

CHAPTER 1 GENERAL INTRODUCTION

1.1 Introduction

Profound changes have taken place in the creation, access, storage, retrieval and “enrichment” of information and communication during the last century. Technological advances have enabled novel levels of connectedness between potentially diverse cultures and philosophies throughout the world.

This has brought about great paradigm shifts in contemporary society. The creation of knowledge has ceased to be the exclusive domain of the elite and “information rich” and the unspoiled reservoirs of knowledge previously disregarded are currently being rediscovered after having been ignored for centuries.

In the past, indigenous knowledge was widely regarded as an academic, if not dilettantish concern, limited largely to social anthropologists. Much of it was seen as superstition and in the dominant model of development, useful knowledge was only generated in institutes of higher education, e.g. universities, and then transferred to ignorant peasants and other poor people. In time, however, overwhelming evidence has come to light indicating from many countries and sources, the great range, validity and usefulness of indigenous knowledge.

A new kind of consciousness is emerging among people who had previously experienced subjugation by colonial powers. This consciousness manifests itself essentially in a reappraisal of cultural heritage and indigenous knowledge, which have in the past been so heavily weighted against the power and prestige of modern science and Western innovations.

Indigenous knowledge has attracted public attention and has become a focus of academic and political debate since the process of decolonization activated a quest for communal identity. There is, however, another compelling reason for the renewed interest in indigenous knowledge: modern technology has proven to be inadequate to solve some of the perennial problems of human existence – particularly in areas of biodiversity. Alternative ways of perceiving and solving these problems are therefore actively pursued.

According to Deliwe (1998:1), indigenous knowledge systems prove to be a promising area for this kind of prospecting. This has opened a political Pandora's box, with perplexing legal implications, centering mainly on issues of ownership of knowledge and an ongoing debate on whether and how to protect the intellectual property rights of indigenous knowledge practices (e.g., should traditional healers be paid royalties once active compounds of medicinal plants they use are isolated by pharmaceutical companies).

The creation of a global marketplace, which offers an economic connection unparalleled in world commerce, has also markedly increased the importance of indigenous knowledge, since cultures long forgotten are reintroduced into Western spheres where Capitalism dominates. This has also a social impact. From eco-tourism to cultural tours and souvenir artifacts has been transformed into a commodity that can be merchandised and sold across international borders. Harris (1997:5) comments that intellectual property is the currency of the 21st century. This particularly holds true in First World Countries. But what about those cultures that do not view intellectual property ownership in the same terms and conditions as the Western economic perspective?

Systems of communal ownership may dominate certain cultures in contrast to the egocentric worldview of exclusive and individual ownership model being practised by Western intellectuals.

According to De Waart & Weiss (1998:2), the consequences thereof, is that the impact of economic globalization and legal harmonization created to support it "cannot be expected to provide the public goods required to secure the *acquis communautaire* of human rights worldwide, let alone extend it to all those peoples which have hitherto been deprived of virtually all their benefits."

Lipinski & Britz (1999:3) examines this problem pertaining to the harmonization in order to align various legal attitudes arising from diverse, political and social regimes.

Indigenous knowledge as an instrument of development has to date not received the needed attention in developing countries in general and in Africa in particular. However, this is changing. As the awareness of the importance of knowledge in the development process grows, the next logical step would be for the country authorities to begin elaborating specific policies in support of acquiring, absorbing and communicating knowledge, with particular attention to indigenous knowledge.

With the emergence of the New South Africa, issues of positive assertion of previously marginalised cultures have arisen. These cultures now seek to contribute to the mosaic of the political resources that define the country's identity. It is hoped that this synthesis may produce an economic synergy that will make this country competitive in the international economic order. The potential economic impact of indigenous knowledge in this process must therefore be determined and much remains to be done to translate this tacit knowledge system to a codified form (that is beyond oral tradition).

This knowledge needs to be made manifest, accessible and applicable and carefully analyzed in order to assess whether some vital elements are lost during the transferring process to a different intellectual context.

Modes of transferring also needs inquiry, since traditional knowledge often requires models perceived antithetical to Western approaches, e.g. knowledge sharing and imitation.

Indigenous knowledge management vested in rural communities presents further challenges, particularly relating to loci of Western philosophies, such as ownership. Although indigenous peoples recognize individual ownership, they tend to vest ownership in collectives (communality). Lipinski & Britz (1999:3) propose that Western jurisprudence should therefore be expanded to accommodate aforementioned notions of ownership, thereby conceptually enriching its currently narrow conception of intellectual property.

In order to obtain all the relevant information on the subject for this dissertation, and to compare global perspectives, an extensive literature survey was conducted on South African, African and international Databases. Furthermore, it is important that the results obtained from this study will be applicable to South Africa in particular. Unfortunately, South Africa is a country with many diverse cultures and therefore it would be near to impossible to address issues pertaining to all the different ethnic groups.

1.2 Research methodology

The research method entailed performing an extensive literature search on all the data available on "indigenous knowledge" and "intellectual property" both in South Africa, elsewhere in Africa and internationally, namely:

- Index to South African theses and dissertations
- NISC (National Inquiry Services Center) CD ROM: African Studies, South African Studies, African Health Anthology
- Wilson Omnifile Full Text database (Including International Law Journals)
- Internet Search (Agent: WebFerret)
- Medline (Comprehensive database from the National Library of Medicine)

- Books and articles from Pretoria State Library, Pretoria University Information Center (Merensky Library), the University of the Western Cape, the University of Witwatersrand and the University of Natal.

1.3 The current state of research and shortcomings encountered

A search on the South African Database of Theses and Dissertations resulted in three dissertations, which concentrated on different aspects of indigenous knowledge in the fields of Law (Hickman, 1998), Political Science (Essel, 1996) and Environmental Studies (Tsompi, 1997). However, no dissertation has to date been conducted from an "Information Science" perspective.

A workshop on indigenous knowledge systems (IKS), (The first national workshop of the indigenous knowledge systems)¹ was held from 21 – 23 September 1998 at the University of North West, South Africa by the National Steering Committee Indigenous Knowledge Systems Program.

Furthermore, a Policy Framework on indigenous knowledge systems in South Africa¹ exists, and a draft Bill² to provide for the promotion and protection of indigenous knowledge were introduced to the National Assembly in 1997, no Act has been declared to date other than the Intellectual Property Laws Act of 1997. However, this particular legislature does not specifically introduce measures aimed against illicit use and exploitation of indigenous knowledge *per se*.

¹ FIRST NATIONAL WORKSHOP OF THE INDIGENOUS KNOWLEDGE SYSTEMS PROGRAM, 21 – 23 September 1998, University of North West, South Africa, National Steering Committee Indigenous Knowledge Systems Program.

² Draft Bill for the Promotion and Protection of Indigenous Knowledge (Refer to Annexure 1).

The most relevant other studies found, were those of Lipinski & Britz (1999), Mundy (1999) as well as Gawora (1994). Gawora (1994) concentrated on the expropriation of Indian knowledge by pharmaceutical and biochemical industries and the danger of the destruction of their traditional database. Lipinski & Britz (1999) attempted to analyze these perspectives from both western and from alternative models to arrive at what might be viewed as a possible harmonizing position. Mundy (1999) concentrated on the recording and use of indigenous knowledge.

However, these references did not concentrate exclusively on the protection of indigenous knowledge from a South African or an African perspective and the protection thereof as a potential economic resource that should be protected by means of appropriate legislature. Therefore, these particular areas need to be scrutinized more closely in this dissertation.

1.4 Central problem statement

In the light of the above mentioned discussion, it is therefore obvious that indigenous medical knowledge has become a most important commodity in today's global marketplace. However, current Western legal regimes are inadequate to deal with the scenarios in which indigenous knowledge often resides and in addition, the dominant global perspective on ownership of indigenous knowledge is based on commercialization and exploitation.

The central problem statement of this study can thus be formulated as a critical analysis of the current protection of indigenous medical knowledge and the possible harmonization of problems associated with today's intellectual property laws. Proposed solutions in this regard will be presented.

1.5 The aim and contribution of this study

The issues that are going to be addressed in this dissertation, are the following:

- The importance (social, cultural and economic) of indigenous medical knowledge and biodiversity in Third World Countries, especially in South Africa and other African countries.
- Current laws on intellectual property in South Africa and other African countries and International (USA, Europe, Australia, and New Zealand).
- The evaluation and possible harmonization of problems associated with current laws and possible solutions regarding appropriate legislature in the African context.

In conclusion, the objectives of the dissertation will be to:

- Highlight the centrality of indigenous communities to indigenous knowledge systems as a source and an owner of indigenous knowledge.
- Increase national awareness of the value of indigenous medical knowledge.
- Attempt to harmonize Western and indigenous beliefs and thereby minimizing conflict.
- Introduce proposals for possible legislature to provide for the promotion and of indigenous knowledge and to prevent the exploitation of our cultural heritage in South Africa (i.e. protection of intellectual property of indigenous peoples, e.g. Zulu, Sesotho, Ndebele, Venda, etc).
- Demonstrate how both traditional (private and exclusive) and alternative (public and communal) perspectives on knowledge (intellectual property) ownership may be incorporated into the South African legal system as well as into any international legislation proposed for the new millennium as a means of promoting further development.

- Indicate the economic benefits that may be reaped in terms of the protection of indigenous medical knowledge in a developing country such as South Africa, e.g. creation of jobs, tourism, and other positive influences on the economy.

The need to explore the anatomy of indigenous knowledge systems, and their meetings with Western systems was therefore one of the primary motivations for this study. A study of this nature has particular relevance for South Africa, where the interactions of local populations with natural resources and the survival and decline of local people's indigenous knowledge are currently issues of urgent importance.

1.6 Structure of content

The chapter allocation of the dissertation will be as follows:

- Chapter 1 Introduction
- Chapter 2 Indigenous knowledge
- Chapter 3 Indigenous knowledge and biological diversity
- Chapter 4 Current intellectual property regimes and indigenous people
- Chapter 5 The exploitation of indigenous knowledge
- Chapter 6 Critical evaluation and possible harmonization of problems associated with current laws and proposed solutions
- Chapter 7 Conclusion

1.7 Terminology

The following are the most important terminology that will be used in this study: Indigenous knowledge, biological diversity, biopiracy, indigenous/traditional medicine, intellectual property.

CHAPTER 2 INDIGENOUS KNOWLEDGE

“They ... brought us parrots and balls of cotton and spears and many other things ... They willingly traded everything they owned. ... They do not bear arms ... They would make fine servants ... With fifty men we could subjugate them all and make them do whatever we want.” – Christopher Columbus

2.1 Introduction

The importance of studying indigenous people's knowledge of natural resources, is becoming increasingly apparent in the face of widespread failure of many top-down, “scientifically” designed rural development schemes to alleviate Third World poverty and the continued decline of environmental conditions in the wake of spreading global technologies. A large body of literature now recognizes that there is much to learn about natural resource management from local users throughout the world. Over decades and even centuries of continual use, local populations have built up elaborate and detailed indigenous knowledge “databases” that can complement, and in some cases exceed, present bodies of formal, globalized scientific knowledge.

At the same time, a large number of researchers are pointing with alarm to widespread erosion of local environmental knowledge. External technological intrusions into local environments and the increasing globalization of local economies are the two most common factors held responsible for the loss of uniquely local information and perspectives. How this process of erosion really works, however, and how serious the problem really is, has not often been addressed.

The need to explore the anatomy of indigenous knowledge systems, and their meetings with Western systems was therefore one of the primary motivations for this study. A study of this nature has particular relevance for South Africa, where the interactions of local populations with natural resources and the survival and decline of local people's indigenous knowledge are currently issues of urgent importance.

On the one hand, many rural communities are highly dependent on small-scale and subsistence-based resource use and have built up extensive knowledge resources over many centuries. On the other hand, the extreme stratification of society, rapidly growing populations, and large-scale migrations have, amongst other factors, led to serious natural resource degradation and resource poverty for certain sectors of the population, even while rapid industrialization and Westernization characterize other sectors.

An understanding what happens to indigenous knowledge systems within this turbulent context is therefore of critical importance for the autonomy and well being of disadvantaged populations facing resource shortages, especially in developing countries such as South Africa.

2.2 Definition of indigenous knowledge

The literature describing indigenous knowledge does not provide a single definition of the concept. Nevertheless, several traits distinguish indigenous knowledge broadly from other knowledge. Indigenous knowledge is unique to a particular culture and society. It forms the basis for local decision-making in agriculture, health, natural resource management and other activities. Indigenous knowledge is embedded in community practices, institutions, relationships and rituals.

What makes this knowledge "indigenous" is its inalienable link to the native people or aborigines of a particular locality. It is knowledge particular to the cultural system of such community in a given locale.

According to Gawora (1994:7), "indigenous knowledge is the traditional knowledge base of indigenous people which are based on experience". Synonyms for indigenous knowledge (or closely related concepts) include "local knowledge", "indigenous technical knowledge" and "traditional knowledge" and is often contrasted with "scientific", "western" or "modern" knowledge, which pertains to knowledge developed by universities, researchers and others, using a formal scientific approach.

Mundy (1999:1) states that: "indigenous knowledge is the knowledge that people in a given community have developed over time, and continue to develop. It is based on experience; often tested over centuries of use; adapted to local culture and environment; and is dynamic and changing".

Indigenous knowledge is not confined to tribal groups or the original inhabitants of an area. It is not even confined to rural people. Rather, any community possesses indigenous knowledge - rural and urban, settled and nomadic, original inhabitants and migrants.

According to Deliwe (1998:5), a heuristic definition of an indigenous knowledge might be: "the social capital in the form of living skills – as a distilled collective wisdom of the past – of a people in a particular location to cope with agro-ecological and social-cultural environments." This definition, however, has the potential defect of excluding hunter-gatherers like aba-Thwa (Qooi-qoi / qoi-xan).



2.3 Characteristics of indigenous knowledge

The following highlights the special features of indigenous knowledge, which distinguishes it broadly from other knowledge. According to the literature (Mundy, 1999:6; Puri, 2000:1; Johnson, 1999:2, Indigenous knowledge for development, a framework for action, 1998:2), indigenous knowledge is :

- **Local**, in that it is rooted in a particular community and situated within broader cultural traditions; it is a set of experiences generated by people living in those communities. Separating the technical from the non-technical, the rational from the non-rational could be problematic. Therefore, when transferred to other places, there is a potential risk of dislocating indigenous knowledge.
- **Tacit** knowledge and, therefore, not easily codifiable.³
- **Transmitted orally**, or through imitation and demonstration. Codifying it may lead to the loss of some of its properties.
- **Experiential rather than theoretical knowledge**. Experience and trial and error, tested in the rigorous laboratory of survival of local communities constantly reinforce indigenous knowledge.
- **Learned through repetition**, which is a defining characteristic of tradition even when new knowledge is added. Repetition aids in the retention and reinforcement of indigenous knowledge.
- **Constantly changing**, being produced as well as reproduced, discovered as well as lost; though it is often perceived by external observers as being somewhat static.
- **Embraces all kinds of scientific, agricultural, technical, architectural, herbal, medicinal⁴ and ecological⁵ knowledge.**

³ Indigenous knowledge derives its explanations of environmental phenomena from cumulative, collective and often spiritual experiences. Such explanations are checked, validated and revised daily and seasonally through the annual cycle of activities.

⁴ Traditional cultures have drawn compounds from the natural environment for centuries for medicinal purposes - appropriation of indigenous knowledge by Western cultures for highly sophisticated biotechnological, pharmaceutical and industrial applications.

⁵ Traditional ecological knowledge does not view human life as superior to other animate and inanimate elements: all life-forms have kinship and are interdependent.

- **An expression of traditional culture that embrace conceptual and creative aspects:** including all kinds of literary and artistic works such as music, dance, song, pageantry, traditional visual designs and crafts, myths, legend, language, body painting, rock and ground painting, drama, religious ceremonies, rituals, narratives and poetry⁶.
- **Holistic** whereas Western science is reductionist
- **Intuitive in its mode of thinking** whereas Western science is analytical
- **Is rooted in a social context** that sees the world in terms of social and spiritual relations between all life-forms.⁷ In contrast, Western science is hierarchically organized and vertically compartmentalized.

2.4 Examples of Indigenous knowledge

- **Language and symbols**, e.g. songs, dance and artistic designs.
- **Folklore**, e.g. stories and legends.
- **Ceremonial and ritual objects and performances**, e.g. costumes and use of plants and animals (e.g. Zulu people of South Africa, Aborigines in Australia).
- **Plant resources**, e.g. the Smoke bush plant, which is used for a variety of therapeutic purposes.⁸
- **Bush foods, agricultural and cosmetic products.**
- **Location of mineral deposits.**
- **Food procurement and preparation.**
- **Sacred sights and burial grounds.**
- **Fire stick farming.**⁹

⁶ More and more, Western people resort to indigenous traditional culture to satisfy “spiritual hunger”.

⁷ Indigenous knowledge is based on the understanding that the elements of matter have a life force. All parts of the natural world are therefore infused with spirit.

⁸ A new painkiller, which appears to have the same potency as morphine, is currently being developed in Queensland, Australia, from the bark of this native tree (Smokebush or *Conospermum*). The idea of using this bark came after observing the actions of an Aboriginal man involved in an accident while trying to catch a crocodile. The crocodile attacked the man and severed a finger. The Aborigine, while in significant pain, stripped some bark from a particular tree, chewed it, and put the chewed mass on the severed finger which miraculously appeared to stop the pain.

2.5 Fields of application of indigenous knowledge

Indigenous cultural knowledge has many facets. It can also manifest itself positively as a contribution towards the solving of the conundrums of twenty first-century life. It is already making a promising start in health and in management of biodiversity.

Indigenous knowledge is not a static entity. It is a communal strategy to cope with a total environment and encompasses more than a cuisine or arts or a collection of adage. It also entails technologies: intellectual tools. These tools are often manifest in actual material implements or in methods, procedures and approaches for solving problems of survival – or for the generation of prosperity. This implies that culture: is a total indigenous knowledge system; is the intellectual creation of a particular community; is indigenous to specific geographical location with its own ecosystem; is a linguistic form of life, like any other knowledge system.

According to Lipinski & Britz (1999:2), "indigenous knowledge is mostly used in the fields of agriculture and medicine and offer from "inside" solutions to some of the developmental problems that these communities experience".

Indigenous practices are sometimes not very spectacular and despite their effectiveness, they may be easily overlooked. For example, a traditional irrigation system consisting of mud canals and bamboo pipes looks less impressive than an introduced system of neat, straight and cemented canals. Nevertheless, the local system can effectively distribute water to the fields. In the long run, it might even conserve water better than the cement canals.

⁹ Burning of the land in a mosaic pattern to promote new growth of grasslands and induce migration of game to prevent overgrazing.

According to Mundy (1999:2), research in Nepal has shown that farmer-managed irrigation systems based on indigenous knowledge resulted in higher agricultural productivity than systems built and managed by government agencies.

Indigenous knowledge is mostly tacit and is embedded in cultural practices and understanding. Given that, then, identity, history and language are important dimensions of indigenous knowledge. Its main form of codification is folklore, often in the form of myths, stories and practices. In its most objective form, this may be oral history and customs. Deliwe (1998:10) contends that: "as knowledge, indigenous knowledge is not reducible to these notions of identity, history and language. Knowledge entails both wisdom and technology".

According to Deliwe (1998:3), wisdom pertains to theoretical knowledge (*theoria*) which may be exemplified by idioms or adages (folklore). It also entails norms and values: knowledge of the good life (*praxis*) for the judgement of good or proper conduct. This is normally objectivised in morals, in political values and in social and political institutions.

Deliwe (1998:3) postulates that technology (*techne*) is about a skill or applied expertise: it is applied knowledge in the management of the total human environment (biosphere). It is innovative and entails the fashioning and the utilization of tools; and usually results in vigorous economic activity (management of scarce resources). Since technology arises from direct interaction with the natural environment, it is concerned with biodiversity. A synthesis of the above typologies of knowledge may produce aesthetics or fine arts.

In practice, the term "indigenous knowledge" makes no distinction between these types of knowledge. An example of this is the indigenous knowledge medical system. In consultation with an indigenous knowledge medical practitioner, a number of things might emerge and merge:

- The collective wisdom of the community is embodied in customs and traditions, as well as the nosology of disease conditions serves as implicit references or paradigm (*theoria*).
- Relationships with kith and kin (dead and living) are explored (*praxis*).
- A diagnosis is made and a prescription (utilizing knowledge and biodiversity) for the management of the condition is issued (*techne*).
- These activities might well be accompanied by song and dance with appropriate display of instruments (decorated sticks and clothing, earthen vessels, music instruments) and symbols such as decoration on body and clothing, chanting, incense, etc (aesthetics).

Indigenous knowledge is also about social capital. It is intimately linked with a traditional economy and entails considerable innovation in its attempts to adapt to change. One of the most important dimensions of the present dissertation is tapping this aspect of indigenous knowledge.

This would accelerate the adaptation of indigenous knowledge in to 21st Century economy and enable wealth creation. The full participation of indigenous communities and practitioners in these endeavors will ensure that they both get recognition and equitable remuneration for sharing knowledge. This can be harnessed in local development strategies.

2.6 Contributions of indigenous knowledge

2.6.1 Development

As we move from an industrial economy to an information economy - in which intellectual know-how will eclipse financial capital as the true measure of wealth – Africa enjoys an extraordinarily strong competitive advantage.

Information can be generated, built upon, and transferred anywhere - as long as the physical and human resources are in place to receive and use it effectively. For this reason, the nations that will be most successful in the information revolution will probably not be those that were most successful in the industrial revolution. In tomorrow's world, cultural assets may well have greater value than financial assets. A country like South Africa is in a far stronger position to take advantage of the information revolution than they were to exploit the industrial revolution.

The nations that will be successful in the information revolution may be large or small, and are unfettered as to hemisphere. Assuredly, however, they will have invested in indigenous knowledge as a critical resource of information. This principle is well understood in Africa, given the deep and rich traditions of the region - prominent among them the cultural reverence for knowledge and education. The capacity of this region to absorb information –and its cultural traditions - hold the key to a tremendous future.

According to Warren et al (1995:20), there are seven kinds of resources that can be mined from indigenous ethno-botanical knowledge:

- Principles e.g. wild plants are not necessarily weeds; a diversity of native vegetation provides resources to meet the needs for food, medicine, shelter and ecological services, yet requires minimal energy inputs; experimentation with new ways of integrating crops and wild plants can improve local systems.
- Plant uses e.g. the uses of material from particular local plants have long been recognized as good "leads" for developing modern applications for plant materials; many modern medicines and new "wonder" drugs are derived from herbal medicines.
- Technologies e.g. agricultural, medical and industrial technologies based on plant materials or plant communities can be modernized to improve efficiency, or provide the basis for adapting modern methods to local circumstances.

- Crops e.g. locally adapted crops that are part of local knowledge systems include varieties of major and minor crops, multi-purpose trees, and pasture.
- Farming systems e.g. making use of natural predators and crops' spatial and temporal distribution patterns to control crop pests.
- Strategies
- Information about local constraints and opportunities e.g. marketability of current crops and wild plants can also be learned by investigating indigenous knowledge systems.

The current practice of extracting and transferring isolated bits of information from a few indigenous knowledge systems, makes limited use of a widespread resource that has tremendous potential for application in designing locally adapted, sustainable agricultural systems. Resources derived from indigenous knowledge can contribute to the attainment of rural development goals, including:

- Improved rural livelihoods
- Sustainable use of the natural resource base
- Improved well-being, health and nutrition
- Strengthened institutional capacity to meet the needs of rural people
- Generation of capital surplus for financing industrialization

Ethno-botanical knowledge systems are currently associated with the lowest socio-economic classes – tribal peoples and peasant farmers. That status association has led the élites who design development interventions to think of the knowledge base of these lower classes as the cause of their low socio-economic status.

Élites have recognized that the indigenous knowledge of the lower classes might be valuable in improving socioeconomic conditions if coupled with modern insights and other development intervention activities.

Secondly, rural sociologists or agronomists who access and transfer knowledge, are generally not educated to pay attention to natural vegetation or to recognize techniques in indigenous resource management that manipulate non-crop vegetation as a resource. Instead, outsiders tend to see non-crop vegetation as “weeds”, “useless forest” or “wasteland”. On the other hand, local people often manage that same vegetation as a multiple-use resource to ensure future productivity of their farmlands, and to meet their needs for food, fuel, construction materials, micro-enterprise inputs, and medicine.

Indigenous knowledge can be used to improve rural livelihoods, especially in marginal areas, by providing the basis for integrating useful native plants and low-input technologies into modernization packages that meet rural needs.

2.6.2 Information wealth

Rifkin (1995:236) contends that a paradigm shift is currently taking place in the economy: from a production-based to an information-based economy (accentuated by globalization) which, in turn, is stimulated mainly by advanced capitalism.

According to Britz *et al* (1999:5), the concepts of information richness and poverty are inextricably linked to the human being and stand in relation to the development of a human being in, among others, the political, economic and cultural spheres.

Information wealth does not primarily refer to economic growth and development. Information richness and poverty are to be considered more generally in terms of development with specific reference to the role of information in this process. Development is described as a person's ability to improve the quality of life, meet different needs, sustain him/herself in a specific environment and make own decisions. i.e. self-sustainability.

Boon (1992:228) therefore correctly indicates that development can be defined from divergent perspectives (such as academic, ideological, political or personal). He also stresses that development must not only be seen as economic development: "[development] is primarily concerned with the well-being of people (e.g. in a material, cultural, and religious sense).

It entails quantitative and qualitative change and progress: sustained improvement in the standard and quality of life. It revolves around, among other things, adequate food, clothing, housing, health, and educational services, and the ability to utilize information in decision-making, education, and so on".

Although the availability and accessibility of information is important for the determination of information wealth and poverty, it is evident that knowledge should be regarded as the most significant criterion for information wealth. Britz *et al* (1999:6) contends that, without meaning (knowledge) being added, available and accessible information has very little value. This implies that information poverty can be described as a person's inability to add development substance to the available information. This inability handicaps both development and livelihood. Furthermore, different forms and levels of knowledge can be distinguished and are also important for the understanding of information richness.

The Hungarian philosopher Polanyi, in his work *The Tacit Dimension* (1966), for example distinguishes between explicit and tacit knowledge. Explicit knowledge can be articulated in formal language (documented) whereas tacit knowledge is personal knowledge embedded in individual experience including factors such as personal beliefs, perspectives and values. The significance of this distinction lies in the way in which this explicit knowledge may be used and protected (as being the intellectual property of a community). It can be argued that information rich societies will protect their explicit knowledge to the benefit of all, and will even stimulate the generation of new knowledge (Britz *et al*, 1999:6).

The fact that knowledge does not equal the addition of correct meaning implies furthermore different levels of knowledge. Ponelis & Wessels (1998:3) for example distinguish between deep and shallow levels of information. The highest level of information could be regarded as the ability to give the correct meaning to information within a specific context, so as to maximize the quality of life.

According to Britz *et al* (1999:6), a further distinction, namely between local and general knowledge is also important in the understanding of information poverty and richness. Local knowledge refers to the knowledge that has originated and gets its utility from a specific community. Such an example is the knowledge of the Bushmen on how to survive in the arid parts of Botswana, the Kalahari Desert. General knowledge refers to the general knowledge (information) that is available on the television or Internet and has a much broader application field than local knowledge - but lacks mostly the deeper layers of meaning within a specific context.

Britz *et al* (1999:6) describes the difference between local and general knowledge as a relationship between insiders and outsiders. Insiders refer to the life experience and indigenous knowledge of local people within a common culture, social and religious perspectives. Outsiders, on the other hand, are those who do not share this experience and find it difficult to add meaning to local knowledge. It can therefore be said that, in economic terms, the wealth of information rich societies lies in their intellectual capital (human and structural) and the way in which this capital is managed and protected.

2.7 Conclusions

The above discussion indicates that indigenous knowledge is a commodity that should be treasured and not exploited. The following underlines its importance:

- Indigenous knowledge provides the basis for problem-solving strategies for local communities, especially the poor.
- It represents an important component of global knowledge on development issues. Indigenous knowledge is an underutilized resource in the development process.
- Learning from indigenous knowledge, by investigating first what local communities know and have, can improve understanding of local conditions and provide a productive context for activities designed to help the communities.
- Understanding indigenous knowledge and adapting international practices to the local setting can help improve the impact and sustainability of development assistance.
- Sharing indigenous knowledge within and across communities can help enhance cross-cultural understanding and promote the cultural dimension of development.
- In the current milieu of an information economy versus the industrial economy of the past, indigenous knowledge and its application, is the true measure of information wealth for developing countries.

Since indigenous knowledge is such a diverse field of knowledge which does not only encompass cultural heritage, but is also closely linked to biodiversity (i.e. through indigenous medicinal practices and plant knowledge), in chapter 3, this subject will be further explored and its relation to biological diversity highlighted.

CHAPTER 3 INDIGENOUS KNOWLEDGE AND BIOLOGICAL DIVERSITY

“Whether with particles of heavenly fire, The God of Nature did his soul inspire; Or earth, but new divided from the sky, And, pliant, still retain'd the ethereal energy: Which wise Prometheus temper'd into paste, And, mix't with living streams, the godlike image cast ... From such rude principles our form began; And earth was metamorphosed into man.” – Ovid, Metamorphosis

3.1 The importance of biological diversity

Indigenous knowledge is a broad and diverse field of knowledge. Not only does it encompass cultural heritage, but it also is closely linked to biodiversity through traditional healing practices and the related knowledge of plants. According to Martha Johnson of the Dene Cultural Institute in Canada (Johnson, 1992:4), traditional¹ indigenous knowledge can be defined as: “a body of knowledge built by a group of people through generations living in close contact with nature. It includes a system of classification, a set of empirical observations about the local environment, and a system of self-management that governs resource use.”

The most fundamental question posed is whether traditional indigenous knowledge and Western science are clearly distinguishable or not. Perhaps the most commonly drawn distinction between the two lies in the tendency of non-Western traditional science to be holistic and of Western science to be reductionist.

¹ What is “traditional” about traditional knowledge is not its antiquity, but the way it is acquired and used. In other words, the social process of learning and sharing knowledge, which is unique to each indigenous culture, lies at the very heart of its “traditionality”. Much of this knowledge is actually quite new, but it has a social meaning, and legal character, entirely unlike the knowledge indigenous people acquire from settlers and industrialised societies.

Agrawal (1995:4) proposes that a conservation ethic is a prevalent feature of the subsistence and resource management practices of present-day indigenous or native peoples and traditional communities, although some anthropologists claim that in many such societies, this ethic is either not observed by many of their members, or is entirely non-existent. Nevertheless, academic studies of such communities provide ample evidence that the protection of traditional ecological knowledge will provide significant environmental benefits as well as commercial applications. For example, in many forest areas, indigenous peoples plant forest gardens and manage the regeneration of bush fallows in ways that take advantage of natural processes and mimic the biodiversity of natural forests.

Much of the world's crop diversity is in the custody of farmers who follow age-old farming and land use practices that conserve biodiversity and provide other local benefits, such as: the promotion of diet diversity, income generation, production stability, minimization of risk, reduced insect and disease incidence, efficient use of labor, intensification of production with limited resources, and maximization of returns under low levels of technology. These ecologically complex agricultural systems associated with centres of crop genetic diversity include traditional cultivars or "land races" that constitute an essential part of the world's crop genetic heritage, and non-domesticated plant and animal species that serve humanity in various ways.

Indigenous knowledge also includes the specialized skills and knowledge of smelting and forging metals from non-renewable natural resources (e.g. gold, silver) and the everyday skills of making utensils for household use from renewable natural resources (e.g. wood). Even seemingly mundane tasks, such as collecting firewood and kindling the hearth, depend on knowing what woods to select for particular purposes. Archaeological research on fossil charcoal provides a record of specific uses of wood going back thousands of years.

Fragments of spiral bangles made of gold, copper, brass and iron from the site of Mapungubwe, dating to the 12th century, use a technique that continues to the present in parts of the Northern Province. The knowledge that is implicit in the manufacturing of these ornaments is a small but significant part of South Africa's cultural heritage. This is, however, only a small fraction of the material waiting to be mined by the capitalistic First World Countries.

Biological diversity (biodiversity) which encompasses the totality of genetic resources, varieties and ecosystems, is the very foundation of life on earth. Unfortunately, it is diminishing at an alarming rate, as human expansion forces the ever-increasing numbers of species into extinction. This is of such concern that the world's leaders gathered in 1992 for the Earth Summit in Rio de Janeiro, Brazil, at which the Convention on Biological Diversity (CBD) was introduced as a measure to halt its trend.²

One of the major areas of concern to delegates at the Earth Summit is the rapid rate at which the earth's biological resources are being consumed, increasingly at a higher rate than the natural regenerative capacity of many species, leading to extinction of species and consequent loss of biological diversity. One of the great difficulties facing those who are concerned with the problem is the lack of precise data on the extent of the problem.

Despite the difficulty of quantifying the true extent of the problem, it has nevertheless been estimated that at current rates of extinction, 25 % of the earth's species could be eliminated within the next fifty years, with more than 50 % being lost by the end of the 21st century. Another estimate puts the rate of extinction at 27 000 species per year, 74 per day, 3 per hour (CBD, 1992).

² The Convention on Biological Diversity turned out to be the most important international instrument with respect to the protection of indigenous knowledge.

South Africa ranks as the third most biologically diverse country in the world, with a particularly rich variety of plant species. Over 30 000 plants, or 7.5 % of the world's total, have so far been described, of which 80 % are endemic (occur nowhere else), including one third of all succulent plant species. Furthermore, it is the only country on earth that is home to an entire floral kingdom, the Cape Floral Kingdom, which is reckoned to have the highest recorded species diversity (9 000 species) of any similar sized temperate or tropical region in the world. With South Africa's remarkable biodiversity and cultural biodiversity, it is not surprising to find that approximately 3 000 species of plants are used as medicine, and of these, some 350 species are the most commonly used and traded medicinal plants (Van Wyk, 1997:4). As a developing nation, with all the problems associated with such a status, South Africa's biodiversity is under serious threat. For example, some 3 435 plant species, or 15 % of the total number, are currently listed as threatened in the South African Red Data Book (Van Wyk, 1997:6, Jordaan & Britz, 2000).

The presence of a diversity of species is essential to maintain the delicate ecological balance which sustains all life on earth, as well as for the enhancement of human existence by, for example, providing the source of new developments in pharmaceuticals and food production. The cause of species loss is varied, but may ultimately be linked to one factor – human population growth and the resultant demand for economic growth.

This demand is greatest in the less developed countries, whose lack of economic resources encourages the unsustainable exploitation of their natural resources for short-term economic gain. Calls by developed countries to halt such practices are met by the response that the developed countries only wish to preserve biodiversity so as to ensure a continued supply of biological material from which to develop new commercial products, which will be protected by intellectual property rights and offered for sale back to the less developed countries at exploitative prices.

The less developed countries claim that since they receive no reward from the supposed benefits of conserving their biodiversity, they have no reason to forego the economic benefits, which they derive from its exploitation. It has been suggested that this could be overcome by granting less developed countries intellectual property rights over the informational value of their native plant and animal species, thus allowing them a share in the profits derived from products developed therefrom.

Existing forms of intellectual property rights are largely unsuitable for such purposes however, having been introduced for the protection of well-defined fields of human endeavor. Hickman (1998:10) proposes a possible alternative, namely the introduction of a new form of property right, perhaps known as a Bioproperty Right, which would grant countries the right to claim royalties in any products which are developed on the basis of the informational properties of their indigenous species. The author stresses that since such a system would be easily circumvented if imposed by individual nations, it is imperative that it be addressed at the international level, perhaps under the forum of the Biodiversity Convention.

As a developing country with a vast diversity of species, South Africa has much to gain from the introduction of such a regime, and it is thus suggested that she promote this proposal and develop a draft Bioproperty Rights Bill, which might serve as a model to be followed by the international community.

South Africa may benefit from the introduction of this Bill in a number of ways, amongst which the most important are:

- Protection of the country's rich biodiversity
- Documentation of knowledge relating to the use of endemic plants that may be lost through oral transfer
- Royalties to the rightful owners of indigenous knowledge
- Economic benefits to the peoples of South Africa

3.2 The economic benefits of biological diversity

In economic terms, biological diversity may be viewed as a resource that has enormous present and future value. The economic justification for preserving biological diversity is that many species of wild plants and animals are undeveloped resources. They have significant economic potential that is currently undiscovered, undervalued or underutilized.

The current economic benefits derived from wild species are estimated to make up 4.5 % of the Gross Domestic Product of the United States. These benefits are derived from applications in agriculture and pharmaceuticals. Naturally occurring compounds form the basis for a large proportion of the pharmaceuticals in use worldwide. In the United States, over 121 prescription drugs accounting for approximately 25 % of all prescriptions dispensed contain active ingredients derived from plant extracts, at a market value of \$ 15 billion annually (Hickman, 1998:25).

In 1990, the combined market value of both prescription and over-the-counter drugs based on plants in Europe, Japan, Australia, Canada and the United States, was \$ 43 billion. In developing nations like South Africa, plant based medications are relied on for 85 % of health care needs (Hickman, 1998:26).

The food security of local communities - and the global community - is based on biodiversity in fields and forests. Biodiversity is of great economic value for plant breeding and new industrial uses. The maintenance of yields and resistance depends upon access to a wide range of genetic material. The industrialized countries have benefited enormously from the intellectual contributions of Third World farmers and indigenous communities, through the acquisition of genetic resources. In addition to its monetary value, the richness of biodiversity ensures the present and future stability of the food supply, as well as the adaptation of natural ecosystems to changing climatic conditions.

But the 'centers of genetic diversity', most of which are located in the Southern Hemisphere, are threatened with extinction. The present economic world order, the destruction of natural habitats, and the widespread introduction of uniform highbred seeds undermine the very concept of sustainable development, by destroying the options for development. On the local level, biodiversity loss threatens the sustenance of local communities, as biodiversity provides food, fibre, medicines and other products that ensure subsistence and income.

3.3 Indigenous people's rights to biodiversity

The issue of rights to chemical or genetic resources from indigenous plants in developing countries, e.g. African countries, is an emotive and controversial issue, but is one that is unavoidable.

Indigenous peoples who manage, maintain, and defend them against destruction inhabit many of the areas richest in biological diversity. The twelve countries with the most biological diversity also have diverse indigenous societies within whose territories much of that biodiversity is conserved (Posey, 1996:7).

A number of the international agreements that grew out of the 1992 United Nations Convention on Environment and Development (UNCED) highlight the key part indigenous peoples play in the conservation and sustainable use of the components of biological diversity. The preamble of the Convention on Biological Diversity (CBD), for instance, recognizes the "close and traditional dependence of many Indigenous and local communities embodying traditional lifestyles on biological resources."

Despite such international recognition, however, indigenous peoples' role in conserving biodiversity has been consistently underestimated. In large part, this is due to the failure to appreciate the anthropogenic (i.e., human-created) or humanized (i.e., human-modified) nature of apparently pristine or "wild" landscapes. But scientists are increasingly discovering that what they had thought were wild resources and areas are actually the products of co-evolutionary relationships between humans and nature.

Ethnobotanical studies of plant use have revealed management practices for many of the species that have been planted and transplanted. Ethnoecological studies have shown how fire, soil modification, selected cutting, and planting have actually modified landscapes. Designating landscapes and the species they contain as cultural or anthropogenic has a number of important implications. One of those implications lies at the heart of the ongoing debate over the rights of indigenous peoples and the application of intellectual property rights. Wild species or landscapes are products of nature. As such, human societies can assert no special claim to them, and the law considers them to be in the public domain. But if species or landscapes have been molded or modified by human presence, they are not automatically considered being in the public domain, and local communities may claim special proprietary rights over them.

In the recent years, a number of controversies have arisen around biological diversity issues. One of the most volatile of these concerns the mining of indigenous knowledge systems by biodiversity prospectors for commercial gain.

The Convention on Biological Diversity (CBD) provides for two distinctly different approaches to the natural and intellectual resources of indigenous peoples: *in situ* conservation, which utilizes "the knowledge, innovations, and practices of local communities embodying traditional lifestyles," and the wider use and application of indigenous technologies.

The latter amounts to nothing less than a global license to extricate commercially useful aspects of knowledge from indigenous knowledge systems.

As biodiversity prospectors have already discovered, research and development costs can be significantly reduced if such information is extracted or mined from the knowledge systems of local indigenous communities. Unfortunately, once that information has been removed from the local community, the community loses control over it because intellectual property law as currently written fails to adequately protect their rights.

From the above, it is clear that indigenous peoples' experience with biodiversity prospecting the intellectual property law cannot adequately resolve the issues of access and benefit sharing raised by the terms of the CBD.

Intellectual property law provides indigenous peoples with few legal courses of action to assert ownership of their own knowledge because the law simply cannot accommodate complex non-Western systems of ownership, tenure, and access. This situation threatens the free exchange of information and resources that provides the intellectual and informational underpinnings for international trade and development.

In the following section, some examples pertaining to the extensive use of indigenous knowledge in traditional medicine in Africa will highlight the right of ownership of these indigenous people hereto as well as the need of proper legal regimes to protect this most important commodity.

3.4 Indigenous knowledge used in Traditional Medicinal practices in Africa

3.4.1 Introduction

The art of native medicine have been practiced in Africa for many years, and is still being practiced even today. The knowledge of medicinal plants is normally passed on orally from one generation to the next. But a lot of valuable information can be lost or distorted whenever a medicine man dies without revealing his knowledge to another.

Traditionally, knowledge is usually passed on only to the first-born sons or other trustworthy persons when the father is getting old or just about to die. These people entrusted with the knowledge will normally take an oath not to reveal its secrets to anybody else. Instructions are generally given in the field, where the son is shown the plant, told the vernacular name, and told how to prepare the drug from the plant or plant part for specific diseases. The sequence of passing on the knowledge therefore requires the recipient to have a good memory.

Occasionally the number of plants and diseases treated are too many for the inheriting person to remember all, thus resulting in one source of errors or loss of valuable knowledge.

The following are examples of indigenous knowledge being used by traditional healers for traditional medicine and as food sources in a few African countries. These include plants (local plant names, parts of the plants used, plus formula, preparation and methods of administering various remedies) and insects.

3.4.2 Different case studies

3.4.2.1 Kenya

Karehed (1997:10) conducted a study among the Maasai, a pastoralist people of Kenya, who still lead a traditional life, greatly dependent on plants as a source of food, medicine, fuel, etc. In the study area, the Loita Hills of the Narok District, Kenya, one of the few remaining indigenous forests of East Africa is located. The main aim of the study was to document the purposes for which the Loita Maasai use plants, in particular which plants were used medicinally and for which diseases. Of the plants encountered in the investigation of the flora, 65 % were actually used in some way or another and many of these used as medicine, were shown to have pharmacological effects.

In another study by Masinde (1996:747) carried out among the Marachi tribe of the Western Province, Kenya, about 140 medicinal plant species from 42 (sub-) families were recorded. Common ailments treated were gastrointestinal diseases like stomach-ache, skin problems like wounds and fungal infections, coughs and colds, headaches, fever, sexually-transmitted diseases and respiratory diseases. According to the author, disease and treatment were often perceived as the physical, psychological and spiritual aspects of one's well being and therefore treatment often involves rituals in addition to the administration of medicine.

3.4.2.2 Madagascar

Medicinal plants are widely used for the treatment of diseases in Madagascar. Novy (1997:120) describes the traditional uses of 68 plants in the medicinal practices of the Betsimisaraka and Tanala peoples of the eastern region of Madagascar. The ethnomedical information was collected during the period August 1993 to June 1994 by means of interviews with local people and traditional healers and by plant collection treks through primary and secondary forest with local botanists, traditional healers and villagers.

Preparations and utilizations of these medicinal plants are as varied as the plants themselves. According to Novy (1997:126), some of the plants are known to science, but because of the diversity of tribal groups in Madagascar, new preparations and utilizations remains to be discovered and chemically tested.

As elsewhere in Africa, ethnopharmacological information based on indigenous knowledge is in danger of being lost in Madagascar as slash and burn agriculture destroys much of the forest, and the elder traditional healers, often illiterate, pass away without handing down their knowledge. Another threat comprises the many different types of users, including individuals, researchers and State institutions that exploit indigenous medicinal plants as crude materials, either for trade, scientific investigations or export. Randimbivololona (1996:197) contends that Malagasy legislation controls the collection of medicinal plants; especially those destined for export; however, according to law, products coming from Malagasy medicinal plants are not patentable locally.

3.4.2.3 Morocco

Merzouki et al (1997:444) conducted an ethnobotanical survey in 1995-1996 in the Bouhmed district of the northern part of Morocco. The use of plants by the Bouhmed population for the preparation of herbal remedies has been studied. Results revealed that 96 species from 49 plant families serve for the treatment of 59 diseases. In order to select the main medicinal plants used in folk medicine to treat arterial hypertension and/or diabetes, a survey was undertaken in different areas of Morocco.

Results indicated that of the 370 women and 256 men interviewed (61 % diabetics, 23 % hypertensives and 16 % hypertensive diabetic patients), 67.5 % of these patients regularly use medicinal plants. This results shows that phytotherapy based on indigenous knowledge, is widely adopted in Morocco.

3.4.2.4 Namibia

Hunger foods usually constitute only a part of the diet of numerous traditional communities and only become the sole source of food during stress or in frontier situations at other times.

Famine foods, of which Africa has more than 2 000 types, include wild cereals, tubers, roots, vegetables, berries, nuts, fruits, insects and wild animals. All of these are utilized by indigenous people through knowledge obtained by their ancestors through the ages. Among the Topnaar people of Namibia, it is found that, although the wild Inara (*Acanthosicyos horridus*, Cucurbitaceae) is a true staple, many species are complementary in normal diets but in famine become a real source of food, as they yield useful products even during droughts (Van Damme, 1998:236).

Green (1998:4) conducted a study in the Nyae Nyae area of Eastern Bushmanland, Namibia amongst the Ju/'hoansi Bushmen. He spent seven months amongst these indigenous people during 1993 – 1994. The author described the use of *Diamphidia nigroornata* and *Polyclada flexuosa* in the production of poison arrows, the use of insects in medicine (e.g. *Brachycerus ornatus* for relieving stomach pains during menstruation in women) and insects used as food (e.g. larvae of *Sternocera orissa*) or for seasoning dishes (*Anthia*, *Thermophilum* and *Camponotus fulvopillus*).

3.4.2.5 South Africa

Medicinal plants are important aspects of the daily lives of many people and an important facet of South African cultural heritage. There are an estimated 200 000 indigenous traditional healers in South Africa, and up to 60 % of South Africans consult these healers, usually in addition to using modern biomedical services (Jordaan & Britz, 2000:4).

The indigenous people of Transkei, Eastern Cape, South Africa, depend on natural plant resources from the forests for medicinal, cultural and other needs. This area, predominantly occupied by the Xhosa people, has remained ethnobotanically unexplored until recently.

Bhat *et al* (1995:7) conducted a survey among the traditional doctors, herbalists, herb sellers, tribal priests and local people, carried out over a 2-year period, and recorded medicinal uses of 26 plants. In a more recent survey by Tyiso *et al* (1998:92) amongst herbalists, traditional doctors and other knowledgeable local people, medicinal and other uses of plants were recorded in 53 plant species. 26 plants used by the Zulu, Xhosa and Sotho traditional healers for the treatment of headaches, pain and inflammation, were assayed for cyclooxygenase inhibitory activity. According to McGaw (1997:115), two thirds of the plants screened had high inhibitory activity.

The following information were obtained through interviews with traditional healers in the Wakkerstroom area, Mpumalanga (Ngwenya, 1999):

Scientific Name	Zulu Name	Popular Name	Uses
<i>Pentasinia Prunelloides</i>	IciShamlilo	Sooibrandbossie	Poultice for sore and swollen muscles and insect stings; stomach ache; haemorrhoids.
<i>Alepiidea amatymbica</i>	Ikhathazo	Slangwortel	Flu; rheumatism; wounds; cleansing of divining bones.
<i>Helichrysum spp.</i> (in this case <i>H. symosum</i>)	Impepho		Headache
<i>Diosorea sylvatica</i>	Ingwevu	Elephants foot	Wounds; blood problems; chest complaints.
<i>Elephantoriza elephantina</i>	Intolwane	Elephants root	Chest complaints, fever; dysentery; syphilis; to stop bleeding.



<i>Solanum spp.</i> (in this case <i>S. panduriforme</i>)	Intuma	Bitter apple	Toothache; skin infections; haemorrhoids; impotence.
<i>Pelargonium luridum</i>	Inyonkulu		Dysentery; Nausea and vomiting; fever; sick calves; love charm; eaten as vegetable.
<i>Maytenus heterophylla</i>	IsiNama	Common spike thorn	Emetic; swollen wounds.
<i>Euphorbia clavaroides</i>	Nhlenhle		Toothache; warts; Newcastle disease in chickens; to bathe swollen feet; leprosy; children eat dried sap as chewing gum.
<i>Ziziphus mucronata</i>	UmLahlabantu	Buffalo thorn	To carry the spirit back home of someone who has died far away; as emetic to get rid of bad dreams or luck.
<i>Opuntia spp.</i>	UmNhlohlo	Prickley pear	Watery sores.
<i>Diospyros lycioides</i>	UmNqandane	Blue bush	Toothbrush; sticks stuck into wall above door to prevent lightning.
<i>Cussonia paniculata</i>	UmSenge	Cabbage tree	Emetic to cleanse system
<i>Lippia javanica</i>	UmSuzwane	Leon Bush/ Fever Tea	Flu; sweep yard to remove bad luck; rashes; sore muscles; ritual cleansing after contact with a corpse.

3.4.2.6 Uganda

Oryem-orga *et al* (1995:111) carried out ethnobotanical studies of the Rwenzori Mountain forest area in Bundibugyo District in Uganda between May and December 1991, and covered the northern part of the Rwenzori Mountain slopes occupied by the Bakonjo people. The presence of a major footpath through the forest with numerous utility trails radiating from it, showed that some forest resources are being sought by the local population. Plant biodiversity was high, as indicated by the fact that in a study plot of only 4250 m², a total of 115 plant species, 101 genera and 57 families were identified from a collection of 300 plant specimens.

77 plant species were found to be of some importance to local communities. Oryem-orga (1995:119) concluded that, of these, 22 were used for medicinal purposes, 16 for firewood, 13 for construction and furniture, 12 for craftwork, 10 provided edible fruits and vegetables and 27 were used for a variety of other purposes. These other purposes include construction of shrines, covering of granary floors, and use as toilet paper, carrying luggage, and fodder for goats, sheep and cattle.

3.5 Conclusions

In conclusion, that biodiversity is valuable enough to pay for itself, has long been recognized as a self-evident truth. However, owing to the globalization of the intellectual property system, the traditional systems for the informal exchange of knowledge are being undermined, and systems of social and economic security are being destroyed.

In preparing this work, it became abundantly apparent that there is a lack of detailed documentation on the use of medicinal plants in Africa, and more in particular, South Africa.

This is an urgent priority in view of the fragility of oral-tradition knowledge, and, and the rapid pace of urbanization and acculturation in South Africa and elsewhere in the world.

However, the transfer of indigenous knowledge has created new problems. In their search for novel natural compounds, drug companies will continue to be guided by indigenous peoples' detailed knowledge of the biodiversity from which they have fashioned their cultures. Some companies, such as Shaman Pharmaceuticals and SmithKline Beecham, are exploring arrangements for compensating indigenous peoples directly. But thus far, that approach is still an exception to the rules by which most corporations and governments choose to operate and these agreements raise many questions about just and equal compensation for indigenous knowledge.

Chapter 4 will be dealing with current intellectual property laws and specifically pertaining to ways of accommodating the indigenous knowledge of the indigenous people of African countries within the existing intellectual property laws.