efforts (e.g. through awareness campaigns and payments for environmental services).

6.3.2 The interdisciplinary nature of ecoagriculture presents both opportunities and challenges

The management of integrated production and conservation landscapes (ecoagriculture) needs to be achieved through interdisciplinary approaches. The inter-linkages between society and the environment are getting more clearly defined than ever before and it is more imperative to consider approaches that cut across multiple fields of expertise and social perspectives. The current global society needs to understand and find solutions for complex situations from a variety of perspectives (interdisciplinary approaches) to be able to overcome the challenges of the next several decades (Davenport 2008, Marcu 2007).

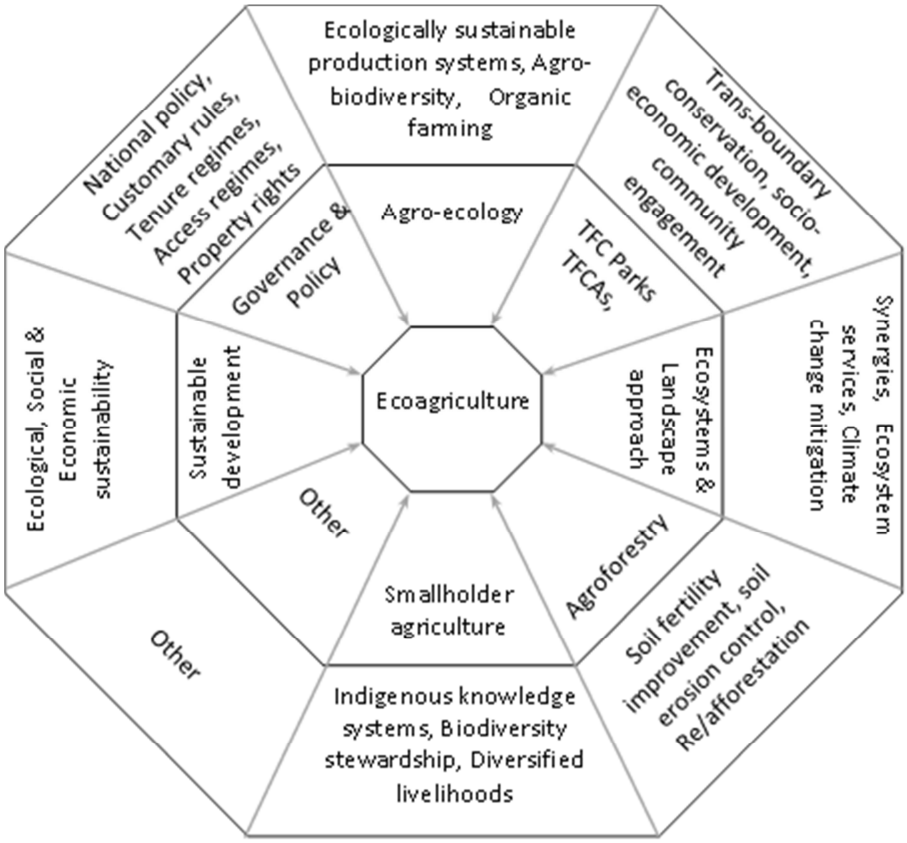

Figure 6.1 Ecoagriculture links disciplines, approaches and goals - author's perception

The ‘science’ or ‘art’ of ecoagriculture is a meeting point of various disciplines, concepts, approaches and goals (Figure 6.1). Ecoagriculture implementation therefore requires stakeholder collaboration. Different researchers and practitioners use their different experiences and expertise to develop coordinated approaches and tools to achieve targeted goals at the landscape scale. Ecoagriculture planning creates opportunities for bringing together practitioners, researchers and other stakeholders from various backgrounds and across the scientific and socio-cultural spectra. To get different practitioners to work together is a challenge. Collaborative research, for instance, is confronted by a dominant intellectual paradigm that conceptually separates culture and nature, rather than considering human–environmental interaction as a dynamic, interpenetrative engagement (Strang 2009). The good thing however is that the concept of integration is gaining popularity. Given sufficient investments of time and energy, supportive policies, committed leadership, effective communication and good facilitation skills, successful stakeholder collaboration can be achieved.

Apart from bridging disciplines, ecoagriculture emphasises on sectoral integration and encourages the harmonisation of policy agendas such as agriculture, food security, poverty alleviation, climate variability, ecosystems, indigenous knowledge systems, marketing and governance approaches. Biodiversity-agriculture integration policies must recognise local farmers as key stewards of ecosystems and empower them to raise production, increase incomes and manage climate risks. There is need to review the existing applicable policies and make adjustments to permit viable sectoral integration.

6.3.3 The question of commitment and capacity

Establishing ecoagriculture landscapes requires new skills, capacities, tools and policies (Scherr 2011) which demands significant commitment. International cooperation on TFCA management also requires consistent commitment to implement applicable policies. This study produced predominantly positive results regarding the feasibility of ecoagriculture planning and implementation in the Usuthu-Tembe-Futi TFCA. A major challenge however is how to ensure the commitment of various stakeholders who indicated their support for agriculture-biodiversity integration. For multilateral environmental agreements to be effective, they need to include incentives as well as sanctions in case of violations or noncompliance (Greenfacts 2011). This

raises a concern over the tripartite protocols for the Lubombo TFCA since there are no clauses to enforce commitment to appropriate action by the parties involved.

Efforts to promote integrated production and conservation landscape management need to recognise the diversity of landscape challenges and be prepared to apply locally-adapted solutions. The spectrum of integrated landscape approaches is wide. It includes integrated watershed management, landscape restoration, territorial development, greening agricultural corridors, eco-regional programs and biological corridors (Scherr 2011). The approach considered most appropriate to a particular landscape will depend on local conditions and priority needs, that is, socio-economic, biophysical, policy and governance mechanisms. The capacity to create locally-adapted solutions in this regard may be limited in the communal farming sector in Southern Africa because of high illiteracy rates and limited technical expertise. Capacity development may be necessary to enable farmers and extension practitioners to become more innovative and pro-active.

6.3.4 Quantifying ecoagriculture feasibility

Haase and Foley (2009) identify a two-fold purpose of poverty or deprivation indices, i.e., to facilitate the effective targeting of resources and for the monitoring and evaluation of policy outcomes. With respect to ecoagriculture, indexes are important for directing effort and resources towards those dimensions that need attention. Indexes can guide the monitoring of landscape performance or the evaluation of intervention effort. Indexes also enable comparisons across different landscapes. However, if poorly constructed or misinterpreted the use of indices may send misleading policy messages (Haase and Foley 2009). Calculation of feasibility index has been done in certain instances, for example, de Janvry et al. (1992) constructed an index of the political feasibility of rural poverty reduction policies, and Heath and Li (2010) considered the construction of a race equity index in the United Kingdom.

The present study estimates the feasibility index for ecoagriculture planning and implementation in the Mathenjwa landscape. This is the first attempt to quantify ecoagriculture feasibility for a given area and the criterion used is original to this study. Often, complex mathematical computations are employed in constructing feasibility indexes. However, in the

interest of fostering local empowerment and self-reliance, the current study employs a relatively simple method which lowly educated peasant farmers and extension officers can appreciate and adopt. An ecoagriculture feasibility index (EFI) is calculated using the landscape's rankings/scores for a given set of attributes and a landscape can assume an EFI ranging from 0 meaning not feasible to 8 implying extremely feasible (Table 6.1). The scores for the attributes in Table 6.1 are drawn from the findings at different stages of this study. With regards to "recognised biodiversity hotspot, TFCA, PA or PA buffer zone" the landscape's score is 1.00 (the maximum score per attribute) because it possesses the three features considered for scoring in this attribute. The scores for "perceptions of local farmers" and "perceptions of key informants" are from Chapter 2. Perceptions of local farmers show a relatively low score most probably because the farmers had limited knowledge of what ecoagriculture entails. This score is likely to increase as awareness of the practice increases in the community. Scores about the "willingness of local farmers" and "landscape performance assessment" are from Chapters Two and 3, while that for "related to community's vision" is from Chapter Four. Scores for "percentage of area under natural vegetation cover" and "policy environment" are derived from Chapter Five. The EFI for the landscape under focus comes to 5.90 (or 74%) implying a high feasibility for systematic ecoagriculture implementation in this area. This outcome positively confirms hypothesis (i) of this study which states that "existing socio-physical and policy environment of the Usuthu-Tembe-Futhi TFCA is conducive to a people-driven sustainable integrated production and conservation landscape management."

Table 6.1 Ecoagriculture feasibility index for the Mathenjwa landscape

Attribute / Condition	Scoring Method	Score
Recognised biodiversity hotspot; TFCA; PA or PA buffer zone	Score 0.333 for each of these 3 conditions (or equivalent) applicable to the area	1.00
Willingness of local farmers	Percentage of willing respondents (92.3/100)	0.92
Perceptions of local farmers	Percentage of positive perceptions (51/100)	0.51
Perceptions of key informants	Percentage of positive perceptions (88/100)	0.88
Landscape performance assessment (LPA) score	Based on participatory LPA score (2.97/5)	0.59
Related to community's vision	% of vision classified under livelihoods + production + biodiversity (65/100)	0.65
Percentage of area under natural vegetation cover	Calculated from aerial photo or satellite imagery (74.46/100)	0.75
Policy environment	Score 0.1 to 0.4 (repressive to not supportive); 0.6 to 1 (supportive to very supportive); 0.5 if neutral. Judgement based on policy analysis results.	0.6
E. F. I.	Sum of scores (possible score is 8.0)	**5.90**
	Or as a percentage of possible score	73.75%

The contribution of the present study is three-fold. 1) It provides an EFI for a specific landscape, in this case the Mathenjwa communal area. 2) The EFI is a new landscape evaluation tool that other researchers or practitioners seeking to promote more sustainable relationships between farmers and the biodiversity they depend upon can adopt. 3) Considering the identified ‘attributes’ or status of a landscape, the results can be a basis for creating an ecoagriculture certification standard. Initiatives certifying that producers adhere to set environmental and

production standards have become popular and can create incentives for local farmers to improve their environmental and socioeconomic performance (Blackman and Rivera 2010).

The criterion for quantifying ecoagriculture feasibility suggested here is intended to be as user-friendly as possible to enhance adoption by communal farmers and other end-users. The criterion enables quantification and spatial comparison of ecoagriculture feasibility for different areas of a country or region, or for a particular landscape at different stages in time. However, the method has some limitations, for instance, it involves some degree of subjective judgement, particularly of the policy environment and thus different evaluators can come up with different indexes for the same area. The method also relies strongly on interview and questionnaire data, but an index that depends on sample surveys shows some inconsistences in trends over time and must be used with caution particularly when assessing changes in the longer term (Heath and Li (2010).

6.4 Conclusions and recommendations

This last section of the research report summarises the main conclusions arrived at in the study and makes recommendations for policy and planning interventions:

- This study confirmed the study area to be an unsystematically managed ecoagriculture landscape involving practices like traditional agroforestry, maintenance of grass strips on steep slopes and production of diverse crops, grasses and trees in different parts of the landscape. Spontaneous or traditional forms of integrating farming and natural biodiversity are effective as long as human population density and demand for ecosystem services remain low. As such, systematic ecoagriculture approaches are recommendable because apart from supporting more viable livelihoods and ecosystem services for local inhabitants, they provide better opportunities for monitoring landscape performance and introducing intervention measures to regulate or improve the performance.
- Ecoagriculture implementation requires efficient stakeholder collaboration and stakeholder analysis is a necessary procedure to identify key stakeholders to engage. The study showed that TFCAs have multiple and diverse stakeholders with varying degrees of influence and importance. This unique combination of stakeholders forms a crucial basis

for ecoagriculture planning and implementation. Extension workers and other players to facilitate ecoagriculture need to be able to select parties to engage. Stakeholder collective action can include landscape-level decision-making involving consultations among farmers and other key stakeholders. For the convenience of planning at the landscape level, the farmers may create decision-making and planning committees. At the local level, individual farmers may, in liaison with their neighbours, plan for their specific fields to enhance complementarity between different practices and interaction between various components of the mosaic.

- Participatory landscape performance assessment (LPA) and community visioning (CV) processes create forums for farmers to talk about, brainstorm and plan the management of integrated production and conservation landscapes. The LPA and CV are interactive media for improving environmental education in communities. They are tools for planning and monitoring landscapes applicable regardless of participants' levels of education. Provided care is taken to minimise its shortcomings (such as over-representing views of more influential participants rather than of the community) CV is a potentially effective approach for encouraging collective action and supporting local ownership of development programmes. CV is recommended for extension and development personnel as a strategy that does not only promote effective engagement of locals but also stimulates local cooperation, enthusiasm and a sense of ownership of proposed development projects.
- This study revealed reluctance of local community members to comply with state regulations (relating to property rights and access to natural resources) that were imposed on them - they did not participate in their formulation. The community members complied more with customary norms and regulations and had very limited knowledge of the documented statutory laws. In view of this scenario, the integration of local indigenous knowledge and norms with public policy becomes vital for sustainable management of local ecosystems. A lesson for TFCA management is that it is crucial to effectively engage local communities, e.g., through consultative policy development and participatory planning. Given the low levels of education in the communal areas, policy needs to emphasise on capacity building to enhance effective engagement of this stakeholder group. Through this way, the communities can be empowered and motivated

to commit themselves to the sustainable management of integrated production and conservation landscapes.

- There was overwhelming willingness to plan ecoagriculture among the farmers but knowledge of systematic management of biodiversity-agriculture integrated landscapes was lacking. The farmers require guidance on identifying the appropriate ecoagriculture strategies for adoption and skills training on implementation. The findings confirm hypothesis (ii) in this study that "for integrated production and conservation landscape management to become sustainable in TFCAs, innovative efforts are necessary in the form of more harmonised policies and governance mechanisms, capacity building, campaigns to raise awareness of associated benefits and skills training to adopt new technologies."
- The study showed that customary rules and traditional authorities have the greater influence over the day-to-day life in the rural communities. For environmental policies to be effective in the communities, local members must therefore contribute to the development of the set of governance measures (from the local to the international levels). This can help to empower local members and enhance their sense of ownership for the policies with the effect of encouraging compliance.
- No country in the world currently has an explicit ecoagriculture policy but one cannot rule out the possibility of countries considering formulating such policies in the future particularly as the ecoagriculture framework gains popularity. It is recommendable to incorporate customary norms into ecoagriculture policy and to make traditional leadership structures (with the support of other stakeholders) the vehicle for policy implementation. Such measures can enhance compliance with the legislation.

Areas for future research are suggested herewith the foregoing conclusions:

i) Investigation towards a certification standard that promotes landscape-level biodiversity conservation and ensures a reward for conservation-livelihood improvement practices within TFCAs and possibly communal farming areas elsewhere. The "Biodiversity Friend" certification standard, the first of its kind that ensures conservation of biodiversity in agriculture (World

Biodiversity Association 2010), can serve as a basis for designing a certification standard that suits conditions of communal farming areas in TFCAs.

ii) Market research for targeted certified agricultural and natural products from the TFCAs, including modelling to predict the viability and sustainability of the markets.

iii) Investigating the socio-economic and ecological implications of ecoagriculture implementation in the TFCA communities.

APPENDICES

Appendix A: Research Clearance Letters

Appendix A1: Ethical Clearance

100 1908 - 2008
UNIVERSITEIT VAN PRETORIA
UNIVERSITY OF PRETORIA
YUNIBESITHI YA PRETORIA

Ref: EC090402-023

22 June 2009

ETHICS COMMITTEE
Faculty of Natural and Agricultural Sciences
University of Pretoria
Pretoria
0002
Tel: 012-4204107
Fax: 012-4203290

Dr E Torguebiau
Department of Zoology and Entomology
University of Pretoria
Pretoria
0002

Dear Dr Torguebiau

Re: EC090402-023 Ecoagriculture Feasibility Study in Mathenjwa Communal Land, KwaZulu-Natal Province, SA

The project conforms to the requirements of the Ethics Committee.

Kind regards

Prof NH Casey
Chairman: Ethics Committee

Appendix A2: Mozambique Research Clearance

Direcção Nacional das Áreas de Conservação
Credencial de Investigação/Levantamento/Recolha

Apenas para uso oficial:	
Nº da Credencial	**0014/2011**
Tipo de actividade	**Pesquisa Cientifica**
Data	**04/07/2011**

Eu, Francisco Pariela, na qualidade de Director Nacional das Áreas de Conservação, confirmo por este meio que foi concedida ao **Sr. Munyaradzi Chitakira** Estudante candidato a PHD de nacionalidade zimbabweana credencial de investigação e recolha de informação cientifica para o seguinte projecto:

Policies governing the utilization and management of natural resources in Libombo TFCA commuties.

Esta Credencial inicia no dia 31 de Agosto de 2011 e expira no dia 31 de Agosto de 2011.

Igualmente por este meio solicito que as autoridades das Reservas Especial do Maputo e Marinha Parcial da Ponta do Ouro, facilitem o desenvolvimento de quaisquer actividades relacionadas com este projecto, obviamente no total respeito pelas normas e orientações científicas da Área de Conservação.

Atenciosamente,

Francisco Pariela
(Director Nacional)

DNAC

Appendix B: Fieldwork Plans

Appendix B1: Phase 3

Subject: Mathenjwa Landscape Performance Assessment

Period: May-June 2009

Dates	Planned Activities
4 May	Travel to KZN
5 – 8 May	Preparations: informing & seeking permission from TA; Identifying venues; Identifying experts & making preliminary appointments; Orientation meeting with assistants
11 – 15 May	Venue arrangements; Informing local *induna*; Choosing & inviting participants for first participatory meeting; First meeting – lowland; Organizing data
18 – 22 May	Venue arrangements; Informing local *induna*; Choosing & inviting participants for second participatory meeting; **Second meeting** – middle land; Organizing data
25 - 29 May	Venue arrangements; Informing local *induna*; Choosing & inviting participants for third participatory meeting; Third meeting – plateau; Organizing data
1 – 4 June *tentative*	Venue arrangements;

	Inviting participants / confirming appointments;
	Fourth meeting – experts & extension workers;
	Organizing data
5 June	Return to Pretoria

Appendix B2: Phase 4

1. Work plan Phase 4a: November/December 2009 and Phase 4b: January/February 2010

Objectives: a) Facilitate community visioning; b) Investigate natural resources governance.

Dates	Planned Activities
(4a) 13 Nov	Travel to KZN
12 – 20 Nov	Preparations: -informing TA; -training assistants -making appointments - unstructured interviews on policy issues
23 – 27 Nov	- Informing local *induna*; - Venue arrangements; -Identifying & participants for first meeting; -1st Visioning meeting – lowland; -Unstructured interviews on policy issues -Organizing data
30 Nov – 4 Dec	- Informing local *indunas*; - Venue arrangements; -Identifying participants for 2nd & 3rd meetings; -2nd & 3rd meeting – middle zone & plateau; -Organizing data
7 – 11 Dec	- Informing local *induna*; - Venue arrangements; -Inviting participants for 4th meeting; -4th meeting – local key informants; -Tourist interviews

	-Organizing data
16 December	Travel to Pretoria
(4b) 12 Jan 2010	Travel to KZN
14 - 22 Jan	-Participant observation – engaging in community activities
	-informal/unstructured interviews on access to resources governance
	-Tourist interviews
25 - 29 Jan	-Semi-structured KI interviews - Pietermaritzburg
	-policy analysis:
1 – 5 Feb	- Engaging in community activities
	- Semi-structured KI interviews
	- Tourist interviews
	- policy analysis
8 – 12 Feb	-Participant observation - engaging in community activities
	-informal/unstructured interviews;
	-Organising information
13 Feb	Travel to Pretoria

chitakira m. cfes up november 2009.

2. Community visioning work schedule

Resources:

Map of community

Photographs of ecoagriculture landscapes

Flip charts

Coloured markers

Pencils

Pens

Note pads

Masking tap

Stik-stuf

Pratt glue

'Stick'N self-adhesive notes' cards

Steps

1. Deciding timeframe of vision and discussing current concerns *(1 hr).*

- Agree on a time frame: 5, 10, 15 or 20 years.
- What are concerns or problems in your village?
- What do you want to see changed or improved?
- What are good things that should be maintained?

2. Analysis of community assets – A brief walk around, group discussions, listing/mapping assets, report back by group leaders, open interactive discussion ($1^1/_2$ – 2 hrs).

- Describe your community.
- What are the people/families like?
- What is the land, soil, animals and vegetation like?
- What do people do for a living?
- Assess ecoagriculture potential.

3. Develop a community vision of the desired future *(1 hr).*

- What landscape do you want to see here in 5; 10; 20 years?
- What life-styles (livelihoods) do you want to see here in 5, 10, 20 years?
- Drawing/ writing the vision in groups – sketches, diagrams, symbols.

4. Presenting, Discussing and Ranking *($1^1/_2$ hrs)*

- What seems to be most important in each vision?
- What do visions have in common?
- Arrive at a common (general) vision

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Appendix B3: Phase 5

Period: 5 February – 6 March 2010

Objective: Analysis of policies governing natural resources utilisation and management and their impact on ecoagriculture.

Dates	Planned Activities
5 Feb 2010	Travel to KZN
8 - 12 Feb	-Participant observation of utilisation and management of natural resources; to learn through participating in relevant community activities *(lower zone)*. -Unstructured interviews of locals on rules / beliefs governing access to and use of land, water, trees, wildlife, etc natural resources -Tourist interviews/questionnaires - Confirm appointments with interviewees
15 - 19 Feb	-Semi-structured Key Informant interviews - Pietermaritzburg -Policy studies – study available policy documents; assess the nature and relative importance of policy / rules at local, provincial & national levels; historical perspective of the policy context and how it affected the local landscape
22 – 26 Feb	-Participant observation of utilisation and management of natural resources; to learn through participating in relevant community activities *(middle zone)*. -Unstructured interviews of locals on rules / beliefs governing access to and use of land, water, trees, wildlife, etc natural resources
1 – 5 Mar	-Participant observation of utilisation and management of natural resources; to learn through participating in relevant community activities *(upper zone)*. -Unstructured interviews of locals on rules / beliefs governing access to and use of land, water, trees, wildlife, etc natural resources -Organising information
6 March	Travel to Pretoria

m chitakira- cfes, up. 29/01/2010

Appendix C: Questionnaires

Appendix C1: Questionnaire for Farmer's Household Heads

Student Name: M. Chitakira (PhD Environment and Society, University of Pretoria)

Subject: Feasibility of ecoagriculture in Mathenjwa Community

Questionnaire number: ……. Date:……..……

Area name: …….. Interviewer's initials: …….

Way Point No. ……GPS Co-ordinates ……..

PLEASE NOTE: This survey is for study purposes. Kindly answer the questions which follow. Your responses shall remain anonymous and confidential.

SECTION A: ENVIRONMENTAL ISSUES

1. What has been the state of wild animals (biodiversity) in your area over the past 15 years?

Increasing ❑ Static ❑ Decreasing ❑ Not sure ❑

2. What of the state of wild plants (biodiversity) in your area over the past 15 years?

Increasing ❑ Static ❑ Decreasing ❑ Not sure ❑

3. Below is a list of uses for trees. Please name three species you would prefer most for each use (where applicable).

Use	Zulu/Scientific/Common Names of trees preferred		
Firewood			
Shade			
Construction			
Medicinal			
Wild fruits			
Domestic fruits			
Humus			

Decorative			
Erosion control			
Live fences			
Cultural			
Other……..			
…….			
…….			

1. Which environmental and livelihood problems are you facing in your farm or village and at what scale? *(Please tick appropriate box)*

Problem	Not faced (0)	Minor (1)	Average(2)	Major (3)
Declining soil fertility				
Declining crop yields				
Soil erosion				
Lack of enough water *(Quantity)*				
Lack of clean water *(Quality)*				
Drought				
Environment-related sickness (people)				
Livestock diseases				
Pests (crops)				
Shortage of firewood				
Shortage of livestock feed / pastures				
Lack of timber for construction				
Lack of shade				
Shortage of wild / indigenous fruits				
Shortage of domesticated / exotic fruits				

Lack of food				
Lack of medicinal plants				
Other (specify)……	……	……..	……..	……..
……..…	……	……..	……..	……..
……	……	……..	……..	……..

SECTION B: ECOAGRICULTURE

Ecoagriculture is a vision for improving human management of the land and natural resource base so that it meets three goals at the same time: (a) provides agricultural products and services on a sustainable basis, (b) supports viable livelihoods for local people, and (c) conserves a full complement of native biodiversity and ecosystem services (Buck et al, 2006).

5. Do you agree or disagree with the following statements?

Statement	Agree	Disagree	Neutral
Conservation of wild plants and animals is as important as agriculture.			
Nature conservation should not only be done in protected areas but also **outside** protected areas			
Conserving wildlife in your farming area will improve wildlife conditions in UGCCA.			
To manage land sustainably, decisions about land use and conservation should be made at Mathenjwa community level instead of farm or village levels.			
People in rural areas should make their living in ways that conserve biodiversity.			

6. Would you be willing to do the following?

Action	Yes	No	Neutral
Protect existing remnants of natural vegetation			
Restore remnants of natural vegetation in areas not suitable for agriculture			

Connect forest/ bush / veld fragments with a greenway or plant corridor			
Promote ecologically friendly farming activities, e.g. contour strips, agroforestry, organic farming, planting hedges			
Avoid the use of fire to clear land or control weeds or pests			
Learn about how to manage an ecoagriculture landscape			
Take part in group meetings to plan for ecoagriculture *(scenario formulation and visioning)*			

7(a). In your view what is the likely chance of success of ecoagriculture in Mathenjwa?

Very high ❑ High ❑ Low ❑ Very low ❑ Not sure ❑

(b) Why? i. ……

ii. …….

8. a. Do you think your household will benefit from practicing ecoagriculture?

Yes ❑ No ❑ Not sure ❑

b. If YES, please explain in what ways?

i. ……..……..

ii. ……..……..……..

iii. ……

9. What are the problems you are likely to face in an effort to practice ecoagriculture?

Please suggest possible solutions.

Problem: ……..…….

Solution: ……..……..……

Problem: ..……..……

Solution: ……..…….

SECTION C: RESPONDENT'S BACKGROUND INFORMATION

(a). Household Head

10. Sex: Male ❑ Female ❑

11. Age in years……..……..……..…….

12. Level of education reached

None ❑ Primary ❑ Secondary ❑ Tertiary ❑ Don't know ❑

13. Primary occupation ……..……..……

14. Where the household head *usually* live

At the homestead ❑ Elsewhere (specify) ……..❑

(b). Respondent (omit if respondent is household head)

15. Sex Male ❑ Female ❑

16. Age in years……..……..……...…….

17. Position in household ……..……..……

18. Level of education reached

None ❑ Primary ❑ Secondary ❑ Tertiary ❑

(c). Household

19. No. of people living in the household

1-4 ❑ 5-8 ❑ 9-12 ❑ Over 12 ❑ Not sure ❑

20. Household's average income per month R……

21. Major sources of household income

Employment ❑ Social Welfare ❑

Crop sales ❑ Veld products sales ❑

Craft sales ❑ Gardening ❑ Other…….……

22. Size of farmland in hectares ……ha. Don't know ❑ No farmland ❑

23. Types and numbers of livestock reared, if any.

Type	Cattle	Goats	Donkeys	Sheep	Pigs	……..	…….	……
No.								

24. Which crops do you grow and what average amounts (Kgs) do you harvest per year?

Crop							

Hectares							
Kgs							

25. Who makes decisions for household farming activities?

Household head alone ❑ Other family members involved ❑

26. Besides farming, what else do you do for living?

……..……..……

……..

27. Please make any remarks you would want to, regarding this research.

……..

……..……

THANK YOU

Appendix C2: Supplementary Questionnaire for Farmers' Households

Tree Species Uses and Preferences: Mathenjwa Community, KZN.

Student Name: Munyaradzi Chitakira (PhD Environment & Society, University of Pretoria)

Area Name: …….. Interviewer's initials: …….. Date…….

PLEASE NOTE: This survey is for study purposes. Kindly answer the questions which follow. Your responses shall remain anonymous and confidential.

1.

Use	Tree species preferred	Reason(s) for Choice of Species	Availability (plenty, average, few, scarce)
Firewood	1.		
	2.		
	3.		
Shade	1.		
	2.		
	3.		
Construction	1.		
	2.		
	3.		
Medicinal	1.		
	2.		
	3.		
Wild Fruits	1.		
	2.		
	3.		
Domestic Fruits	1.		
	2.		

	3.		
Humus	1.		
	2.		
	3.		
Decorative	1.		
	2.		
	3.		
Erosion control	1.		
	2.		
	3.		
Live Fence (hedge)	1.		
	2.		
	3.		
Cultural Burial	1.		
	2.		
	3.		
Prevent Lightning	1.		
	2.		
	3.		
Protect against evil/enemies	1.		
	2.		
	3.		
Other …..……..	1.		
	2.		
	3.		
Other	1.		

…..……	2.		
	3.		

2. Do you like to conserve these trees in your area? Yes [ ] No [ ] Not sure [ ]

3. Which difficulties or problems do you face when you want to conserve these trees?

……
……
…….

Appendix C3: Questionnaire for Tourists

Student Name: M. Chitakira (Centre for Environmental Studies, University of Pretoria).

Contacts: mchitakira@zoology.up.ac.za; 012 420 4282; 0794455727.

Subject: Rural Tourism (Mathenjwa Ward)

KINDLY NOTE: This survey is for study purposes. Please be free to respond to the following questions. All responses shall remain anonymous and confidential.

Rural tourism is any form of tourism that showcases the rural life, art culture and heritage. It may include farm or agricultural tourism, hiking, biking, visiting community museums and buying crafts.

SECTION A: Respondent's Perception of Rural Tourism

1. Would you like to tour rural communities in South Africa?

Yes [ ] No [ ] Not sure [ ]

2. If Yes, which aspects of rural life would you be interested in when visiting a community?

……
……
……

3. Would you like to visit Mathenjwa Community/Ward, the rural area in this locality (northern KwaZulu-Natal)? Yes [ ] No [ ] Not sure [ ]

Please give reasons for your opinion.

……
……
……

4. In your view, what **infrastructure** is needed the touring of rural communities in northern KwaZulu-Natal attractive and sustainable?

……
……
……

5. What **policies** are required for rural tourism to be a success?

……
……
.

6. What remarks would you make regarding rural tourism (in northern KwaZulu-Natal)?

……
……

Section B: Respondent's Background Information

10. Sex: Male ❑ Female ❑

Country of origin: ……..

11. Age in years……..……..……..…….

12. Level of education reached

None ❑ Primary ❑ Secondary ❑ Tertiary ❑ Not sure ❑

THANK YOU

Appendix D: Schedules for Key Informant (KI) Interviews

Appendix D1: Guide for KI Interviews on Ecoagriculture Feasibility

Student Name: M. Chitakira (Centre for Environmental Studies, University of Pretoria)

Subject: Feasibility of ecoagriculture in Mathenjwa Community

NOTE: This survey is for study purposes. Please feel free to answer all or some of the questions which follow. Your responses shall remain anonymous and confidential.

Date:…….

Ecoagriculture is a vision for improving human management of the land and natural resource base so that it meets three goals at the same time: (a) provides agricultural products and services on a sustainable basis, (b) supports viable livelihoods for local people, and (c) conserves a full complement of native biodiversity and ecosystem services (Buck et al, 2006).

QUESTIONS

1. a). As an organisation, what are your interests regarding communal farmers?

b). What role are you playing in Mathenjwa Communal Area?

2 Which non-farming activities can the people of Mathenjwa possibly do to make a living without causing damage to wild biodiversity or the environment?

3. a). Considering the existing socio-economic and environmental conditions (policy, land tenure, climate, wildlife, soils, terrain, vegetation, household income levels, etc.) how feasible is it to implement ecoagriculture in the area? Please explain.

b). Which conditions/factors are likely to promote ecoagriculture?

c). Which conditions/factors might work against ecoagriculture?

4. a). Do you foresee any challenges likely to be encountered by Mathenjwa communal farmers in an effort to adopt ecoagriculture?

b). Kindly suggest strategies of overcoming such challenges.

5. a). In support of the goals of ecoagriculture, which forms of support would your organisation offer to the farmers?

b). Which benefits offered by ecoagriculture would you like communal farmers to know?

6. a). Would you say partnership is important to the success of ecoagriculture in Mathenjwa?

b). If so, please explain in brief, the roles of the various stakeholders to be involved in the partnership.

7. a). How do existing policies encourage / discourage ecoagriculture in Mathenjwa? b). What policy changes (at a local level) do you recommend for the achievement of ecoagriculture goals in these smallholder farming areas?

8. Do you have other remarks to make regarding the implementation of ecoagriculture in communal farming areas?

THANK YOU VERY MUCH

Appendix D2: Guide for KI Interviews on Policy and Governance Studies

Subject: Policies governing the utilisation and management of natural resources in Mathenjwa Communal Area (Ndumo)

Researcher's Name: Munya Chitakira (Student - University of Pretoria, Centre for Environmental Studies)

Date:…….

NOTE: This interview is part of a research on the feasibility of ecoagriculture in Mathenjwa Community. Please feel free to answer the questions relevant to you from the list below. Your responses shall remain anonymous and confidential.

Ecoagriculture is a practice of combining farming and nature conservation at the same place and time in order to improve human livelihoods. It is a vision for improving human management of the land and natural resource base so that it meets three goals at the same time: (a) provides agricultural products and services on a sustainable basis, (b) supports viable livelihoods for local people, and (c) conserves a full complement of native biodiversity and ecosystem services (Buck et al, 2006)

QUESTIONS

1. Which rules control access to land for farming, grazing, or other household use by the people of Mathenjwa?
2. Which rules control access to resources from the wild like firewood, fruits, fish, wild animals, birds, etc in KZN?
3. What kind of tenure do the community members have over the land? Do / can they have title deeds over the land they are using?
4. Which rights do the community members in KZN have over natural resources such as land, water, trees, wild animals, etc in their area? For example:
    - use
    - sell to get income
    - manage – control the use, protect or improve
    - develop the resources for ecotourism
5. What is the nature of the rights, for example in terms of:
    - durability
    - exclusivity (excluding others from use or usufruct)
    - transferability
    - rights recognised by legal instruments
6. Governance (of land, natural resources, etc.) can be seen as the processes that different actors develop to apply broadly defined policy rules. Such rules do not exist only as government decisions blindly implemented by citizens. Because of the existence of

provincial and local powers (including traditional rules), because of the empowerment of local people and because of on-going decentralisation processes, policy rules can be formulated and implemented through social processes involving many actors (stakeholders). According to you, who could be the main actors of "ecoagriculture governance"? Please explain why and how.

7. In your view, how do the existing policies at national, provincial or local levels encourage or discourage ecoagriculture or conservation of natural resources in the community?
8. What changes in policy (at any level) do you think are needed for ecoagriculture to become possible in the communal farming areas in this country?
9. What other remarks would you like to make regarding this research?

THANK YOU VERY MUCH

Appendix D3: Guide for Interviews with - Agriculture Practitioners

Subject: Policies governing the utilisation and management of natural resources in Mathenjwa Communal Area (Ndumo)

Researcher's Name: Munya Chitakira (Student - University of Pretoria, Centre for Environmental Studies).

Date:…….

NOTE: This interview is part of a research on the feasibility of ecoagriculture in Mathenjwa Community. Please feel free to answer the questions relevant to you from the list below. Your responses shall remain anonymous and confidential.

Ecoagriculture is a practice of combining farming and nature conservation at the same place and time in order to improve human livelihoods. It is a vision for improving human management of the land and natural resource base so that it meets three goals at the same time: (a) provides agricultural products and services on a sustainable basis, (b) supports viable livelihoods for local people, and (c) conserves a full complement of native biodiversity and ecosystem services (Buck et al, 2006)

QUESTIONS

1. a. How do policies (at national, provincial or local level) affect the acquisition of agricultural inputs by communal farmers in KZN?
   b. Which are the policies?
2. Which policies affect access to technical assistance to the peasant farmers in Mathenjwa / Ndumo area?
3. Which policies affect the marketing of agricultural products (like livestock and crops) by these farmers?
4. What marketing challenges do the communal farmers in KZN face? Please explain.
5. Governance (of land, natural resources, etc.) can be seen as the processes that different actors develop to apply broadly defined policy rules. Such rules do not exist only as government decisions blindly implemented by citizens. Because of the existence of provincial and local powers (including traditional rules), because of the empowerment of local people and because of on-going decentralisation processes, policy rules can be formulated and implemented through social processes involving many actors (stakeholders). According to you, who could be the main actors of "ecoagriculture governance"? May you explain why and how?
6. In your view, what changes in policy (at any level) are needed for ecoagriculture to become possible in these communal farming areas?
7. Please make any other remarks you want regarding this research.

THANK YOU VERY MUCH

Appendix D4: Guide for Interviews with Local Leadership and Farmers

Subject: Policies governing the utilisation and management of natural resources in Mathenjwa Communal Area (Ndumo)

Researcher's Name: Munya Chitakira (Student - University of Pretoria, Centre for Environmental Studies)

Date:…….

NOTE: This interview is part of a research on the feasibility of ecoagriculture in Mathenjwa Community. Please feel free to answer the questions below. Your responses shall remain anonymous and confidential.

Ecoagriculture is a practice of combining farming and nature conservation at the same place and time in order to improve human livelihoods. It is a vision for improving human management of the land and natural resource base so that it meets three goals at the same time: (a) provides agricultural products and services on a sustainable basis, (b) supports viable livelihoods for local people, and (c) conserves a full complement of native biodiversity and ecosystem services (Buck et al, 2006)

QUESTIONS

1. How does a person in Mathenjwa community get access to land for farming, grazing, or other household use?
2. Which steps does one take when he/she wants to get resources from the wild like firewood, grass, fruits, fish, wild animals, birds, etc?
3. What kind of ownership do you have over the land you are using? Do / can you have title deeds?
4. As a member of the community which rights do you have over natural resources such as land, water, trees, wild animals, etc in their area? For example:
    - use
    - sell to get income
    - manage – control the use, protect or improve
    - pass on the land to your child or relative
    - develop the resources for ecotourism
5. Governance (of land, natural resources, etc.) can be seen as the processes that different actors develop to apply broadly defined policy rules. Because of the existence of provincial and local powers (including traditional rules), because of the empowerment of local people and because of on-going decentralisation processes, policy rules can be formulated and implemented through social processes involving many actors (stakeholders). According to you, who could be the main actors of "ecoagriculture governance"? May you explain why and how?

6. In your view, how do the existing rules encourage or discourage ecoagriculture or conservation of natural resources in the community?
7. What changes in policy (at any level) do you think are needed for ecoagriculture to become possible in the communal farming areas in this country?
8. Kindly make any other remarks regarding this research?

THANK YOU VERY MUCH

Appendix D5: Guide for Interviews on Rural Tourism

Subject: Policies governing the utilisation and management of natural resources in Mathenjwa Communal Area (Ndumo)

Researcher's Name: Munya Chitakira (Student - University of Pretoria, Centre for Environmental Studies)

Date:…….

NOTE: This interview is part of a research on the feasibility of ecoagriculture in Mathenjwa Community. Please feel free to answer the questions relevant to you from the list below. Your responses shall remain anonymous and confidential.

Ecoagriculture is a practice of combining farming and nature conservation at the same place and time in order to improve human livelihoods. It is a vision for improving human management of the land and natural resource base so that it meets three goals at the same time: (a) provides agricultural products and services on a sustainable basis, (b) supports viable livelihoods for local people, and (c) conserves a full complement of native biodiversity and ecosystem services (Buck et al, 2006)

QUESTIONS

1. a. How do policies (at national, provincial or local level) affect/ encourage or discourage the development of community-driven ecotourism projects in KZN?
   b. Which are the policies?
2. What are the possible sources of funding for community ecotourism projects that can be utilised by the people of Mathenjwa / Ndumo area?
3. Which are the challenges that a community in northern KZN might face in an effort to develop ecotourism so that it becomes a source of livelihood in addition to farming?
4. Do the community members have rights to develop natural resources in their locality for ecotourism? Please give reasons for your opinions.
5. Are the rights in question 4 above recognised by legal instruments?
6. Governance (of land, natural resources, etc.) can be seen as the processes that different actors develop to apply broadly defined policy rules. Such rules do not exist only as government decisions blindly implemented by citizens. Because of the existence of provincial and local powers (including traditional rules), because of the empowerment of local people and because of on-going decentralisation processes, policy rules can be formulated and implemented through social processes involving many actors (stakeholders). According to you, who could be the main actors of "ecoagriculture governance"? May you explain why and how?
7. In your view, what changes in policy (at any level) are needed for ecoagriculture to become possible in these communal farming areas?
8. Please make any other remarks you want regarding this research.

THANK YOU

Appendix D6: Interview Guide for KI Interviews in Mozambique

Subject: Policies governing the utilisation and management of natural resources in Lubombo TFCA communities.

Researcher: Munyaradzi Chitakira (Student - University of Pretoria, South Africa). Email: mchitakira@zoology.up.ac.za

Kindly note:

Thank you for participating in this interview. The interview is part of a research carried out for educational purposes. Please feel free to answer the questions relevant to you from the list below. Your responses shall remain anonymous and confidential.

Discussion Topics

1. What activities are being carried out in the TFCA?
2. What are the future plans (or activities) for the TFCA?
3. What developments in policy have been made to promote the success of TFCA goals?
4. How are the local communities being involved in the TFCA activities?
5. Which rights do the community members living within the Lubombo TFCA have over natural resources such as land, water, trees, forest products and wild animals, in their area? For example:
    a. use
    b. sell to get income
    c. manage – control the use, protect or improve
    d. pass on the land to one's child or relative
    e. develop the resources for ecotourism
6. How do policies (at national or local level) provide for the access to:
    a. agricultural inputs and
    b. extension services by local communal farmers?
7. Please feel free to discuss or provide other relevant information.

OBRIGADO - THANK YOU

Appendix E: Landscape Performance Assessment (LPA) Tools

Appendix E1: Ecoagriculture Landscape Performance Goals and Criteria in English and Zulu

Source: the English version of LPS was adapted from Buck et al. (2006).

Conservation Goal and Criteria

Isizathu Sokonga

Goal: The landscape conserves, maintains, and restores native biodiversity and ecosystem services

I-landscape yonga, igcine, futhi ivuselele izimpilo ezahlukahlukene zasendle kanye nezinsiza ze-Ecosystem

Criterion C1: The landscape contains an adequate quantity and suitable configuration of natural and semi-natural habitat to protect native biodiversity.

i-Landscape iqukethe inani elanele nelifanele lesimo semvelo kanye ne singamvelo ukuvikela i-biodiversity yokuzalwa.

A natural habitat contains native species and has proceeded along some ecological path of development. Most biodiversity does not need pristine habitat to exist, although some may, so a combination of natural and somewhat disturbed (i.e., semi-natural) habitats are worth protecting.

Ama-biodiversity amaningi awadingi izindawo ezicolisakele ukuze aphile, noma amanye ewadinga, ngakho icombination yokwemvelo iyaphazamiseka(lokho I semi-natural) lezindawo zifanelwe ukuvikelwa.

Criterion C2: Habitats within the landscape are similar to the composition and structure of the habitats historically found in the landscape.

Indawo yemvelo ne singamvelo kwi-landscape icishe ifane nekhomposishini nesimo sendawo eyayitholakala emlandweni walendawo?

Ecological integrity denotes a system with its historical species composition and structure in tact. Composition refers to the assemblages of species in a habitat, and structure refers primarily to physical attributes of the habitat such as multi-layering of forests, decomposing logs on the ground, pit and mound topography, etc.

Iqiniso nge Ecology wukuthi, inomthelela kwindlela nomlando wezilwanyana nezitshalo. I-composition ikhuluma ngoquqaba lwezilwane ezitholakala endaweni, kanti isimo sisho indlela ezingazibona ngazo njenge hlathi elinnama layer amaningi, ukubola kwezihlahla njalonjalo.

Criterion C3: Important species within the landscape are biologically viable.

Ingabe izihlobo zezilwane nezitshalo ezibalulekile kulendawo ziyahambelana ne Biology?

Certain species within the landscape may be deemed to be biologically, economically, or politically “important”. Biological *viability* means that the demographic and genetic condition of these species enable them to reproduce and thrive.

Ezinye izilwanyana nezitshalo endaweni zingabalulela ngokwebiology, ngokomnotho noma ngokwezepolotiki. Ibiological viability isho isimo semvelo salezilwanyana/izitshalo esizenza zikwazi ukukhula zande.

Criterion C4: The landscape provides locally, regionally, and globally important ecosystem services.

I-landscape inikeza amaservisi e ecosystem abalulekile ngokwalendawo, ngokwesifunda nangokomhlaba jikelele.

An ecosystem is healthy if it provides primary production, nutrient retention and cycling, nitrogen fixing, soil stabilizing, water purification, and other functions. An ecosystem that provides at least a substantial proportion of ecosystem services may be considered healthy even though it may no longer have integrity.

I-ecosystem iba ngenempilo uma inikeza iprimary production, umsoco wokuzigcina ziphilile, namanzi ahlanzekile njalonjalo. I-ecosystem enikeza inani elanele le-service ye-ecosystem lingabonakala njengelinempilo noma lingeke lisaba nako ukwethembeka

Criterion C5: Natural areas and aquatic resources are adequately buffered from productive areas and activities.

izindawo zemvelo nezamanzi zivikeleke ngokwanele kwindawo yemikhiqizo kanye nezinto ezenziwa yizindawo zemikhiqizo.

Productive agricultural areas have a tendency to leak soil, chemicals, weedy plants and foraging livestock into nearby non-farmed areas and waterways. To eliminate these effects, conservation areas are managed for resilience to degrading production activities, and production is based on non-degrading practices.

Izindawo zokutshala zinokulahla umsoco emhlabathini, amachemical, nokhula, lokhu kukhubaza imfuyo eseduze naleyondawo. Ukuvikela lokhu, izindawo zokongiwa kwemvelo ziyaqashelwa.

Production Goal and Criteria

Goal: The landscape provides for the sustainable production of crops, livestock, fish, forest, and wild edible resources.

Injongo yokukhiqiza: I-Landscape ikwazi ukukhiqiza izitshalo, imfuyo, izinhlanzi, amahlathi nezemvelo ngokuthembeka nokonga.

Criterion P1: Production systems respond to demand (positively) by internal (local) consumers and buyers and by external buyers.

Izindlela zokukhiqiza ziyazenelisa yini izidingo zabathengi endaweni, nabathengi abavela ngaphandle?

Production systems that are responsive to local as well as external demand are likely to be economically sustainable, while also contributing to local well-being. This criterion tracks the orientation of a landscape toward supplying goods for local vs. external markets.

Izindlela zokukhiqiza ziyakwazi ukubhekana nezidingo zangaphakathi nezangaphandle ukuze zikwazi ukukhulisa umnotho.

Criterion P2: Production systems are financially viable and can adapt to changes in input and output markets.

Izindlela zokukhiqiza aziyona yini inkinga ngokwezimali kanti futhi ziyamelana yini noshintsho kwizimakethe ze-input (okudingekayo ukuze uthole umkhiqizo) ne-output (umkhiqizo).

Financially viable production systems imply that there are positive returns to producers. Financial viability is more likely when producers are tied into markets that have relatively short value chains (few middlemen) enabling a higher portion of the value of production to be retained locally. Adaptability is more likely when there is ready access to inputs including credit.

Isimo sezimali zezindlela zokukhiqiza ziyangenisa yini imali eyanele kubakhiqizi. Imali ingena kahle kubakhiqizi uma bekwazi ukufinyelela ezimakethe ukuze inzuzo yemali ibaningi kubakhiqizi

Criterion P3: Production systems are resilient to natural and anthropogenic disturbances.

Izindlela zokukhiqiza ziyamelana nokuphazamiseka, kwezemvelo nabantu.

Production systems maintain the natural capital that sustains production over time and makes them resilient. Disturbances may include drought, flood, mudslides, disease, and climate change.

Izindlela zokukhiqiza zigcina i-capital yemvelo evumelana nomkhiqizo futhi iwenze ukwazi ukumelana nezimo ezinzima. Iziphazamiso zisho isomiso, izikhukhula, izifo nokushintsashintsha kwesimo sezulu.

Criterion P4: Production practices have a neutral or positive impact on wild biodiversity and ecosystem services in the landscape.

Izindlela zokukhiqiza zinomthelela omuhle kwi bidiversity yasendle nakusevisi ye ecosystem.

By emphasizing the use of biological inputs, crop rotations, soil cover, and diverse assemblages of plants, while limiting chemical inputs, and also by strategically locating production systems in the landscape, habitat values can be conserved and ecosystem service delivery can be enhanced.

Ngokuqiniseka i biological inputs, izivuno, umhlabathi nezitshalo eziningi, kanye nokuvimbela ukusetshenziswa kwamachemichals nokuthola indlela youkukhiqiza ku-landscape ukubaluleka kwendawo kungongeka nokusebenza kwe ecosystem kungakhula kakhulu

Criterion P5: Species and varietal diversity of crops, livestock, fisheries and forests is adequate and maintained.

Izinhlobo zezilwane nezitshalo nokwehlukahlukana kwezivuno, nemfuyo, nezinhlanzi namahlathi zanele futhi ziyanakekelwa.

Agrobiodiversity is managed to enhance and sustain agricultural production. Maintaining agrobiodiversity locally helps to conserve it globally.

I-Agrobiodiversity iyaqashelwa ukuze kukhule imikhiqizo yezolimo. Ukunakekela I agrobiodiversity ngokwalapha kusiza ukuyonga emhlabeni wonke jikelele.

Livelihood Goal and Criteria

Goal: The landscape sustains or enhances the livelihoods and well-being of all social groups who live there.

Injongo yempilo: I-landscape inakekela izimpilo zazo zonke izilwane nezithsalo ezihlala kuleyondawo.

Criterion L1: Households and communities are able to meet their basic needs while sustaining natural resources.

Imindeni nomphakathi iyakhona ukubhekana nezidingo ngqangi ngaphandle kokuphazamisa ezemvelo.

To meet basic needs residents need to have food, potable (clean) water, energy, shelter, healing products and services, and cash.

Ukuze kuhlangatshezwane nezidingongqangi, abahlali bendawo kufanele babe nokudla, amanzi ahlanzekile, ugesi, izindlu, ezokwelapha, kanye nemali.

Criterion L2: The value of household and community assets increases.

Inani leholo nezimpahla yemindeni nomphakathi kuyakhula.

Assets include infrastructure (buildings, roads, bridges), common property, renewable and non-renewable natural resources, human and social capital, and cultural knowledge. These assets allow households and communities to manage risks to life, health, and well being.

Lokhu kusho izakhiwo, imigwaqo namabhuloho ezivuselelekayo nalezo ezingavuseleleki. Lama Assets avumela imindeni nomphakathi ukumelanda nobungozi bempilo.

Criterion L3: Households and communities have sustainable and equitable access to critical natural resource stocks and flows.

Imindeni nomphakathi iyakwazi ukuthola amaresource ezemvelo abalulekile.

Natural resources include soil, forests, grasslands, fisheries, and water. Equity is concerned with tenure and use rights according to factors such as gender, ethnicity, and class.

Lokhu kubandakanya inhlabathi, amahlathi, utshani, izinhlanzi namanzi.

Criterion L4: Local economies and livelihoods are resilient to change in human and non-human population dynamics.

Umnotho nokusimama kwendawo makungaphazanyiswa ukusintsha kwabantu, izitshalo nezilwane emphakathini.

Population dynamics include human immigration and emigration, demographic changes in local populations, and the spread of domestic and invasive plant and animal species.

Ipopulation dynamics isho ukuhamba kwabantu emphakathini, noshintsho likusabalala kwezitshalo nezilwane zendawo nezokufika.

Criterion L5: Households and communities are resilient to external shocks such as flooding, drought, changing commodity prices, disease epidemics, and others.

Imindeni nemiphakathi iyakwazi ukumelana nezinto ezithusayo njengezikhukhula, isomiso, ukwenyuka kwentengo, izifo nokunye.

People have the social, institutional, and technical capacity to adapt their livelihoods to the vagaries of climate, economy and politics.

Abantu banezindlela, izikhungo nolwazi lokubhekana nezimo zempilo uma kuba noshintsho lwesimo sezulu, sezomnotho nezepolitiki.

Institutions Goal and Criteria

Goal: The landscape hosts institutions that support the planning, negotiation, implementation, resource mobilization, and capacity-building needed to realize the goals of integration (conservation and production).

Injongo yezikhungo:Izikhungo ziyatholakala eziphethe nama-Landscape. Lezizikhungo zihambisana nokuhleleka nokutshalwa

Criterion I1: Mechanisms are in place and functioning for cross-sectoral interaction at landscape scale.

Ukuhlelwa, nokubhekwa nokuthathwa kwezinqumo mayelana ne cross-sectoral kanye the cross-boundary, kuyimpumelelo ngokwesilinganiso se-Landscape.

Project and policy support is needed to integrate sector-based activities. Critical support services include finance, technical assistance, research, cross-sector planning and monitoring, and information exchange that enable innovation and effective decision-making.

Ukusekelwa kyuadingeka ukuhlanganisa imisebenzi ye- sector. Ukwesekela okunalulekile kuhlanganisa izimali, usizo kwitechnical, uphando, ukuhlela nokuphatha icross-sector nokushinshtisana ngolwazi olungenza ukuthathwa kwezinqumo kube okuyikho.

Criterion I2: Producers and other community members have adequate capacity to learn and innovate about integrated landscape planning and management.

Abalimi, abakhiqizi nemiphakathi banamandla ekwenzeni ukuphathwa kwelandscape kube yimpumelelo.

Farmers, nature reserve managers, community leaders, and others concerned with land stewardship need knowledge and incentives to engage in developing practices and policies that lead to integrated landscapes.

Abalimi, abagcini bezemvelo, abaholi bomphakathi nabanye, bayadinga ulwazi nezinto ezizobakhuthaza ukuze bazibandakanye ekwenzeni imithetho ezoholele kwi-landscape ehlangene.

Criterion I3: Public policy supports integrated landscapes.

Ubudlelwane phakathi komphakathi nomasipala buyahambisana nokuphathwa kwama-landscape?

Institutional practices and coordination mechanisms for integrated landscapes are in place among relevant local and regional government agencies and NGOs; supported by relevant property rights laws and regulations (tenure systems).

Ama Intergrated landscape abekwa ngokwendawo, kanye nesifunda sikahulumeni nama NGOs, ahambisana namalungelo ezakhiwo nemithetho nenqubomgomo.

Criterion I4: Markets provide incentives for integrated landscapes.

Izimakethe ziyakukhokhela lokuphathwa kwama-Landscape.

Producers need access to markets for products and services that return a profit as well as incentives to invest in sustaining ecosystem function and livelihood security. Examples include market access for certified agricultural products and markets for ecosystem services.

Abakhiqizi badinga ukufinyelela emikhiqizweni efaka inzuzo nale ebakhuthazayo ukuba ba investe kwi livelihood security.

Criterion I5: Knowledge, norms, and values support integrated landscapes.

Ulwazi, imigomo nezindlela zokuphila ziyahambisana nokuphathwa kwama-Landscape.

Groups and organizations in the landscape are ecologically and culturally attuned to opportunities for influencing choices in land and resource management practice that will lead the landscapes in the ‘right direction’.

Izinhlangano kwilandscape zijwayele amathuba lawo azoholela ilandscape kwindlela eyiyo ngokwezemvelo namasiko.

Appendix E2: LPA Scorecard in English and Zulu

Source: the English version of LPS was adapted from Buck et al. (2006).

Landscape Performance Scorecard

Directions: Score each question below by circling a number. A 1 indicates very poor performance and a 5 indicates very high performance. Circle 2 numbers together to give an intermediate score. For example, circle the 1 and the 2 together to give a score of 1.5.

Indlela yokuphendula imibuzo: Nikeza amaphuzu kulemibuzo engezansi ngokuzungeleza inombolo. 1- ubonisa ukwenza okungagculisi kanti u-5 ubonisa ukwenza okugculisa ngokungaphezulu kokulindelwe. Zungeleza izinombolo ezimbili ukubonisa impendulo ephakathi. Isibonelo: Zungeleza u 1 no 2 ukuthola u 1.5.

Conservation Goal: The landscape conserves, maintains, and restores wild biodiversity and ecosystem services
Conservation Questions

Isizathu Sokonga: I-landscape yonga, igcine, futhi ivuselele izimpilo ezahlukahlukene zasendle kanye nezinsiza ze-Ecosystem.

Imibuzo emayelana nokonga

C1: Does the landscape contain an adequate quantity and suitable configuration of natural and semi-natural habitat to protect native biodiversity?	1 2 3 4 5
C1: Ingabe i-Landscape iqukethe inani elanele nelifanele nesimo semvelo kanye ne singamvelo ukuvikela i-biodiversity yokuzalwa.	1 2 3 4 5
C2: Do natural and semi-natural habitats in the landscape approximate the composition and structure of the habitats historically found in the landscape?	1 2 3 4 5
C2: Ingabe indawo yemvelo ne singamvelo kwi-landscape icishe ifane nokuqukethwe kwisimo sendawo eyayitholakala emlandweni walendawo?	1 2 3 4 5
C3: Are important species within the landscape biologically viable?	1 2 3 4 5

C3: Ingabe izinhlobo zezilwane nezitshalo ezibalulekile kulendawo ziyahambelana nemvelo?	1 2 3 4 5
C4: Does the landscape provide locally, regionally, and globally important ecosystem services?	1 2 3 4 5
C4: Ingabe lendawo inikeza amaservisi e ecosystem abalulekile ngokwalendawo, ngokwesifunda nangokomhlaba jikelele na?	1 2 3 4 5
C5: Are natural areas and aquatic resources adequately buffered from productive areas and activities?	1 2 3 4 5
C5: Ingabe izindawo zemvelo nezamanzi zivikeleke ngokwanele kwindawo yemikhiqizo kanye nezinto ezenziwa yizindawo zemikhiqizo?	1 2 3 4 5

Production Goal: The landscape provides for sustainable, productive, and ecologically compatible agricultural production systems. Production Questions

Injongo yokukhiqiza: I-Landscape ikwazi ukukhiqiza izitshalo, imfuyo, izinhlanzi, amahlathi nezemvelo ngokuthembeka nokonga..

P1: Do production systems respond to demand by internal (local) consumers and buyers, and by external buyers?	1 2 3 4 5
P1: Ingabe izindlela zokukhiqiza ziyazeneliza yini izindingo zabathengi endaweni, nabathengi abavela ngaphandle?	1 2 3 4 5
P2: Are production systems financially viable and can they adapt to changes in input and output markets?	1 2 3 4 5
P2: Ingabe izindlela zokukhiqiza zaziyona yini inkinga ngokwezimali kanti futhi ziyamelana yini noshintsho kwizimakethe ze-input (okudingekayo ukuze uthole umkhiqizo) ne-output (umkhiqizo)?	1 2 3 4 5
P3: Are production systems resilient to disturbances, both natural and human?	1 2 3 4 5
P3 Ingabe izindlela zokukhiqiza ziyamelana yini	1 2 3 4 5

nokuphazamiseka, kwezemvelo nabantu?

P4: Do production practices have a neutral or positive impact on wild biodiversity and ecosystem services? 1 2 3 4 5

P4: Ingabe izindlela zokukhiqiza zinomthelela omuhle yini kwi biodiversity yasendle nakusevisi ye ecosystem? 1 2 3 4 5

P5: Are species and varietal diversity of crops, livestock, fisheries and forests adequate and maintained? 1 2 3 4 5

P5: Ingabe izinhlobo zezilwane nezitshalo ngokwehlukahlukana kwezivuno, nemfuyo, nezinhlanzi namahlathi zanele futhi ziyanakekelwa? 1 2 3 4 5

Livelihood Goal: The landscape sustains or enhances the livelihoods and well-being of all social groups that reside there. Livelihood Questions

Injongo yempilo: I-landscape inakekela izimpilo zazo zonke izilwane nezithsalo ezihlala kuleyondawo.

Imibuzo mayelana nenjongo yempilo:

L1: Are households and communities able to meet their basic needs while sustaining natural resources? 1 2 3 4 5

L1: Ingabe imindeni nomphakathi iyakhona ukubhekana nezidingo ngqangi ngaphandle kokuphazamisa ezemvelo? 1 2 3 4 5

L2: Is the value of household and community income and assets increasing? 1 2 3 4 5

L2: Ingabe inani leholo nezimpahla yemindeni nomphakathi kuyakhula? 1 2 3 4 5

L3: Do households and communities have sustainable and equitable access to critical natural resource stocks and flows? 1 2 3 4 5

L3: Ingabe imindeni nomphakathi iyakwazi ukuthola amaresource ezemvelo abalulekile? 1 2 3 4 5

L4: Are people in the landscape able to adapt to changes in human and non-human (plant & animal) population 1 2 3 4 5

dynamics?

L4 Ingabe umnotho nokusimama kwendawo kuyaphazamiseka ngokushintsha kwabantu, izitshalo nezilwane emphakathini? 1 2 3 4 5

L5: Are households and communities resilient to external shocks such as flooding, draught, changes in commodity prices, disease epidemics and others? 1 2 3 4 5

L5: Ingabe imindeni nemiphakathi iyakwazi ukumelana nezinto ezithusayo njengezikhukhula, isomiso, ukwenyuka kwentengo, izifo nokunye? 1 2 3 4 5

Institutions Goal: Institutions are present that enable integrated, ongoing planning, negotiation, implementation, resource mobilization, and capacity-building in support of the goals of integrated landscape management.
Institution Questions

Injongo yezikhungo: Izikhungo ziyatholakala eziphethe ama-Landscape

Imibuzo mayelana nezikhungo:

I1: Is there effective cross-sectoral and cross-boundary planning, monitoring and decision making at landscape scale? 1 2 3 4 5

I1: Ingabe ukuhlelwa, nokubhekwa nokuthathwa kwezinqumo mayelana ne cross-sectoral kanye the cross-boundary, kuyimpumelelo ngokwesilinganiso se-Landscape? 1 2 3 4 5

I2: Do farmers, producers, and communities have adequate capacities to contribute to effective landscape management? 1 2 3 4 5

I2: Ingabe abalimi, abakhiqizi nemiphakathi banamandla ekwenzeni ukuphathwa kwelandscape kube yimpumelelo? 1 2 3 4 5

I3: Do relationships among public and civic institutions support the management of integrated landscapes? 1 2 3 4 5

I3: Ingabe ubudlelwane phakathi komphakathi nomasipala buyahambisana nokuphathwa kwama-landscape? 1 2 3 4 5

I4: Do markets provide incentives for the management of integrated landscapes?	1	2	3	4	5
I4: Ingabe izimakethe ziyakukhokhela lokuphathwa kwama-Landscape?	1	2	3	4	5
I5: Do knowledge, norms and values (culture) support integrated landscape management?	1	2	3	4	5
I5: Ingabe ulwazi, imigomo nezindlela zokuphila ziyahambisana nokuphathwa kwama-Landscape na?	1	2	3	4	5

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