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The protection of indigenous medical knowledge: a critical analysis

by

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"We shall not cease from exploration
And the end of all our exploring
Will be to arrive where we started
And know the place for the first time."
- T.S. Elliot

Abstract

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The creation of a global marketplace, which offers an economic connection unparalleled in world commerce, has markedly increased the importance of indigenous knowledge, since cultures long forgotten are reintroduced into Western spheres where Capitalism dominates.

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. The capacity of this region to absorb information and its cultural traditions hold the key to a tremendous future. In tomorrow's world, cultural assets like indigenous medical knowledge, may well have greater value than financial assets.

Indigenous knowledge particularly with regards to indigenous medicine and conservation management of biodiversity, is crucial towards the solving of the conundrums of twenty first-century life. In view of this, the recognition and protection of indigenous peoples' rights in their knowledge, innovations and practices relating to biodiversity are assuming an increasing urgency.

With the emergence of the New South Africa, sharing of indigenous knowledge within and across communities can enhance the process of cross-cultural understanding and may provide a basis for problem-solving strategies for local, poor communities.

The potential economic impact of indigenous knowledge is vast. However, this means that this tacit knowledge system must be captured and translated to a codified form that is beyond oral tradition.

This study concentrates on the problems resulting from the exploitation of indigenous medical knowledge and the inadequacy of current legislation to protect indigenous people's knowledge of natural resources. The importance of this study lies in the fact that it concentrates exclusively on the protection by means of appropriate legislature of indigenous medical knowledge from a South African or an African perspective as a potential economic resource.

An extensive literature search on the importance (social, cultural and economic) of indigenous knowledge and biodiversity in Third World Countries was conducted and the lack of legislative regimes on intellectual property in South Africa and other African countries in comparison with International intellectual property law was evaluated. Possible harmonization of problems associated with current laws and possible solutions regarding appropriate legislature and practical proposals based on social justice are offered.

Sinopsis

Beskerming van inheemse medisinale kennis: 'n kritiese analise

deur

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Graad: Magister (Inligtingkunde)

Noudat lank vergete kulture weer aan Westerse sfere waar Kapitalisme oorheers blootgestel word, het die skep van 'n wêreldwye mark met ekonomiese verbintenisse ongeken in wêreldhandel, die belangrikheid van inheemse kennis weer merkbaar laat toeneem.

In ontwikkelende lande in die algemeen, en meer spesifiek in Afrika, het inheemse kennis as 'n middel tot ontwikkeling tot op hede nie die nodige belangstelling ontlok nie. Die kapasiteit van hierdie wêrelddeel om inligting te absorbeer, tesame met sy kulturele tradisies, behou egter die sleutel tot 'n opwindende toekoms. In die nabye toekoms mag kulturele bates soos inheemse medisinale kennis dalk selfs van groter waarde wees as finansiële bates.

Inheemse kennis spesifiek met betrekking tot inheemse medisyne en bewaringsbestuur van biodiversiteit, is krities in die uitdagings daar gestel deur 'n een-en-twintigste eeu bestaan. In die lig hiervan, word die kwessie van die erkenning en beskerming van inheemse bevolkingsgroepe se regte ten opsigte van hul kennis, innoverings en praktyke rakende biodiversiteit al meer dringend.

Die ontwikkeling van die Nuwe Suid-Afrika beteken dat mededeling van inheemse kennis binne en tussen gemeenskappe die proses van kruis-kulturele begrip kan bevorder en selfs 'n basis vir probleemoplossingstrategieë vir plaaslike, arm gemeenskappe kan lewer.

Die potensieël ekonomiese impak hiervan is oneindig. Dit beteken egter dat ontasbare kennis vasgevang en vertaal moet word in 'n verstaanbare vorm wat mondelingse tradisie oorbrug.

Die studie fokus op probleme wat vloei uit die uitbuiting van inheemse medisinale kennis en die onvermoë van huidige wetgewing om inheemse bevolkingsgroepe se kennis van natuurlike hulpbronne te beskerm. Die belangrikheid van hierdie studieveld berus op die feit dat dit eksklusief fokus op beskerming van inheemse medisinale kennis as 'n potensieël ekonomiese hulpbron, deur middel van toepaslike wetgewing, vanuit 'n Suid-Afrikaanse of Afrika perspektief. 'n Uitgebreide literatuurstudie rakende die belangrikheid (sosiaal, kultureel en ekonomies) van inheemse kennis en biodiversiteit in die Derde Wêreld Lande is gedoen. Verder is die afwesigheid van wetgewende intellektuele eiendomsregimes in Suid Afrika en ander Afrika-lande in vergelyking met Internasionale intellektuele eiendomswetgewing geëvalueer. Moontlike harmonisering van probleme geassosieer met huidige wetgewing en moontlike oplossings met betrekking tot toepaslike wetgewing word gegee en praktiese voorstelle, gebaseer op sosiale reg, word gemaak.

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"It is our duty to proceed from what is near to what is distant, from what is known to what is less known, to gather the traditions from those who have reported them, to correct them as much as possible and to leave the rest as it is, in order to make our work help anyone who seeks the truth and loves wisdom."

Abu'l-Rayan Muhammed al-Biruni, 973-1050 AD [1]

"I am talking about societies drained of their essence, cultures trampled underfoot, institutions undermined, lands confiscated, religions smashed, magnificent artistic creations destroyed, extraordinary possibilities wiped out..."

"I am talking about millions of men [and women] torn from their gods, their land, their habits, their life, - from the dance, from wisdom..."

Aime Cesaire, Discourse on Colonialism [1]

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 came 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 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 Africa[1] exists, and a draft Bill[2] 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, medicinal[4] and ecological[5] 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 poetry[6].
- **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]

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[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 *Conospernum*). 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 sosio-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 sosio-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 Polyani, 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), traditional[1] 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. Accoding 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
Pentasina Prunelloides	IciShamlilo	Sooibrandbossie	Poultice for sore and swollen muscles and insect stings; stomach ache; haemorrhoids.
Alepidea amatymbica	Ikhathazo	Slangwortel	Flu; rheumatism; wounds; cleansing of divining bones.
Helichrysum spp. (in this case *H.symosum*)	Impepho		Headache
Diosorea sylvatica	Ingwevu	Elephants foot	Wounds; blood problems; chest complaints.
Elephantoriza elephantina	Intolwane	Elephants root	Chest complaints, fever; dysentery; syphilis; to stop bleeding.

Solanum spp.(in this case *S. panduriforme*)	Intuma	Bitter apple	Toothache; skin infections; haemorrhoids; impotence.
Pelargonium luridum	Inyonkulu		Dysentery; Nausea and vomiting; fever; sick calves; love charm; eaten as vegetable.
Maytenus heterophylla	IsiNama	Common spike thorn	Emetic; swollen wounds.
Euphorbia clavaroides	Nhlenhle		Toothache; warts; Newcastle disease in chickens; to bathe swollen feet; leprosy; children eat dried sap as chewing gum.
Ziziphus mucronata	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.
Opuntia spp.	UmNhlohlo	Prickley pear	Watery sores.
Diospyros lycioides	UmNqandane	Blue bush	Toothbrush; sticks stuck into wall above door to prevent lightning.
Cussonia paniculata	UmSenge	Cabbage tree	Emetic to cleanse system
Lippia javanica	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 m^2, 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.

CHAPTER 4 CURRENT INTELLECTUAL PROPERTY REGIMES AND INDIGENOUS PEOPLE

Industrialized society has lost all sense of the proper place of human beings in the scheme of things to the point where it believes that it is right to own, control and fundamentally change life itself. We have lost all sense of our appropriate place in nature. -- President, Guaymi General Congress

4.1 Introduction

The world has endured and continues to endure profound losses of indigenous peoples and rural groups and their knowledge about the natural world constructed from their intimate ties to land and place. These losses have been accompanied by neglect and the marginalization of their practices and beliefs, often figured as inferior forms of knowing to be replaced by universalized knowledge derived from the Western scientific tradition. While the latter tradition has great beauty, power and utility, attempts to apply it universally without regard for traditional knowledge systems has in many cases led to failures in sustainable resource use and the erosion of biological diversity (as discussed in Chapter 3).

This imposition of scientific management regimes without the participation of local communities has prompted debate on whether the neglect of traditional knowledge violates human rights, civil rights, and indigenous rights. Since the goal of protecting and promoting indigenous knowledge is to gain the maximum advantage for the relevant communities, the question of ownership is fundamental.

The World Intellectual Property Rights Organization (WIPO) is currently exploring ways of accommodating the indigenous knowledge of less developed countries, within the existing property laws. The question invariably arises whether there is a need to develop an alternative system specific to the ownership of indigenous knowledge.

The question of who owns, who has access to and who benefits from indigenous knowledge and the biological resources from which it is derived, is still a contentious issue. Current Western jurisprudence is limited in its conception of intellectual property and it therefore needs to be expanded to accommodate indigenous knowledge system notions of ownership.

4.2 Definition of intellectual property

What is intellectual property? To this question, there are two answers, one colloquial, and one legal. The colloquial description of intellectual property is that it simply comprises all those things that are created in the human brain, such as ideas, inventions, poems, designs and concepts. The legal description, however, differs from the colloquial in that it focuses upon the rights and powers that are enjoyed in the produce of the mind, rather than upon the produce itself. Thus, intellectual property rights are based on the notion that innovation is the product of the creative, intellectual and applied concepts and ideas of individuals.

According to Phillips & Firth (1990:6), intellectual property law is the aggregate of rights and duties that pertain to the control of intellectual property. Intellectual property law comprises of five different means by which the law can benefit the holder of intellectual property. They are, in descending order of legal cogency:

i) An absolute monopoly of the market to prevent all other persons from using that property within the market place governed by the law which protects it.

An example can be found in the rights enjoyed by the holder of a patent for an invention.

ii) A qualified monopoly in which the creator of intellectual property enjoys the right subject to one major qualification: he/she cannot stop another party "stripping down" his creation and thus effectively using it as a basis for his own creation. An example of this is the protection of new plant and seed varieties.

iii) A monopoly of the use of one's creation within the market which prevents others from copying or otherwise exploiting the work actually produced by him, but without the right to prevent the exploitation of an identical or similar work produced through the independent intellectual endeavor of another. Such a qualified monopoly is exemplified by the protection most frequently given by copyright law.

iv) A compulsory license, in which the intellectual property owner relinquishes his control over his intellectual product. Design and patent laws are both familiar with forms of this device.

v) The concept of unfair competition, which do not exclude others entirely from the use of any identifiable intellectual property, but which do ensure that their use of that property is fair.

4.3 The importance of intellectual property

Intellectual property plays a vital part in the physical well-being of the individual and in the vitality of the economy, since it encourages the creation of ideas and inventions, their disclosure for the benefit of all, not to mention their commercial exploitation so as to facilitate the greatest exploitation of their practical or concrete embodiments.

Aside from its practical and economic aspects, intellectual property law fulfils functions that have a purely moral content, for according to Phillips & Firth (1990:10), it is ideally capable of providing:

I) that no one other than the inventor, author or intellectual creator is falsely attributed as such;

ii) that the creator of a work may make legal objection to the distortion of his work by others, and

iii) that the author who has changed his mind about the validity of his intellectual product can retract it prior to the embarrassment of its publication by another person.

The rights described above are sometimes referred to as moral rights, since they protect the creator's moral rather than his pecuniary interest in his work.

Countries that provide for the protection of intellectual property also benefit in many ways. In addition to increasing the general pool of information and knowledge, adequate legal protection fosters investment and trade.

When looking for new markets or countries in which to expand manufacturing or distribution facilities, companies often look to countries that will protect their intellectual property. Companies that are active internationally often will not allow certain technologies or other intellectual property to be sold in countries that will not protect the property owner's rights.

Where the owner's rights are not protected, third parties may use the property and, therefore, unfairly reap the rewards of the owner's investment in developing and marketing the property. Thus, inadequate legal protection for intellectual property acts as a trade barrier. Finally, because intellectual property has independent value, the property may be used to secure financing in some countries. This could provide a vast benefit to especially Third World Countries.

4.4 Intellectual property law and its application to indigenous people

Indigenous knowledge is a sought after commodity in today's marketplace. However, since indigenous knowledge is mostly intangible (e.g. word-of-mouth indigenous medicine and remedies), legal protection is minimal and Western societies have not seen fit to offer proper protection under current intellectual property laws. Furthermore, intellectual property laws of developed countries are often inadequate to deal with the scenarios in which indigenous knowledge resides, especially because of cultural differences. The result is a disparity of access to existing intellectual property of others by indigenous and developing people.

Existing property systems in Third World countries are not in alignment and knowledge storage and transfer systems of indigenous people are not based on concepts of a Western individual ownership model. Intellectual property rights are concepts foreign to many indigenous people. Also, some cultures do not perceive intellectual property rights on the same plane. They perceive ownership, akin to Western traditions, as antithetical. They rely instead on communal or shared ownership. Concepts of possession have seldom developed in indigenous cultures, because the carrier of the knowledge is one and the same, immutable. It may be able to be transported, but the content cannot change because it is culturally significant or dependent. For a Western view of intellectual property, this means that the creativity or novelty of the artefact or process is quite low.

One could therefore ask whether a Western view should dominate and in the process dismiss alternative cultural perspectives. Because of these apparent differences in worldviews, one can only but grasp the immense task that lies ahead of achieving a harmonized and universal set of legal protection. It is important that laws should be changed or developed in order to uplift welfare and not to exploit but to equally distribute the benefits of economic growth.

It is therefore imperative that mechanisms such as international property agreements should ameliorate instead of worsen the condition of developing countries.

4.5 The history of the development of intellectual property

There is a lack of studies that trace the historical origins of intellectual property beyond Greco-Roman times. However, references are usually made to certain pre-Greco-Roman facts to suggest that elements of intellectual property had their origins in those distant times. In Egypt, for example, the use of marks on jars, tools and building stones was prevalent for 30 centuries BC The notion of literary property goes back to non-European peoples with more ancient civilizations. Among the Europeans, the Greeks were the first to repudiate slavish copying of existing works and to punish literary piracy (Phillips & Firth, 1990).

During Roman times, authors were not always satisfied with glory alone...they also drew some profit from their manuscripts. There thus emerged a pecuniary right of authors irrespective of the commercial value to them or the publishers.

However, this was far from the recognition of an exclusive reproduction right, because the Romans did not yet appreciate the distinction between the ownership of a manuscript and the exclusive right to reproduce it. This was the status quo right through the Middle Ages in Europe and until the renaissance in the XIIth century. The concern of lay authors in this period seemed to be to prevent "careless or unscrupulous scribes" from implicating the real authors by their alterations and distortions.

The invention of the printing press enabled works to be copied in an unprecedented manner. Hence statutes were introduced to protect individual creations and inventions; to encourage trade and to censor the wide circulation of undesirable ideas. Today's intellectual property laws originate from this era.

The fundamental elements of the intellectual property system was largely developed between 1450 and 1550 in the Republic of Venice preceding the English Statute of Monopolies and the parallel development of the patent system in France. Phillips & Firth (1990:14) contended, that in these times, "the city of Florence was not only a city of unsurpassable artists and poets, but also the financial center of Europe, creating the right atmosphere and demand for laws on ownership".[1]

Venice granted copyrights too, and by 1500, copyrights were granted indiscriminately for old and new books. In 1517 a general copyright statute was introduced on the basis of which only new books were able to obtain protection just as inventions had to be new from 1474. Further, an act of 1544 gave more recognition to the author's personality: It was expressly acknowledged that he could choose to keep his work unpublished. With the decline of Venice, the other countries in Europe and later on to the New World countries, from which the intellectual property laws still continue to evolve to this day, adopted most of its practices (Phillips & Firth:1990).

[1] The development of patent law at that early stage, is summed up by Mandich (in Endeshaw, 1996:12):

"It seems that Venice was the first to have continuously and constantly applied rules to patents of invention, instead of granting an occasional, isolated monopoly. Among these rules were these: that protection always was extended to an inventor, provided his invention was recognized as useful; that the patent term was limited; that the right was transferable inter vivos and mortis causa; that it was subject to a compulsory license in favor of the state; that a patent was forfeited by failure to use it within a certain term; and that it failed in case of prior knowledge within the territory of the Republic."

The passage of the Statute of Monopolies in 1624 was a landmark in the history of British patent law because it was the first English statute to refer specifically to patents for inventions. According to Phillips & Firth (1990:18), the first record of a reward to an author was a 1530 "patent" for a book teaching the French language.

The claim for royal grant was based on costs and risks that publishers suffered on account of cheaper imitations or imports. Yet, privileges were granted selectively "to repress the publication of forged, scandalous, heretical and seditious productions" – a matter of importance in the troubled times which followed the introduction of printing. In spite of this, however, the increasing power of the press in the 1550s prompted the Crown to take tougher measures against unlicensed works. This was attained by establishing a "Company of Stationers or Text Writers" in 1557 (Phillips & Frith, 1990:27), which meant that only members of this Society (who must also consent to the search, seizure and burning of all prohibited books) were permitted to print. The penalty for those who violated this, was imprisonment. A succession of ordinances was passed, seeking more to suppress sedition rather than to protect literary property.

The expiry of the last of the ordinances in 1694 and the impossibility of renewing it, as well as the repeated petitions from booksellers and printers, persuaded Parliament to come out with a statute (Queen Anne's) in 1709. The Statute of Anne reestablished monopoly rights, for a period shorter than before, not to the guilds alone, but to everyone. The passage of this Act can be attributed to the radical influences of the "new ideas of individualism, originality and aesthetic relativism" that were gaining ground in the 18th century in Europe. By encapsulating these new ideas in the form of legislation, granting exclusive rights of reproduction to authors, the 1709 statute became the first law on copyright in the modern sense of the term (Gurnsey, 1995:9).

By referring to the "author or proprietor" of a new work, the Act implied "authorship establishes a property, which can be transferred to the publisher" (Phillips & Firth, 1990:28). The Act's recognition, for the first time, of authors' rights forms a landmark in the development of the distinction between the abstract conception of the author's work and the tangible materials used, which...were the sole subjects recognized in early times as capable of ownership.

Furthermore, the recognition, in the Act, of the right of authors as different from the rights of publishers, ushered in a new period in which authors by themselves could claim copyright.

It seems overall, that intellectual property laws have always evolved in response to economic and political necessity. From the times when intellectual property emerged as a policy instrument of the state (during mercantilism) through the period of industrialization within the nation-state to the creation of an international economy, intellectual property laws have changed to accommodate newly emergent or perceived needs.

Further evolution of intellectual property forms in the leading First World (industrial) Countries (England and France) corresponded to rising levels of technology. As manufacturers and tool making (mechanical invention) superseded the guilds and crafts and printing became general activities, protection in the form of privileges gave way to detailed national laws enacted by governments to fix rights to intellectual creations.

With the development of the capitalist economy and the growth of industrial exports, intellectual property forms that suited protection of rights within the nation-state proved unable to do the same for citizens' interests abroad. Thus bilateral treaties became instrumental in protecting cross-border interests. Repeated forms of bilateral treaties were later codified in the Paris and Berne conventions.

4.6 Current International intellectual property laws

There is very little international law governing intellectual property. However, there is a remarkable amount of transnational uniformity, which results from treaties and international conventions. These treaties and conventions usually oblige member countries to provide minimum norms of intellectual property protection and to extend the protection for the benefit of foreign nationals. Several of the more important treaties and conventions are discussed below.

4.6.1 The Berne Convention

The Berne Convention, established in 1886, is the principal transnational convention relating purely to copyright protection.

The Berne Convention is based on national treatment, and imposes minimum norms of copyright protection. Like the Paris Convention, the Berne Convention grants foreign nationals the same protection and advantages as those granted to nationals of any member country, without discrimination. The membership of the Berne Convention has increased from an initial membership of 10 to over 90 countries including nearly all of the leading economic countries. Under the Berne Convention, and its six subsequent amendments, copyright protection is automatic throughout all member countries without the need to comply with any formalities (Endeshaw, 1996:28).

4.6.2 The Paris Convention

The International Convention for the Protection of Intellectual Property is probably the single most important multilateral treaty on intellectual property, and is better known as the "Paris Convention."

Most industrialized nations and many developing countries are parties to this convention and are referred to collectively as the Paris Union. To date, 56 countries have ratified the latest revision of the text, which covers a wide range of intellectual property rights including patents, industrial designs, trademarks, trade names, service marks, collective marks and unfair competition. The Paris Convention grants foreign nationals the same protection and benefits accorded to nationals of any other member country, without discrimination.

One of the most important provisions of the Paris Convention relates to "Convention Priority." An applicant's priority date is the date on which an application is first filed in the applicant's home country. According to Endeshaw (1996:24), the convention allows the applicant to claim this date as the effective date on which an application for the same patent, industrial design, utility mark or trademark was filed in any other member country, provided that the application is filed within 12 months (for patents and utility marks) or six months (for industrial design and trademarks) from the claimed priority date. This removes the need and cost to file all the separate country applications at the same time to obtain effective protection. Under the convention priority filing system, intervening third party applications cannot act as bars to the owner's application if the owner files within the prescribed time.

4.6.3 International Filing Systems

There is currently no single way to obtain truly international protection of intellectual property. The closest current approaches to such international protection are those provided by the following conventions establishing international application filing systems.

4.6.3.1 European Patent Convention ("EPC")

The EPC created the European Patent Office ("EPO"), which is based in Germany. The convention currently applies to most European Economic Community member states and to several other European countries. The EPC provides for a single application in English, German or French, on which a central search and examination is carried out. Once the patent is accepted for grant, and the appropriate fees and translations are submitted, the single application is converted into a bundle of individual national patents. The system also allows an opposition to the grant to be lodged at the EPO within nine months from patent grant. Subsequent issues of validity, however, must be dealt with on a country by country basis by individual national courts (Endeshaw, 1996:26-31).

4.6.3.2 Patent Cooperation Treaty (PCT)

This system, which includes many countries in addition to European countries, similarly provides for the filing of a single application designating the member countries from which patents are desired.

Although the single filing takes place under the auspice of the World Intellectual Property Organization (WIPO), a specialized agency of the United Nations system that seeks to promote international cooperation in the protection of international property, the actual filing is made either in the United States or the EPO. The single application is searched, and it is possible to request a non-binding opinion on patentability. After the payment of the appropriate fees and the filing of appropriate translations, the application is converted into a bundle of individual national applications, which are then subject to examination by individual national patent offices (Endeshaw, 1996).

4.6.4 GATT/TRIPS

Led by the United States of America (and with the compliance of the EEC and Japan), the pressure for "universal" forms of intellectual property gathered momentum in the Uruguay General Agreement on Tariffs and Trade (GATT) Round and managed to push through the Trade Related Aspects of Intellectual Property Rights (TRIPs). In spite of their different approaches, the First World Countries aimed to extend the scope of international conventions by superimposing a so-called intellectual property "code" on the enforcement mechanisms of the GATT (Drahos, 1997:201).

The Uruguay Round of international trade negotiations, launched under the auspices of the (GATT) in Punta del Este, Uruguay, in December 1986, came to a conclusion six years later on December 15, 1993 (Phillips & Firth, 1990). The result of the negotiations was a comprehensive set of agreements, including one on TRIPS.

The TRIPS agreement is considered to be among the most important parts of the world trade pact. In essence, the agreement requires member countries to adopt a certain minimum standard of international property protection. For example, in the area of trademarks, the agreement defines which types of marks are eligible for protection, and states that internationally well-known marks shall enjoy additional protection.

In the area of patents, it expands protection such that offers for sale of the patented invention without permission - as well as actual sales - constitute infringement.

Under the TRIPS agreement, member countries are obliged to rewrite national laws to make them conform to internationally agreed norms for the protection of patents, trademarks, copyrights, industrial designs, trade secrets, and integrated circuits (semi-conductor chip mask works).

It also broadens the areas of protection to include technological areas -- such as pharmaceutical products, computer software, and inventions and works arising from new technologies - that are not currently protected in many countries.

The TRIPS agreement also attempts to prevent any use of geographical terms that may mislead consumers as to the origin of goods. Some aspects of the agreement relating to the use of such geographical terms have not been completely resolved, but the TRIPS agreement does provide for future negotiations on unresolved issues. For example, during the GATT/TRIPS negotiations the United States and others argued that the term "champagne" had become a generic term for a certain type of beverage; the European Union argued the contrary view. Ultimately, the United States passed GATT legislation requiring the Patent and Trademark Office to treat all false geographical indications for wines and spirits (e.g., BORDEAUX wine originating from anywhere other than the Bordeaux region of France) as unregisterable.

In the area of copyrights, the agreement requires compliance with the latest (1971) rules of the Berne Convention. Under the TRIPS agreement, countries will amend their national legislation and practices to conform with the agreement's provisions according to the following timetable: developed countries over one year; former Soviet block and developing countries over five years; and less developed countries over 11 years.

The TRIPS accord includes enforcement provisions which provide for the use of improved international dispute settlement procedures under the World Trade Organization (WTO) for disputes between countries. The accord also permits cross-sectoral retaliation for a violation of TRIPS obligations; if a country fails to protect patents, for example, it could face retaliation in an unrelated sector (Phillips & Firth, 1990).

The US proposition (and unilateral practice) of using trade sanctions as a means of beating any divergent positions into line may have drastic consequences for Third World Countries. A likely effect of the TRIPs arrangement, now forming a treaty obligation of World Trade Organization (WTO) members, on Third World Countries, might be to force them to introduce legislation identical to those in First World Countries.

The newest and perhaps most important phenomenon in the globalisation process is the emergence of trade agreements as key instruments of economic liberalisation and as mechanisms used by the major countries to have disciplines and rules placed on developing countries in a wide range of issues. Trade agreements, that are legally-binding and have strong enforcement capability, have become the most important vehicles for disseminating and implementing economic and social policies across the world, policies that have been planned by the few developed countries for developing countries to follow. The World Trade Organisation, which is the organisation of the multilateral trading system, has in fact become the main vehicle of choice of industrialised countries for organising and enforcing global economic governance (Drahos, 1997:202).

The change-over from the old GATT to the new WTO with expanded powers and jurisdiction marked the arrival of the age of trade agreements in a new phase of the globalisation of policy making.

Due to the extension of issues beyond trade into other areas such as intellectual property, investment and investment measures, and the environment, the WTO is no longer only a "trade" organisation. "Trade" in the context of the multilateral system has become a code-word to include all issues that have come or may come under the purview of the WTO.

Moreover the WTO agreements have the most significant implications for non-economic matters; for example the WTO services agreement and the specific agreements on communications and information technology will have far- reaching effects on the culture of countries around the world (Hamelink, 1998:160).

4.7 Ownership in the Indigenous Culture

Indigenous people view the world in which they live as an integrated whole. Their beliefs, knowledge, arts and other forms of cultural expression have been handed down through the generations. The many stories, songs, dances, paintings and other forms of expression are therefore important aspects of indigenous cultural knowledge, power and identity. Therefore, all these elements of heritage should be managed and protected as a single, interrelated and integrated whole.

According to the a report published by the United Nation's Economic and Social Council (Lewis & Davidson, 1993:1), "...heritage includes all expressions of the relationship between the people, their land and the other living things and spirits which share the land, and is the basis for maintaining social, economic and diplomatic relationships - through sharing - with other peoples. All the aspects of heritage are interrelated and cannot be separated from the traditional Territory of the people concerned. "What tangible and intangible items constitute the heritage of a particular indigenous people must be decided by the people themselves" (King *et al*, 1996:2). Furthermore, indigenous cultural heritage is collectively owned and socially based and evolving continuously. In other words, heritage comprises all objects, sites and knowledge, the nature or use of which has been transmitted or continuous to be transmitted from generation to generation, and which is regarded as pertaining to a particular indigenous group or its territory.

More specifically, heritage includes (Deliwe, 1998:4):

- Literary, performing and artistic works (including songs, music, dances, stories, ceremonies, symbols, languages and designs).
- Scientific, agricultural, technical and ecological knowledge (including cultigens, medicines and the phenotypes of flora and fauna)
- All items of immovable cultural property (including sacred and historically significant sites and burial grounds).
- All items of movable cultural property
- Documentation of indigenous people's heritage in archives, film, photographs, videotape or audiotape and all forms of media.
- Human remains and tissues.

Thus, the heritage of an indigenous people is a living one that needs to be protected.

Although heritage is collectively owned, there is often an individual or group who is the custodian or caretaker of a particular item of heritage. The traditional custodians are empowered as trustees in relation to the particular item of heritage only in so far as their actions conform to the best interests of the community as a whole. This type of relationship was noted in the case of *Milpurrurru v Indofurn* (Blakeney, 1995:1). This case demonstrated that the unauthorized reproduction of designs that are of significance to Aboriginal culture could be extremely damaging. An artist may have the authority to depict a traditional, pre-existing design in their artwork by virtue of their birth or by initiation. Whilst they have this right, they hold the knowledge embodied in the work on trust for the rest of the clan. The case revolved around the concern relating to the possibly damaging effect of the use of reproductions of traditional Aboriginal designs on products such as key rings, tea towels, wall hangings and T shirts.

It is evident that, although there has been a step forward in the court's willingness to recognize Aboriginal interests in the protection of their artistic works against unauthorized use, the Copyright Act's requirement that the creator of a work be able to assert copyright ownership creates a problem where the design which is the subject of a claim dates back more than 50 years before the infringing act. This case is an example of the importance of comprehensive legislation to protect expressions of Aboriginal folklore.

According to western beliefs, the actual copyright owner, however, is the cultural producer or author. This author-function was used to help determine the constitution of cultural works as intellectual property through the use of copyright law. What was at stake in this circuit was the limitation of reproduction; it was through the constitution of cultural works as intellectual property, and the allocation of limited rights of reproduction, that the potential instability inherent in reproduction made possible by modern technologies of culture was constrained.

The way in which the author-function was put into law, differed within different judicial systems. So, for example, what might be called an author's rights regime developed in France in which author's were accorded a special category of personal rights. This was done by explicitly linking the ownership of intellectual property rights, including the rights of reproduction or copying, with the particular conception of the author as creator.

In "Ownership of the image" (Edelman, 1979:7), Bernard Edelman examines the nature of this connection, and suggests that it was grounded in the French moral rights tradition, that is, the principle of the rights of personality including the rights of paternity ("the right to be identified") and integrity ("the right to object to derogatory treatment of work"). Within this tradition, the work of art could be legally defined as property because it was regarded as the creative expression of what the artist already owned: his self or personality. Thus, it was in relation to the rights of personality that the rights of copying or reproduction were contained in France.

This regime stands in contrast to what might be called a "copiers" (or copyright) regime in England and in the USA (and in most common-law countries). In this regime, the rights of reproduction are vested in the copyright owners rather than directly in cultural producers. "Property was the right to make copies - not the right to authorship". It was only with the Statute of Anne (1709) and the series of legal decisions culminating in the judgement in 1774 that there came to exist an alienable right in text itself (Edelman, 1979: 24).

Given that indigenous knowledge is collectively owned, only the group as a whole may consent to the sharing of indigenous cultural and intellectual property. Such consent is given through specific decision-making procedures that differ depending on the nature of the particular item. Consent procedures may differ from group to group. Furthermore, consent is not permanent and may be revoked. As Daes (in Deliwe, 1998:13) notes: "Heritage can never be alienated, surrendered or sold, except for conditional use. Sharing therefore creates a relationship between the givers and receivers of knowledge. The givers retain the authority to ensure that knowledge is used properly and the receivers continue to recognize and repay the gift."

4.8 Intellectual property laws in Third World Countries

It is often forgotten that African countries had indigenous law making and enforcement institutions and mechanisms before the arrival of the colonial powers.[2]

[2] Allot, a leading authority on African law, wrote (in Endeshaw, 1996):

"In the pre-colonial era, indigenous legal institutions were evolving, more rapidly than is sometimes appreciated, on a tribal or local basis. Each was autonomous, though there was some cross-cultural influence and the laws of macro-ethnic groups tended to keep their similarity. The laws were unwritten, except where Islam and the law of the sacred texts had intruded...

However, the independent evolution of laws in Africa as well as the vast majority of other Third World Countries today, was interrupted by colonialism. The 1884 Congress of Berlin which formalized the subjugation of practically the whole Africa set the scene for the "transfer of law" to African countries on the assumption that the imperial powers ought to "civilize" their subjects.

Basically two legal systems were imposed on African colonies and remain entrenched in them even after the so-called decolonization or independence: the Roman-Germanic system from the continental colonial powers (Spain, France, Belgium, Portugal and Italy) and the common law from England. The various laws were applicable in the respective colonies of those powers and still remain thus, to this day.

The most pronounced impact on the African intellectual property legal regime came not from any single effort but from the emergence of two poles of IP organization and laws, namely the African Intellectual Property Organization (OAPI, according to its French acronym) in 1962 and the African Regional Industrial Property Organization (ARIPO) in 1976 (Phillips & Frith, 1990:44). Their coming into existence was in no small measure due to the support of the former colonial powers (often through the WIPO), thereby reflecting the strength of earlier linkages and allegiances to the two principal legal systems, that is common law and continental law.

Now that intellectual property laws operating in First World Countries have been shown to have evolved under economic and technological circumstances that differ substantially from those in the non-industrial Third World Countries, one would expect that the latter would opt for entirely new solutions in intellectual property.

Although deriving mainly in theory from ancient custom, in state, tribal, or local authorities and on judicial formulation of adjudicators or arbitrators for many of their detailed rules and for the modification of rules to suit changing circumstances."

Indeed, a few writers who have approached the problem of intellectual property in Third World Countries from the point of view of the economic and technological reality that obtains in them have suggested complete discarding of the intellectual property system imported from First World Countries. Others have advised reforming the intellectual property laws in First World Countries to make it "appropriate" for the conditions of backwardness or underdevelopment in Third World Countries; they contend that intellectual property laws may have failed in Third World Countries, because the peculiar circumstances of the latter have not been taken care of.

Still others (such as WIPO) maintain that the intellectual property system has no problems of its own, except that Third World Countries do not understand properly or do not have the resources to implement it. Nevertheless, the introduction and application of intellectual property laws in Third World Countries have long undergone difficulties stemming from obvious causes and although much has been written on the need of Third World Countries to embrace, wholly or partially, forms of intellectual property laws developed and applied in First World Countries, it is still questionable whether intellectual property laws developed in First World Countries are of any relevance to Third World Countries.

Until recently, it was considered unlikely that intellectual property rights could pertain to the special features of indigenous cultural heritage material. However, indigenous songs, dances, stories, lifestyles, knowledge, biogenetic resources and resource management practices are becoming of increasing value to modern society as property which can be applied commercially. In the light of these developments, indigenous people worldwide are seeking to protect their cultural and commercial interests.

4.9. Case Studies:

4.9.1 Evolution and Current Status of Intellectual Property Laws in Ethiopia

The earliest known law in Ethiopia, the *"Fetha Negast"* (Endeshaw, 1996:69) permitted, as "suitable for Christians", trades that were "necessary to sustain the body" directly or indirectly. While it warned against turning the "whole attention" to any one trade as a way of life, it provided for contractual relations between artisans and those who commissioned them. The artisan was able to keep the work "from its owner" until he was paid. It is interesting that the law recognized no ownership under other circumstances. Perhaps because of the restrictions by the *"Fetha Negast"*, makers of artifacts were generally frowned upon and considered social outcasts, although this never prevented anyone from buying their works and using them. Rulers of the land at all levels in Ethiopia kept at their courts such artisans, scribes and musicians as they needed and remunerated them more favourably than their ordinary retinue. It might thus be said that patronage was the first form of reward for Ethiopian creators.

Consequently, creators of literary, artistic and musical works (both written and oral) in Ethiopia, have received material benefits as well as social recognition over many centuries. Sanctions of a social character were imposed against anyone who faked another's poetry and recited it as their own. Such a person was considered a thief and openly confronted and shamed by an audience which would retort to a recital of the poetry: "It has been said before" (Endeshaw, 1996:72). In fact, it was often the practice that those who were caught plagiarizing would be beaten and condemned in the same way as anyone stealing money.

Religious musical compositions known as *"Woreb"* (Endeshaw, 1996:73), were recognized by the name of the composer and their public performance allowed only if this fact was acknowledged.

Aside from these two exceptions, the free use of others' creations was the general rule around the end of the last century.[3]

A change in attitude came about as a result of increased contact with the outside world during the 19th century. The failure of the Ethiopian government to bring about economic transformation prevented any establishment of legal rules that promoted and protected creativity. The Italian occupation of Ethiopia in 1936 was only a confirmation of that failure. According to Phillips & Frith (1990: 57), after liberation in 1941, a new drive for economic and technological progress was launched and legal reforms were initiated.

However, the development of intellectual property laws in Ethiopia indicates many deficiencies and gaps. Laws of copyright, confidentiality and unfair competition have been in code for nearly forty years now (since 1960) and courts have attempted to apply them, though with divergent interpretations and inconsistencies.

The main problems in the codes appear to be ambiguity, on the one hand and overlapping or contradictory provisions and conceptions, on the other. These problems have been compounded by translation errors and conceptual misplacement involved in using English legal terms of art to cover continental equivalents. The practice of registration of trademarks and patents legally provided for since 1943, has not showed any significant increase in domestic applications.

[3] Zeyohannes (in Phillips & Frith, 1990) notes: "The fact that a scholar's works were being copied by others, gave the author a feling of being respected rather than that of an infringement of his rights. The only [sic!] customary restriction imposed on students of traditional church schools, was that one had to copy down word by word without the slightest alteration. The primary purpose of passing down literary and heritages to generations was, thus served."

4.9.2 South Africa and its search for the protection and promotion of its indigenous knowledge

In comparison with what happened in the rest of the developing world, South Africa is rather unique in the way in which its indigenous knowledge was used/misused, protected and promoted. . This country is one of the few countries in Africa and elsewhere in the world, that have adopted the alternative approach of protecting and promoting indigenous knowledge by formulating a separate legislation dealing with specific indigenous knowledge. Not only has the country drafted a bill on the " Protection and Promotion of South African Indigenous Knowledges" but it has also taken other initiatives to protect and promote its rich wealth of indigenous knowledge.

These initiatives include, *inter alia*, the establishment of an Indigenous Knowledge System Programme (IKSP), the initiation of research projects to determine how indigenous knowledge and indigenous technologies can contribute to innovation in South Africa, setting up research projects to determine the value of traditional medicine.

All these initiatives are taken within the ideological context of the African Renaissance – an concept that was coined by the president of South Africa, Mr. Thabo Mbeki. This notion promotes the rebirth of the African people and the forging of a new identity, whilst moving away from the "dark ages" of colonialism and apartheid. In this context the Indigenous Knowledge Systems are seen as a national heritage.[4] As such, indigenous knowledge is seen as one of the major contributors to the further development of the country.

[4] President Mbeki himself denoted this as: "...the unique creation of African hands and African minds" (Indigenous Knowledge Systems, 1997:2) .

Although a country that was subjected to and exploited by colonial powers (and apartheid as a political system), South Africa's rich wealth of indigenous knowledge was never commercially exploited on a full scale, and neither were there any recorded cases of legal actions that were taken by indigenous peoples against possible misuse or exploitation of their indigenous knowledge or artefacts. There were also no official efforts to protect or promote South Africa's indigenous knowledge.

A variety of reasons contributed to this situation. Since indigenous knowledge is mostly tacit knowledge and mainly transmitted in an oral way or by means of demonstration, it is therefore very seldom available in a tangible medium. It is not theoretical knowledge but rather experimental, gained by means of trail and error, and it therefore changes constantly and can easily get lost (Bosman & Marais, 1998:20). It was therefore highly difficult to protect indigenous knowledge under previous and current intellectual property legislation in the country.

Furthermore, there is a vast gap between traditional African and Western beliefs. Most indigenous people in South Africa believe that ownership is rarely vested as a property right, and that knowledge as a benefit should be shared freely with others. The concept of "immaterial legal objects" does therefore not exist in the legal terminology of these people (Boonzaaier, 1993 & Boersma). The lack of legal cases against the (mis)use of their knowledge can therefore be explained by their perspective on "ownership of knowledge".

Also, for a long time, the West perceived African indigenous knowledge as inferior and bearing little or no scientific value. This knowledge was largely regarded to be of academic concern limited to the field of social anthropology and often perceived as superstition.

Indigenous people were seen as pre-logic people with alternative modes of *thinking*, relying on intuition rather that reason, and ignorant of science (Augusto, 1997:4).

To illustrate the vast difference in worldviews, indigenous people regard heritage as relationship, whilst Western world regards it as a bundle of economic rights. This notion probably explains why these indigenous knowledge (and/or artefacts) were not exploited in full in South Africa.

However, the perception of indigenous knowledge in South Africa has radically changed since 1994 when the system of apartheid was finally ended and replaced by a democracy. There was an urgency amongst politicians, academics and local people that South Africa was to "rediscover the value of their indigenous knowledge" (Adam, 1997:7). This indigenous knowledge was suddenly seen as an untapped resource that could contribute to the development of poor communities. For example, the highly rated research institution in South Africa, the Human Sciences Research Council (HSRC), illustrated how indigenous knowledge could be used in Social Impact Assessment studies.[5]

South Africa has realised that the sharing of indigenous knowledge within and across communities can help to enhance the process of cross-cultural understanding and the promotion of the cultural dimension of development. It also acknowledged that indigenous knowledge can provide a basis for problem-solving strategies for local, poor communities. It is in this context that one must understand and interpret the initiative of the South African Department of Arts, Science and Technology to link indigenous knowledge to the National System of Innovation in South Africa to try to establish how, and in which manner, indigenous knowledge can contribute to innovation and development in South Africa (Adam,1997:6).

[5] In one of these projects the HSRC came to the following conclusion :" The real value of local knowledge, in our opinion, is that it has made us aware of the need to challenge every facet of the concept of development (Bosman & Marais, 1998:23).

Recently South Africa has formulated a White Paper on the Protection of Indigenous Knowledge which will be presented to Parliament. The main aim of the draft bill on the "Protection and Promotion of South African Indigenous Knowledges" is to protect and promote indigenous knowledge. It is proposed that this must be done by means of the establishment of an independent South African Indigenous Knowledge Regulatory Authority. This Regulatory Authority will have the power to seize and detain indigenous knowledge or suspected indigenous knowledges imported, exported to entering or leaving South Africa. In the preamble of the draft bill it is also stated that indigenous knowledge systems represent an important part of the living culture heritage of the nation, and that South African must recognise the need to identify resources that are unique to South Africa.

Two important underlying principles of the draft bill reads as follows: "Global and international responsibilities relating to indigenous knowledge must be discharged in the national interest" and "'The indigenous knowledges is held in public trust for the people, and the beneficial use of resources must serve the public interest and the resources must be protected as the people's common heritage".

Apart from the legal efforts to protect and promote indigenous knowledge in South Africa, there are also initiatives to integrate traditional medical knowledge into the existing allopathic medical research projects. This is not only done to promote indigenous knowledge, but also to learn from it. One good example is a programme of the South African Medical Research Council to test plants, which were provided by traditional healers of elders of communities, for a the cure of malaria. It was agreed that, if any outcomes were to be positive, the royalties will be shared 50/50 (Mowszowski, 1998:1).

4.10 Conclusion

The intellectual property laws in force in Sub-Sahara Africa today largely originated in colonial laws received during colonial rule and have continued to be applied beyond independence, without any fundamental change to them.

This is no surprise because, even the entire system of laws imposed on them during colonialism has in large measure been kept in the respective ex-colonies, though a number of changes have been introduced through new statutes. To date, there have been no real attempts to reform the laws thoroughly.

While most indigenous societies recognize some form of "ownership" of traditional knowledge, such ownership rarely is vested as a property right. Even when a person possesses knowledge unique to his or her experience or training, the community views that knowledge as a benefit to be shared freely with others.

As a result of such deep-seated sentiments, the marriage of intellectual property rights to traditional knowledge in indigenous societies is, at best, a shotgun wedding. Moreover, experience has shown that the application of such rights has not had a dramatic impact on the economic well-being of indigenous people. For this reason, it is difficult to refute the notion that it may be better to minimize the importance of intellectual property rights and focus instead on the human rights of indigenous people.

The protection of human rights will remain an elusive goal among many developing nations in the years ahead. Therefore, step-by-step negotiations, and efforts to protect intellectual property rights will continue to be among the most important tools for limiting the exploitation of indigenous peoples.

CHAPTER 5 THE EXPLOITATION OF INDIGENOUS KNOWLEDGE

5.1 Introduction

Over hundreds of thousands of years, indigenous people have developed a close and unique connection with the environments in which they live. They have also established distinct systems of knowledge, innovation and practices relating to the uses and management of biological diversity.

Much of this knowledge contributes extensively to research and development, particularly in areas such as pharmaceuticals, and agricultural and cosmetic products. These jungle-dwelling societies might know botanical remedies for diseases that currently baffle modern science. This theory is the basis for a multi-million dollar business effort to patent new medicines from ancient herbal remedies. A pertinent example of this, is one of today's most potent medicines for treating childhood leukemia, which was derived from the rosy periwinkle, an old standby of witch doctors in Madagascar.

In the context of these uses, indigenous peoples claim that their rights as traditional holders and custodians of this knowledge are not adequately recognized or protected by legal measures. They demand not only for recognition and protection of this knowledge, but also for the right to share equitably in benefits derived from the uses of this knowledge.

Existing intellectual property laws offer limited scope for the recognition of indigenous peoples' rights in biodiversity-related knowledge and practices. Similarly, native title, heritage and environmental laws and policies also provide insufficient means for addressing indigenous rights in biodiversity-related knowledge and practices.

The challenge is to protect the rights of indigenous peoples to their knowledge, while also conserving biological diversity.

5.2 The importance of indigenous medicine

Indigenous medicine has for centuries been the mainstay of the health care system in non-Western communities, and its continuous utilization must be taken seriously. One area in which indigenous medicine has not developed in the same way as Western medicine, is in the construction of precision methodologies for testing its effectiveness. Often those trained in Western medicine, have taken this to mean that indigenous medicine is not effective. But the apparent absence of Western-type methods for testing the efficacy of indigenous medicine should not be seen as evidence of its ineffectiveness. Examples include aspirin, quinine and cancer chemotherapy agents (e.g. taxanes) amongst others, which are all synthetic equivalents of old folk medicines.

Moreover, African and other indigenous societies have a system for measuring efficacy of their medicine within a social context. This is reflected in the fact that the community refers patients with particular ailments to a specific traditional healer. Such collective behaviour is indicative of the community's recognition of the effectiveness of that particular "medicine man" and his medicine.

Traditional knowledge related to human health, is currently the basis of primary health care for a large part of the world's population. Interest in this area is more and more recognized in development policies, the media and scientific literature. In Africa, traditional healers and remedies made from plants play an important role in the health care of millions of people. Local communities have always used and managed natural biodiversity resources to meet their needs in health care.

Ratios of traditional practitioners and medical doctors to total populations in African countries are telling. In Ghana's'Kwahu district, there is one traditional healer for every 224 people but only one university trained medical doctor for almost 21 000 residents (ELCI, 1996).

The same applies to Swaziland, where the ratios are for every traditional healer there are 110 people while for every medical doctor, there are 10 000 people (ELCI, 1996).

Relegated for a long time to a marginal place in health planning of developing countries, traditional medicine or more appropriately, traditional systems of health care, have undergone a major revival in the last twenty years. Also, the international pharmaceutical industry has started developing a keen interest in medicinal plants. The sales of the phyto-medicine industry have already exceeded $ 2 billion in the United States in 1996 (ELCI, 1996). We are thus currently at a stage where traditional medicine is considered more for its capacity to generate other medicine and financial earnings, than for its own sake.

5.3 Bioprospecting

Bioprospecting is the name given to the search for useful plant related substances that can be developed into marketable commodities such as pharmaceuticals, pesticides and cosmetics.[1] Increasingly sophisticated biotechnological processes are used to transform plant derived substances into commercially successful products with global markets.

There is currently an increased interest in natural remedies. Hence, pharmaceutical companies are keen to use traditional knowledge.

[1] World Resources Institute (http://www.igc.org/wri/biodiv/bp-facts.html)

It has been estimated that 25% of prescription drugs (about 7000) in the United States, have active ingredients which are extracted or derived from plants (Puri, 2000:1).

In the chemical field, extracts from particular plants have been used as a natural insecticide by environmentally friendly pest controllers. A Brazilian fungus has been patented as a natural fire ant control and genetically modified organism – the potential seems unlimited.

The patenting of products and substances derived from the natural environment has particular implications for indigenous peoples' claims.

5.4 Patent protection and its limitations in protecting indigenous knowledge

A patent is an important component of intellectual property that confers exclusive rights on the creator of an invention. The conditions required for a patent are that the invention – either a product or a process – should be new, non-obvious (i.e. it should involve an inventive step), and industrially applicable. Another requirement for a patent is that the invention should be clearly described and documented and made available to wider society (e.g. through publications in books or journals) (Lipinski and Britz, 2001:22).

The following examples of bioprospecting and the patenting of biological products raise important issues regarding the role of indigenous knowledge, practices and innovations, and the applicability of patent laws to these. These examples of bioprospecting and patenting of biological and genetic products raise issues about what is patentable subject matter. Patent law generally defines subject matter that is deemed patentable in terms of what subject matter is excluded from patent applications.

These exclusions usually comprise discoveries of materials or substances that already exist in nature, plants or animals or products from these, or biological processes (other than microbiological processes) for the production of plant or animal varieties or products.

5.5 Case studies of global commercial exploitation of indigenous medicinal knowledge

5.5.1 India

The neem tree (*Azadirachta indica*) is found widely throughout parts of India. It forms a central part of Indian communities' culture and heritage. It is used by these communities for a vast range of purposes such as in medicines, toiletries, insecticides, fertilizers, and in agriculture. The medicinal, pharmacological and therapeutic properties of neem have been known about and used for millennia, and it is known in Sanskrit as *Sarva Roga Nivarini,* "the curer of all ailments" (Davis, 1998:4).

The neem has unique characteristics as a bio-insecticide in that it is lethal to at least 200 types of insects as well as species of mites and nematodes, but completely harmless to birds, mammals and even beneficial to insects such as bees (Puri, 2000:27).

From the early 1970's, the neem tree began to attract the attention of the United States and global markets. In 1971, a US importer noted the properties of the neem tree, and began importing it (Puri, 2000:27).

Following testing for a pesticidal product derived from neem extracts, the importer received clearance for this product from the US Environmental Protection Agency in 1985, and in 1988 he sold the patent for the pesticide to the transitional chemical company W.R. Grace & Co (Davis, 1998:4). W.R. Grace's patent desribed it as a "strong, stable azadirachtin formulation used as a pesticide" (Puri, 2000:27).

The patenting and marketing by Grace of products based on neem derived substances, led to a debate about the appropriation of the intellectual property of Indian communities. Indian and Third World critics of Grace's approach claim that the preparation of neem based products has been part of the collective community knowledge of Indian societies for millennia, and should not have been patented by Grace. They refuted the assertions by Grace that its methods for developing neem-based products were novel, non-obvious and based ion extraction methods that constituted an innovative technique, and therefore amenable to patenting. Instead, the critics argued that the extraction and preparation of active substances from neem is a traditional innovation based on millennia of collective knowledge and practice.[2]

5.5.2 Australia

The bioprospecting and patenting of the neem tree has parrallels in Australia, as illustrated by the case of the smokebush. The smokebush is the common name for *Conospermum*, a plant that is widespread throughout parts of western Australia and in parts of some other states. It was used traditionally by Aboriginal peoples for a variety of therapeutic purposes (Davis, 1998:5).

[2] The critics state that: "Patent claims on the various processes and products of the neem that re built on the vast and intellectual heritage of the Indian people, reflect a total devaluation of the country's intellectual heritage and an arrogance on the assumption of superiority of western sciences" (Davis, 1998:5).

During the 1960's, the smokebush was among those plants that were collected and screened for scientific purposes by the US National Cancer Institute, under license from the West Australian Government. In 1981, some specimens were sent to the US where they were tested for possible anti-cancer chemicals. No cancer resistant properties were found, and the samples were stored for several years. Later, in the late 1980's, these samples were again tested, but this time for potential substances that could cure AIDS. A substance called *Conocurvone* was isolated, which, when laboratory tested, was found to destroy the HIV virus in low concentrations (Davis, 1998:5).

To develop this substance, in the early 1990's, the Western Australian Government granted a license to Amrad Pty Ltd, a Victorian based multinational pharmaceutical company. The US National Cancer Institute granted Amrad an exclusive worldwide license to develop the patent for this anti-AIDS substance. It has been suggested that Amrad provided $ 1.5 million to gain access rights to smokebush and related species. Some estimates state that the Western Australian Government would receive royalties exceeding $ 100 million by the year 2002 if *Conocurvone* is successfully commercialised (Davis, 1998:5).

Given these commercial values on smokebush and its derivatives, critics argue that there should be provisions for Aboriginal peoples to share in benefits from this plant, given their role as first having identified the smokebush for its therapeutic and healing properties.

The collecting and screening of smokebush by scientific interests has been facilitated by the Western Australian Government's use of its Conservation and Land Management Act of 1984. This Act was amended in 1993 to include a clause specifically designated to encourage state control over biological resources.

Some have argued that these amendments disadvantage indigenous peoples who claim rights to species, or knowledge of species in Western Australia, favoring instead, state and industry interests (Davis, 1998:5).

Amrad Pharmaceuticals has recently also signed an agreement with the Aboriginal Tiwi Land Council to enable it to conduct research with rare Northern Territory plants with the assistance of Tiwi Aborigines (Puri, 2000).

5.5.3 Cameroon

The bark of *Prunus africana* has been found to have important anti-cancer properties. It is also used in the treatment of benign prostatic hypertrophy (BPH). The bark of this tree is currently being debarked illegally, causing many trees to die and threatening extinction of the species (Bodeker, 2000:1).

A French company is the sole holder of a commercial exploitation permit to collect and export the bark to the European market. The European market was estimated at $ 150 million in 1992 (Bodeker, 2000:1). None of these profits are repatriated to Cameroon, whose citizens are paid only for the collection of the bark.[3]

5.5.4 South Africa

In South Africa, as elsewhere in Africa, there is not only a need to promote the use of indigenous knowledge, but there is also a serious need to protect it from exploitation and possible extinction.

[3] Cameroon intellectual property laws protect patents (including pharmaceutical patents and "cultural patrimony", e.g. indigenous medicinal treatments. However, protection would be limited only to Cameroon. New inventions, based on minor variations on traditional knowledge would be eligible for patent protection in industrialized countries (Bodeker, 2000:1). Cameroon has made no attempt to

This is specifically applicable to indigenous medical knowledge. South Africa is the third most biologically diverse country in the world, with more than 30 000 plant species - 80% of these species are endemic to the region. Many of these species are used by traditional healers (of whom there are more than 200 000 in South Africa) as medicine. However, two problems arise. The one is that 15% of these species are under serious treat of extinction (Jordaan & Britz, 1999:4).

The second is that of bio-piracy. It is estimated that over a dozen Japanese, European and American pharmaceutical companies obtain their raw material from Africa, and treat the host countries as global warehouses to be exploited by paying them extremely low prices for the plant species that are used (Dutton & Dutton, 1997:1). The problem is that there is current up to date legal protection in terms of intellectual property in South Africa for indigenous knowledge.

Once a local community gives away it indigenous medical knowledge its has lost control of the valuable resource. Two examples of these practices are the following:

5.5.4.1 Rooibos tea (*Aspalathus linearis*), rooibostee, bossietee (Afrikaans)

Southern Africa has a diverse and interesting indigenous tea culture. Several teas are known, but the distinction between a tea, a tonic tea and a medicinal tea (i.e. a medicinal infusion) is somewhat blurred. Some examples of these are the following: in some parts of the Karoo, lidjiestee (made from *Viscum capense*) is still in daily use as a tonic.

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develop its own capacity to prepare medicinal plant extracts for sale on the world market, nor to link this trade to conservation and local community development.

The same is true for devil's claw (*Harpagophytum procumbens*) in the Kalahari region and in Namibia. Honeybush tea (*Cyclopia* species) is another well-known indigenous tea which is also widely used.

Rooibos tea is one of the best known indigenous medicinal teas, and have become increasingly popular as a health beverage, because it is totally devoid of caffeine but rich in phenolic compounds which is nowadays claimed to have important anti-oxidant activity. This plant is a shrub of up to two metres high, with bright green needle-shaped leaves that turn reddish-brown after processing. The small, yellow flowers are produced in early summer, followed by small single-seeded pods.

Rooibos tea is a traditional beverage of the Khoi-descended people of the Cedarberg region in the Cape and is one of only a few indigenous plants that have become an important commercial crop. Production is still centred in its natural distribution area (the districts of Nieuwoudtville, Clanwilliam, Citrusdal and Piquetberg). Seeds have to be treated with sulphuric acid to break the impermeable seed coat and seedlings are transplanted to deep acid sandy soils.

The production area has cold wet winters and hot dry summers, with a mere 300 to 350 millimetres of rain per year. Some wild types of rooibos tea are harvested on a small scale, but only one form, the so-called red type or Rocklands type, is commercially cultivated.

Annual yields vary from bout four to nine million kilograms, depending on the rainfall. The plants are mostly harvested with sickles and tied into bundles. They are then chopped into short segments, moistened, bruised and left in heaps to "sweat" or "ferment" for several hours until a sweet smell develops.

So-called "fermentation" is actually an oxidation process, during which the phenolic compounds in the plant are enzymatically oxidized. When the tea-maker is satisfied with the colour and aroma, the tea is spread out thinly to sun-dry (Refer to Annexure 2 for the rooibos tea production cycle).

According to van Wyk & Gericke (2000:100), marketing started in 1904, through the efforts of Benjamin Ginsberg, who bought wild tea from local people. During the early 1930's, Dr. P. le Fras Nortier helped to develop rooibos tea as a crop plant and Mr. James van Putten played a major role in later years. The Rooibos Tea Control Board was established in 1954 to stabilize producer prices through structured marketing and quality control. This Board was recently turned into a private company. Through imaginative marketing, rooibos tea has become an important commercial product, with retail and export earnings running into many millions of rands per year.

However, the Khoi people and original holders of the knowledge who have traditionally used rooibos for its therapeutic and healing properties, would receive nothing from the commercial exploitation of the plant.

Rooibos tea is popular as a health beverage, prepared and used in much the same way as black tea. However, it contains no harmful stimulants and is totally devoid of caffeine. It has gained popularity as an excellent iced tea. The health properties are ascribed mainly to the low tannin content, the presence of minerals and the antispasmodic and free-radical capturing properties of several unique flavonoid *C*-glycosides such as aspalathin and nothofagin. The product is also used as an ingredient in cosmetics, in slimming products, as a flavoring agent in baking, cooking, cocktails and even as a milk substitute for infants who are prone to colic.

5.5.4.2 Devil's claw (*Harpagophytum procumbens*) sengaparile (Twana), duiwelsklou, kloudoring (Afrikaans)

The Devil's claw is a perennial plant with annual stems spreading from a central tap root. The common names are derived from the claw-like fruit

The thick, fleshy secondary roots are the parts used medicinally. The plant is traded world-*wide,* and it has a reputation for efficacy in osteoarthritis, fibrositis and rheumatism and is particularly effective in small joint disease.

According to van Wyk & Gericke (2000:146), devil's claw is taken as a bitter tonic to stimulate the appetite and for indigestion. Taken in the form of infusions and decoctions, tinctures and extracts, it is used in many health conditions, including diabetes, hypertension, gout and peptic ulcers. It is taken for fever, and as n important tonic in infectious diseases including tuberculosis. Taken on a regular daily basis, it has a subtle laxative effect. Small doses are used for menstrual cramps, and in higher doses to assist in expelling a retained placenta. It is also used post-partum as an analgesic, and to keep the uterus contracted.

The dry, powdered tuber is used directly as a wound dressing, or it is mixed with animal fat or vaseline to make wound healing and burn-healing ointments. Commercial ointments and creams are applied topically for minor muscular aches and pains and to painful joints. In Germany, it is used in supportive therapy for degenerative disorders of the locomotor system and for lack of appetite and dyspeptic problems.

The iridoids harpagoside, harpagide and procumbide have analgesic and anti-inflammatory activity, and, together with phytosterols, such as β-sitosterol, may be responsible for some of the efficacy of devil's claw. Clinical studies support its use in painful joint conditions (Lecomte & Costa, 1992) and low backache (Chrubasik, 1996). Serum cholesterol and uric acid levels were also found to be reduced (Brady et al, 1981).

Devil's claw has become a medicinal plant of international importance, with approximately 500 tons being traded annually, almost solely from wild-harvested material. With the increasing interest in the therapeutic potential of this plant, there is a danger of over-exploitation of wild resources. Furthermore, the original custodians of the indigenous medicinal knowledge who have traditionally used Devil's claw for its therapeutic and healing properties, are not shareholders in the commercial success of the plant.

A number of private initiatives in Namibia and South Africa are successfully propagating the plant on a limited commercial scale in the interests of providing a sustainable supply of raw material, and also to control the quality of the raw material.[4]

It is obvious from the above examples of bioprospecting and patenting of biological and genetic products that important issues are raised about what is patentable subject matter. Patent law generally defines subject matter that is deemed patentable in terms of what subject matter is excluded from patent applications. These exclusions usually comprise discoveries of materials or substances that already exist in nature, plants or animals or products from these, or biological processes (other than microbiological processes) for the production of plant or animal varieties or products.

[4] The Agricultural Research Council of South Africa is investigating the feasibility of transferring propagation technologies to the small rural farmer in the interest of rural development.

5.6 Conclusion

The recognition and protection of indigenous peoples' rights in their knowledge, innovations and practices relating to biodiversity is assuming an increasing urgency. Indigenous knowledge makes a significant contribution to the collection and screening of plant-related substances, and the development of commercial products such as pharmaceuticals from these. Often, however, the contribution made by indigenous knowledge, innovations and practices remain unacknowledged, and little or no financial benefits are returned to these knowledge holders and innovators for their contribution.

While conventional intellectual property rights systems are largely ineffective in providing recognition and protection for indigenous knowledge, there are some other avenues that have potential to offer solutions. In the next chapter, some solutions of these problems will be discussed, e.g. alternatives to intellectual property systems that may offer more productive opportunities for the protection and promotion of indigenous knowledge.

CHAPTER 6 CRITICAL EVALUATION AND POSSIBLE HARMONIZATION OF PROBLEMS ASSOCIATED WITH CURRENT LAWS AND PROPOSED SOLUTIONS

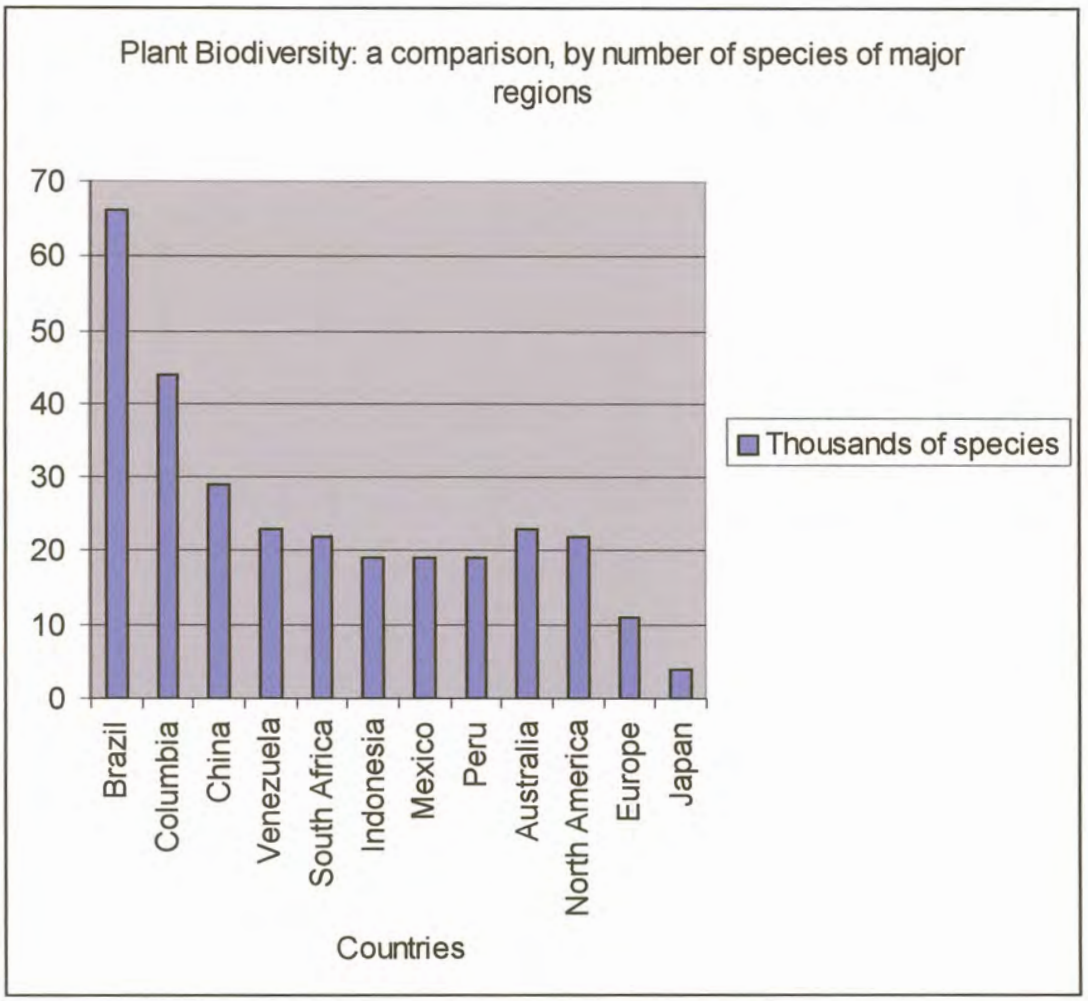
6.1 Introduction

Expressions of indigenous culture of underdeveloped countries or of underdeveloped peoples within developed or developing nations is a sought after commodity in today's globalized marketplace. Since indigenous knowledge is often found in intangible form, the legal protection may be minimal. When the knowledge is expressed in tangible form, societies have seen fit to offer protection under the rubric of intellectual property laws. However, these legal protections have emerged from a "western" or "developed" legal tradition and are often inadequate to deal with the scenarios in which indigenous knowledge often resides. The dominant global perspective on the ownership of knowledge is furthermore based upon commercialization and exploitation. There is, however, a renewed interest in the rights (including ownership rights) of indigenous people (United Nations General Assembly Resolution, 48/163:1993; Lipinski & Britz, 2000). This is accompanied by a growing need to incorporate alternative, non-economic, viewpoints into the present global legal infrastructures. This new emerging perspective may be, amongst other, a reflection of the "new politics of identity" where indigenous people struggle for "recognition of cultural diversity" (Axford,1995:174).

6.2 Indigenous knowledge and the growing importance of plant biodiversity and medicine from natural resources

In the health field, 80% of the world's population is at least partly dependent upon traditional medicine and medicinal plants to treat their ills. In the light of the above, the conservation of pharmaceutical biodiversity is critical.

More than two-thirds of the world's plant species – at least 35 000 of which have potential medicinal value – originate in developing countries (refer to Figure 1).[1]



According to an inter-governmental meeting of Southern experts in Tanzania in 1990, at least 7 000 medical compounds in the Western pharmacopoeia – from aspirin to birth control pills – are drawn from plants. The estimated value (manufacturer's price) of Third World countries medicinal materials could range from $ 35 million to $ 47 billion by the end of 2000.

[1] The Crucible Group. IDRC. 1994, 140 pp. People, plants and patents. The impact of intellectual property on trade, plant biodiversity and rural society. ISBN 0-88936-725-6, www.idrc.ca/books/725/chap1.html

Because the development of medicinal plants relies heavily on the knowledge of indigenous people and rural societies, concerns about equitable benefit sharing and intellectual property inevitably arise. While the benefits to drug companies are clear, the contributions of indigenous people, whose knowledge and innovation are often the key of drug development, generally go unrewarded.

6.3 Possible problems with current laws

6.3.1 Patents and indigenous medicine

A chemical or pharmaceutical patent derived from a plant or the patent of a crop plant derived from "newly discovered" indigenous stores of flora knowledge can contribute greatly to the health and wellbeing of many beyond the confines of the indigenous culture (and to the profit margins of developers, i.e. pharmaceutical companies) (King, 1996:2).

Again, the concept of property embodied within the patent law does not mesh well with the environs in which the indigenous knowledge is used. There exists fundamentally a problem of recognition of ownership of natural resources and the proper compensation to be paid for the exploitation of these resources and if it should involve intellectual property rights at all.

The particulars of discovery or development of the plant into a commercially viable patent (it may be a naturally occurring plant that is only patentable after mutation/alteration or processing) often do not coincide with the ownership rights the patent laws offer. As a result, there is inadequate recognition of ownership rights due to the indigenous contact or referral and thus compensation to the source's originator, the indigenous people, is seldom forthcoming by legal right.

Western interests are often responsible for the development and marketing of a viable commercial version of aboriginal plant therapy.

In the light of the above, the following questions may be posed: what rights, if any, should reside in the indigenous people that have served as caretaker and developer of the knowledge, often accumulating expertise in the use of the fauna and flora of their environment for centuries? How should these rights be balanced against the reapers and developers of that knowledge without whose effort and contribution the knowledge would not be widely available or commercially viable or even medically palpable to the general population? Also, should indigenous people be able to control the use or release of their knowledge in the first instance?

The main problem is not the patentability of the drug therapy, but who is entitled to the ownership rights. For example, many drug therapies are described first, not in the medical or pharmaceutical literature, but in the anthropological literature as indigenous case studies, the medicinal use of plants being merely one part of a larger study.

Another problem arises when considering the sharing of a patent between the original holder (traditional healer or indigenous group) and the developer (pharmaceutical company). Does the traditional healer or indigenous group truly know how and the extent to which their use of the drug will actually be applied in a mass-market product? Furthermore, development of the finished product takes place without any involvement from the originating indigenous resources. According to Lipinski & Britz (2000:25), merely supplying useful background information about the benefits of a useful medicinal plant is not enough for the patent requirement of co-contributor or joint inventor. Whether the contribution of indigenous knowledge is an essential part of the conception, depends on details of collaboration, the method of development and type of patent sought.

The publication rules may be less a problem where the specific goal of plant development is involved. This is true because the publication must be more than a mere passing mention (for purposes of novelty).

Furthermore, a pharmaceutical company would be careful by its own act to not trigger the activation of publication rules (the statutory bar) with respect to medicinal fauna and flora that it intended to develop. "Simply naming a plant used in indigenous medicinal systems, or even describing its particular uses, activities, and effects, will not provide a drug developer of ordinary skill with the means for developing a drug from that plant without additional inventive contribution by the developer." (Lipinski & Britz; 2000:26).

While patent protection might be shared with the indigenous knowledge holder, it seems unlikely. Legislative amendment could of course make it so, but this would skew the existing concept of "inventor" under existing patent laws. However, some other ownership right in the indigenous people could be granted. Lipinski and Britz (2000:26) contend that this could involve firstly a claim to share in the economic interest, either in terms of initial monetary compensation or a right to share in the subsequent revenue stream if developed successfully and secondly a general right of control over the development or exploitation. This would include not so much an ability to prevent development by others in the first instance, but in the ability of the indigenous people to preserve their traditional access to the source of knowledge, be it fauna or flora.

6.3.2 Moral Rights

One mechanism to protect intellectual property is based upon rights of personality or persona (Liemer, 1998:7). Moral rights are based on civil law concepts and acknowledge the natural rights of authors (*droit d'auteur*) to control the disposition of their creation beyond commercial considerations. Moral rights include the following three rights:

- The right of attribution (*driot a la paternite*). This grants holders of the right the ability to be identified as the originator of the work (paternity right). It implies also the right to be free from false attribution.

- The second moral right is the right of integrity (*droit a l'integrite*) which includes the right to protect the integrity of the work (prevent modification, alteration and excessive criticism).
- The third moral right to control the public presentation or disclosure of the work (*driot de divulgation*). The creator of a work has a right to determine when the work is finished, thus disclosed to the public and thus formally published. The creator of a work can also withdraw after publication the work from public use (Peeler,1999: 423).

Moral rights have the potential to protect indigenous knowledge and enhance the harmonization of international intellectual property law (Farley, 1997: 20). This is due to the fact that moral rights cannot be alienated from its creator. In the present discussion, the rights of paternity and integrity impact most upon the expression of the indigenous culture and knowledge. These rights implies that a creator (of indigenous knowledge) has the right to be identified as creator and the right to object to uses of the work which would discredit the reputation of the creator. The additional right of non-disclosure can apply to cases in which a commercial developer makes public the indigenous knowledge without permission or expresses indigenous knowledge in such a way that it would harm the indigenous culture. This might occur if a particular fauna and flora used by indigenous people are harvested into extinction.

Unfortunately, moral rights are individual rights and not communal rights. Moreover, moral rights typically protect unique works of art and would not protect general indigenous knowledge expressed through commonly known stories or shared folk remedies. If moral rights could be expanded to the community or groups it might hold promise for protecting the commercial exploitation of indigenous knowledge.

6.3.3 Commercial misappropriation

Intellectual property protects tangible information. However, the question is whether intellectual property protects intangible knowledge. Since this is the status of much of the store of indigenous knowledge, should the law not also be extended to protect intangible indigenous knowledge from commercial exploitation?

In the present legal system information, which is in an intangible form such as a mere business idea is protected from unauthorized taking and/or commercial exploitation. This is known as misappropriation. However, it is mostly applicable to factual information. Misappropriation acts as a finder's fee mechanism: encouraging the finders to seek more information secure in the knowledge that if any revenue stream is generated by another's use of that information then the original collector of compiler will likewise share in any revenue stream that the use thereof creates. An example of this phenomenon would be indigenous medicinal knowledge used by traditional healers and the commercial interest of pharmaceutical companies in this valuable commodity.

Indigenous knowledge is more than mere facts, and thus no longer subject to continuous "discovery". According to Lipinski & Britz (1999:6), this implies that the granting of misappropriation ownership rights to the indigenous would not have a negative impact on the discovery – collection – creation incentive system as the discovery, collection and creation is already exploited. The application of the misappropriation right could therefore reward the indigenous when the initial discovery, now perhaps centuries old, is found to have commercially relevant use today. The concept is grounded in the protection of commercial exploitation of another's knowledge. Therefore indigenous people will be protected from developers (e.g. pharmaceutical companies) who might collect indigenous knowledge at no or little cost and commercially exploit it in the market place. The right of misappropriation would furthermore recognize the great efforts of indigenous, often over generations, in contributing to the knowledge base of others.

6.3.4 Protection of indigenous property

Information in traditional societies is mostly seen as a primary good and therefore it plays a major role in the economic, political and cultural processes in which societal members are engaged. Considering the global importance of information, one of the main issues is therefore the fair and equal distribution of information. It has, however, been argued that the development and implementation of primarily Western concept of intellectual property and notions of property being based on exclusiveness, has had a major impact on the way in which information is being distributed. This may lead to a paradox between the reality of the co-modification (of information) processes and the goal of information and knowledge dissemination in society (as a renewable resource).

Lipinski and Britz (2000:27) argues that ownership information must not only be based on a legal perspective but also be investigated from a moral perspective based on social justice. Since uneven and even imperfect distribution of information can have serious economic, political and social implications, a theory of justice must be found that can be used to evaluate unequal distributions in an attempt to gauge socially acceptable levels of disparity, or alternatively, succeed in achieving justice.

Within the framework of these emerging perspectives, the present shortcomings and inadequacies in the present global legal infrastructure were investigated by Lipinski & Britz (1999:1), who proposed a possible solution of harmonization of current laws.

The authors' objectives were to illustrate that both the current (private and exclusive) and alternative (communal or public) legal perspectives on knowledge ownership (intellectual property) can be harmonized in order to protect indigenous knowledge from further exploitation.

Lipinski & Britz (1999:1) illustrated how the use of present legal infrastructures support the existing free market system based upon individual ownership, demonstrated how strands of these various concepts might be woven into a new protection scheme (Kuruck, 1993: 842). Deconstruction assists in questioning the present global information property world order; it provides the building blocks upon which a new order, one which would protect indigenous rights, might be fashioned. In response to this a discussion of ethical implications resulting from the disparity of ownership and control rights is undertaken. This provides a moral basis upon which past practices may be evaluated and future protection mechanisms designed. This ethical framework is based on the work of John Rawls.

Western legal infrastructures support a market orientated property system and this often results in an inadequate or inconsistent mechanism for the articulation of social, political or ethical considerations (McEvoy, 1998:100). However, this does not exclude the possibility that these property-based mechanisms could not be used in future to become more adequate and consistent.

6.4 Possible harmonization of current legislature

6.4.1 South Africa's alternative legal approach to protect its indigenous knowledge[2]

South Africa's proposed way in which to protect and promote indigenous knowledge is to formulate, apart from intellectual property, separate legislation dealing specifically with indigenous knowledge. South Africa is one of the few countries that has adopted such an approach. Not only has the country drafted a bill on the " Protection and Promotion of South African Indigenous Knowledges" but it has taken other initiatives to protect and promote its rich wealth of indigenous knowledge.

[2] Refer to Chapter 4 (4.6.1.2), where this subject was discussed in further detail

These initiatives include, *inter alia*, the establishment of an Indigenous Knowledge System Programme (IKSP), the initiation of research projects to determine how indigenous knowledge and indigenous technologies can contribute to innovation in South Africa, setting up research projects to determine the value of traditional medicine.

South Africa has realized that the sharing of indigenous knowledge within and across communities can help to enhance the process of cross-cultural understanding and the promotion of the cultural dimension of development. It also acknowledged that indigenous knowledge could provide a basis for problem-solving strategies for local, poor communities.

As was already mentioned in Chapter 3 (3.2), there is, however, not only a need to promote the use of indigenous knowledge in South Africa. There is also a serious need to protect it from exploitation and possible extinction. This is specifically applicable to indigenous medical knowledge. South Africa is the third most biologically diverse country in the world, with more than 30 000 plant species - 80% of these species are endemic to the region. Many of these species are used by traditional healers (of whom there are more than 200 000 in South Africa) as medicine. However, two problems arise. The one is that 15% of these species are under serious treat of extinction (Jordaan & Britz, 1999:4).

The second is that of bio-piracy. It is estimated that over a dozen Japanese, European and American pharmaceutical companies obtain their raw material from Africa, and treat the host countries as global warehouses to be exploited by paying them extremely low prices for the plant species that are used (Dutton & Dutton, 1997:1). The problem is that there is currently no up to date legal protection in terms of intellectual property in South Africa for indigenous knowledge. Once a local community gives away it indigenous medical knowledge its has lost control of the valuable resource. This is one of the main reasons why South Africa has formulated a White Paper on the Protection of Indigenous Knowledge which will be presented to Parliament.

The main aim of this draft bill was extensively discussed in Chapter 4 (4.6.1.2). In the preamble of the draft bill it is also stated that indigenous knowledge systems represent an important part of the living culture heritage of the nation, and that South African must recognize the need to identify resources that are unique to South Africa.

It seems that South Africa, in its search for a fair and just protection of its indigenous knowledge, has opted for an alternative legal approach.

6.4.2 The deconstruction and reconstruction of indigenous knowledge rights

Lipinski & Britz (1999:9) postulated the following probing questions: Should the present legal infrastructure continue unaltered? This might then imply that indigenous people are without any legal resources as the legal system assigns ownership and control rights to persons other than the indigenous .If protection should exist, should such a mechanism rest on some form of an intellectual property right? Should it derive from some other property right: right of publicity, misappropriation, a non-property right or the articulation of a sui generis right, derived from a combination of existing concepts several equitable or quasi-equitable principle and specifically addressing the rights of indigenous?

The designing of any protection mechanism raises problems of definitions, of exclusion and inclusion. The notion of deconstruction, as a form of criticism, is of particular relevance to the present discussion of communal versus individual rights and exclusions. Deconstruction is critical of definitions in general and for that reason is relevant to the present discussion as globalization by its design imposes external definitions on internal and communal indigenous systems. Due to the fact the law is constructed, it can be de- and re-constructed (Caputo,1997:130). The deconstruction argument can therefore be used for the protection of indigenous knowledge.

The question is how to find a balance in these competing interests (ownership rights of authors to control the work versus access rights (and under deconstruction creation rights as well) of users)? Deconstruction might suggest a preservation of these paradoxes by not precluding the structuring of a mechanism that prevents others form using indigenous knowledge, but rather the structuring process would look to meeting the concerns posed by deconstruction, while at the same time forwarding the rights of indigenous. This would imply a strategy to identify the purpose behind those intellectual property regimes as discussed above. In this process deconstruction would force a return to the underlying precepts: societal benefits. (Lipinski and Britz, 2000:3) The process of reconstructing the law would then focus on the preservation of the rights of the indigenous to maintain the use and interpretation of their knowledge by offering protection from practices of others that interfere with the exercise of those rights.

It can therefore be argued that an indigenous community has a legitimate right of control to its indigenous knowledge, specifically when the commercial exploitation of the knowledge is involved.

6.4.3 The moral foundation based on social justice

Lipinski and Britz (2000:28) proposed a framework for new legal structures in order to realign current property laws that subsequently will aid in the upliftment of information-poor societies. According to the authors, there are four categories of social justice applicable to a situation of information poverty: commutative, distributive, contributive and retributive justice. Applied to indigenous medicinal knowledge systems, the following may hold true:

- *Commutative justice:* calls for fundamental fairness in all agreements and exchanges between individuals or social groups. In its economic application, it calls for equality in transactions and it is applicable in cases where information is treated as a commodity. Commutative justice is of specific relevance in the dealing of indigenous medicinal knowledge.

In terms of access to information, commutative justice underscores the importance of a fair relationship between buyers or developers (pharmaceutical companies) and sellers or creators (indigenous people) of information. The economic gain from the commercialization of indigenous medicinal knowledge must also not be at the expense of the least advantaged society. The contribution of indigenous medicinal knowledge and patent process must be recognized. Since large pharmaceutical and biochemical companies (or developers) draw tremendous economic value from the indigenous knowledge of a new drug entity, it is only fair that the indigenous people be compensated for that contribution. Before undertaking to collect information pertaining to indigenous medicinal knowledge, the researcher or developer should have some idea of how the community in question might benefit from the exercise. Perhaps the ethno-biological information can be shared with the community or used for future development projects in the area, e.g. in the fields of ethno-medicine and indigenous agricultural systems and general plant uses such as food, construction material and dye.

- *Distributive justice:* is concerned with the fair allocation of the benefits of a particular society (for instance income, wealth, power and status) to its members. It applies to situations where information is treated as a primary good. Distributive justice performs to the fair distribution of information to people and the accessibility thereof, in order to satisfy basic needs. With regards to indigenous medicinal knowledge, there should be free access to and local communities should make available its innovation and practices in relation thereof, to other communities, provided that such innovation is not acquired for commercial utilization. Under the concept of distributive justice, indigenous medicinal knowledge should be shared with others outside the originating culture and promoted. It should, however, be protected from exploitation.

Distributive justice requires that the developer (those that add value to existing indigenous medicinal knowledge) must never exude the indigenous people from continuous use of the information, since indigenous medicinal knowledge tends to be more essential to daily existence and survival in the practices of their culture, than it is to the people of the world at large.

- *Contributive justice:* is applicable here information is treated both as a primary good and as a commodity. Thus dealing with the creation of equal opportunities through equal access to information and knowledge. Regarding the flow and access of information, contributive justice can serve to maximize the use of information for productivity. Based on this viewpoint, it can be argued that society has a responsibility to create a legal and moral environment that will stimulate creativity and productivity, e.g. encourage knowledge creation by both indigenous people and Western developers. The creation and processing of indigenous medicinal knowledge must be encouraged as well as the temporary outflow of human capital – because it can be an effective way of acquiring foreign knowledge which can be used to the benefit of society. Indigenous medicinal knowledge can be made available to the less knowledgeable within the community, especially the young, by means of printed word and other learning materials.

- *Retributive justice:* also known as punishable justice, refers to the fair and just punishment of the guilty. With regard to access and use of information, it acts as an important guideline for the protection of indigenous medicinal knowledge. Under this category of justice, indigenous knowledge should be the subject of retribution; the purpose of which is to compensate for past harms and by the threat of its imposition, it limits future acts of appropriation of indigenous medicinal knowledge to those that are justified.

Lipinski and Britz (2000:28) contend that the application of the above mentioned theory can then be used to assess the role of information control and access mechanisms, for example, the intellectual property laws, in affecting the distribution of indigenous knowledge. Based on the work of Lipinski & Britz (2000:41), the following proposals are made:

- *Recognition of ownership rights:* Indigenous people have an ownership right in the indigenous medicinal knowledge associated with their culture. This right may extend beyond present intellectual property regimes. (Distributive Justice)

- *Recognition of custodianship rights:* Communities should have rights to the custodianship or stewardship of their innovation. (Distributive Justice)

- *Recognition of moral rights:* Indigenous knowledge should be used in a way that preserves the culture from which it was derived. The use of knowledge should maintain the integrity of the indigenous knowledge, not disparage the indigenous culture from which it was derived, and allow for the proper identification or attribution of the indigenous people as a source of he knowledge. (Contributive Justice: freedom and integrity)

- *Recognition of economic interests:* Indigenous people must have recognized rights over the use and dissemination of their indigenous medicinal knowledge in the commercial market place. If economic benefit is derived from the use of the indigenous knowledge, the indigenous people should have the right to share in the commercial exploitation of the knowledge, and possibly control the initial economic use of the knowledge. (Commutative Justice)

- *Recognition of development rights:* Any local community may opt to be paid a non-monetary equivalent as may be determined by the local community in accordance with its customs, practices and usage (Commutative Justice)

- *Recognition of problems with current laws:* Oral traditions must be protected under international and national intellectual property and other laws, in addition, current problems with the intangibility of knowledge from indigenous people must be confronted and resolved. (Distributive Justice and Contributive Justice: participation and production)

- *Consideration:* Place a moratorium on any further commercialization of indigenous medicinal knowledge until international, national and local indigenous communities have developed appropriate protection mechanisms. This insulation will allow indigenous cultures to at least survive, perhaps prosper (increasing the diversity for all), instead of wither. (Commutative Justice and Retributive Justice)

- *Consideration:* Ethical deliberation should recommend and result in the expansion of legal mechanisms that protect alternate indigenous interests in their knowledge. (Distributive Justice)

- *Consideration:* Indigenous people should have the right to use the intellectual property of others in an expanded application of the general law as it would apply to non-indigenous users if conditions of moral justification warrant, e.g., use of another's intellectual property in a commercial setting would not be allowed. This practical expression might take the form of a shortened period of copyright duration protection or adoption of the compulsory license schemes for developing nations discussed earlier is consistent with the analysis of social justice as proposed and interpreted herein. (Commutative Justice, Distributive Justice, Contributive Justice and Retributive Justice)

6.4.4 Practical proposal based on social justice

This section proposes a framework for action to promote and create awareness of the importance of indigenous medicinal knowledge to indigenous people and other role players (developers, e.g. pharmaceutical companies). The framework would revolve around four pillars:

6.4.4.1 Disseminating information

- *Disseminating information:*

✓ Providing tools and methods for recording of indigenous medicinal knowledge and indigenous food plants (e.g. fieldworker handbooks).

✓ Educating indigenous people on conservation of plant species and their habitats and related indigenous medicinal knowledge.

✓ Educating indigenous people on the value of indigenous medicinal information (economically as well as for social upliftment).

✓ Educating indigenous people on Agroforestry, especially the planting of multipurpose indigenous trees and shrubs which have food value in addition to such benefits as shade and medicinal qualities.

✓ Developing a comprehensive database (a pharmacopoeia for Southern Africa) of indigenous medicinal practices relating to the use of fauna and flora and comparing the use of different plant/animal substances amongst the different ethnic groups.

✓ Publishing selected cases in print (by means of a newsletter) and electronic format.

✓ Developing a web-page to cater for all the most important ethnic groups in South Africa in their own languages.

6.4.4.2 Facilitating exchange of information

- *Facilitating exchange of indigenous medicinal knowledge among developing communities:*

- ✓ Assisting local community to share indigenous knowledge amongst themselves.
- ✓ Identifying appropriate methods of capturing and disseminating indigenous knowledge among communities.
- ✓ Facilitating a global network (e.g. Internet) to exchange indigenous medicinal knowledge.

6.4.4.3 Applying indigenous medicinal knowledge

- *Applying indigenous knowledge in the development process:*

- ✓ Raising awareness of the importance of indigenous medicinal knowledge by means of brochures being distributed or advertisements on television, in newspapers and magazines.
- ✓ Integrating indigenous medicinal practices in projects supported by developers.

6.4.4.4 Building partnerships

- *Building partnerships:*

- ✓ Speaking to and learning from local communities and traditional healers and trying to understand their knowledge systems and eliciting their technical knowledge.
- ✓ Addressing the intellectual property rights issues of indigenous knowledge
- ✓ Discussing compensation / Royalties (Compensation for the creation, compilation and distribution of knowledge will contribute to the stimulation of future creativity regarding the creation of knowledge).

6.5 Conclusion

In today's global marketplace, no stone goes unturned. Where there is commercial value, there are profits to be made. However, as entrepreneurs scour the world in search of new drug commodities, a voice of dissent is growing and striving to be heard. That voice belongs to the world's indigenous people, and it is a voice that has been ignored long enough.

It has been suggested that, if pharmaceutical companies can secure intellectual property protection for their "inventions" – even those derived from the knowledge systems of indigenous people, then indigenous people too, should be entitled to intellectual property protection.

Contemporary intellectual property law permit only the patenting of an identified active principle from a plant, not the plant or folk information relating to the medicinal properties of the plant. The most significant rights of indigenous people are those deriving from physical control of the plants and the knowledge pertaining to their use. This control can provide the basis for trade secret protection. Such agreements are enforceable in developed nations and should become so in developing nations.

There have been recent efforts to strengthen indigenous people's rights over relevant medicinal knowledge, but the most far-reaching of these are not yet a part of international law. Pharmaceutical patents combined with trade secrecy can allow companies to develop and market medicine and ensure that the ethnic group from which the material or information was derived is properly rewarded. However, a uniform agreement that deals in a balanced way with the relative rights of indigenous people should be developed.

CHAPTER 7 CONCLUSION

Concerning the central statement of this study, namely the protection of indigenous medical knowledge, the following conclusions can be made:

7.1 Indigenous knowledge

As indicated in this study, the importance of studying indigenous people's knowledge of natural resources, is becoming increasingly apparent in the face of widespread failure to alleviate poverty in Third World countries and the continued decline of environmental conditions in the wake of spreading global technologies. 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.

As the focus of this study, in Chapter one, the term "indigenous knowledge" was defined. The author described the characteristics of indigenous knowledge and highlights the special features of indigenous knowledge, which distinguishes it broadly from other kinds of knowledge. Several pertinent examples of indigenous knowledge are given. The author further discussed the numerous fields of application of indigenous knowledge and concluded the chapter with the contributions of indigenous knowledge to development and information wealth.

From this chapter, it became apparent that, 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.

7.2 Indigenous knowledge and biological diversity

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), this subject and its relation to biological diversity was further explored and highlighted.

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.

In this chapter, the author discussed the importance and economic benefits of biological diversity in particular in South Africa, which ranks as the third most biologically diverse country in the world, with its rich variety of plant species. The author highlights the fact that in economic terms, biological diversity may be viewed as a resource that has enormous present and future value which is currently undiscovered, undervalued or underutilized. The indigenous people's rights to biodiversity is discussed.

The chapter is concluded by examples of indigenous knowledge being used by traditional healers for traditional medicine and as food sources in a few African countries (Kenya, Madagascar, Morocco, Namibia, South Africa and Uganda). This highlights the right of ownership of these indigenous people hereto as well as the need of proper legal regimes to protect this most important commodity.

7.3 Current intellectual property regimes and indigenous people

Chapter four deals with the contentious issue of who owns, who has access to and who benefits from indigenous knowledge and the biological resources from which it is derived.

Since current Western jurisprudence is limited in its conception of intellectual property, it therefore needs to be expanded to accommodate indigenous knowledge system notions of ownership.

In this chapter, the author defines intellectual property and continues to highlight the importance of intellectual property and its application to indigenous people.

The author discussed the history of international intellectual property laws and investigates their application in intellectual property laws in Third World countries. Here the author supplied the reader with two case studies from two African countries, namely Ethiopia and South Africa.

From this chapter, it is evident that existing intellectual property laws offer limited scope for the recognition of indigenous peoples' rights in biodiversity-related knowledge and practices. Similarly, native title, heritage and environmental laws and policies also provide insufficient means for addressing indigenous rights in biodiversity-related knowledge and practices. The challenge is to protect the rights of indigenous peoples to their knowledge, while also conserving biological diversity.

7.4 The exploitation of indigenous knowledge

Indigenous medicine has for centuries been the mainstay of the health care system in non-Western communities and traditional knowledge related to human health, is currently the basis of primary health care for a large part of the world's population.

In chapter five, the author highlights the importance of indigenous medicine and the commercial importance of bioprospecting. Within the current scenario, the author investigates the implications of the patenting of products and substances derived from the natural environment.

Different case studies dealing with global commercial exploitation of indigenous medical knowledge, are discussed (i.e. India, Australia, Cameroon and South Africa).

7.5 Critical evaluation and possible harmonization of problems associated with current laws and proposed solutions

While conventional intellectual property rights systems are largely ineffective in providing recognition and protection for indigenous knowledge, there are some other avenues that have potential to offer solutions. In chapter six, some solutions of these problems were discussed, e.g. alternatives to intellectual property systems that may offer more productive opportunities for the protection and promotion of indigenous knowledge.

The author investigates the growing importance of plant biodiversity and medicine from natural resources. Then possible problems with current laws (patents and indigenous medicine, moral rights, commercial misappropriation and protection of indigenous property) are discussed.

The author investigated the following avenues for the possible harmonization of current legislature: deconstruction and reconstruction of indigenous knowledge, moral foundation based on social justice and finally practical proposals based on social justice. The following practical examples were elucidated by the author: disseminating information, facilitating exchange of information, applying indigenous medicinal knowledge and building partnerships with indigenous people.

From this chapter it is evident that the harmonization of intellectual property rights and traditional knowledge and belief systems are extremely difficult and whilst not refuting the importance of intellectual property rights, the author proposes a paradigm shift to focus also on the moral and social rights of indigenous people.

7.6 Proposed further research themes

In retrospect, the following research themes, which can be regarded as relevant to indigenous medical knowledge, can be indicated:

- Indigenous knowledge and distribution of economic benefit.
- Indigenous medicinal knowledge. Is it a true measure of information wealth?
- Indigenous medicine: information acquisition and database creation

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ANNEXURE 1

DRAFT IKS BILL SUMMARY (GOYVAERTS, LETSOALO, JUNE 2000)
NATIONAL RESEARCH FOUNDATION (NRF)

Short definition of Indigenous knowledge (IK)

Indigenous knowledge (IK) means productions, including works and technologies, both tangible and intangible, consisting of characteristic elements of the traditional artistic heritage developed and maintained by a community of South Africa or individuals reflecting the traditional artistic expectations of such a community.

Characteristics of IK

Every element of IK has traditional owners, who may be the whole community, a particular family or clan, an association or society, or individuals who have been specially taught or initiated to be custodians.
The traditional ownership of IK must be determined in accordance with traditional communities' own customs, laws and practices.

Implementing structures

Regulatory authorities convened by a chairperson as appointed by the minister

- Duties include the performance of all acts and other things that a juristic person may perform by law or do subject to the provisions of this act.
- The objects are:

- To coordinate and advise on IK
- To promote IK and regulate liaison between IK in the interest of the public
- To conduct and coordinate research on he protection of IK
- To determine strategic policy with regard to Intellectual Property Right Protection (IPRP) and IK
- To solicit advise for the promotion and protection of IK from the general public in the form of competitions
- To promote mass participation
- To develop a directory of inventors
- To establish a tariff of fees payable for authorization of utilization of technologies
- To protect the vested IP of individuals, strengthening of research, linkage to provincial structures and government small business support initiatives and the development of a suitable approach to the management of information and data assembled with assistance by community partners.

- Funded by the minister
- Income: funds generated by collection of tariffs and fines
- Special committees established by the Authority to assist with any function deemed necessary
- Appointment of experts
- Collective community administration agencies
  - Defend economic right stipulated in the act on behalf of the community
  - Require state authorization
  - Disseminate information to members and mandatories

Establishment of Directorate of Indigenous Knowledges

- Headed by a Registrar

- Functions: registration, deposit, supervision and inspection
- Publish periodical bulletins on IK

Regulations

Minister may make regulations after consultation with the Regulatory Authority to prescribe the conditions of granting protection if community administration is inadequate. The Regulatory Authority may issue guidelines and advise with regard to IK protection specifically to:

- Researchers and scholarly institutions:
  - Comprehensive inventories of IK must e provided to communities
  - All elements of IK must be returned to the rightful owner or agreements for shared custody, use and interpretation of IK must be obtained
  - Offers for the donation or sale of elements of IK can only be considered in consultation with traditional owners
  - When studying undescribed species of plants, animals and microorganisms or naturally occurring pharmaceuticals prior consent of traditional owners must be sought and documented
- Business and industry concerning:
  - No incentives may be offered to individuals to claim IK in violation of community trust and traditional laws
  - No scholars or scientists may be employed to acquire and record IK in violation of these guidelines

Offences and penalties

- Any person who knowingly contravenes the act
- Convictions liable to a fine equal to three times the value of the gain derived from IK or imprisonment not exceeding 20 years jail
- A magistrate can impose an additional fine

Appointment of inspectors

Transitional procedures

- Current utilization must apply for authorization from the Regulatory Authority within six months

ADDENDA

Forms of Intellectual Property Right Protection (IPRP)

- **Patents:**
  - Must be filed, requires payment for filing
  - Criteria: inventive step, novel, commercial use
  - Protection for sole commercial exploitation valid for 20 – 25 years

- **Copyright:**
  - Not necessarily filed
  - Criteria: original work by an artisan including books, paintings, works of art, etc.
  - Not to be copied without explicit permission of the artisan
  - Protection valid for 50 – 100 years

- **Trademark:**
  - Must be filed
  - Criteria: original and not part of a language
  - Extends the sole right to sell products or services under the trademark
  - Renewable ownership against payment

Please note the limitations, the time spans of protection and regulations of the above IPRP systems.

The protection of knowledge *per se* does not contribute to welfare; on the contrary it often costs money. It is the successful commercial exploitation of such that may contribute to welfare. Most IK *per se* will not qualify for a patent as it may not be an invention, or it may be difficult to identify the inventor, or it may be published before either orally or written.

- Does the bill only cover tangibles as current works are protected under the copyright act?
- The bill is proposed to act retroactively: "return to its rightful owners": is this possible?
- Some IK only developed in interaction or after exchange of knowledge with other cultures. How far back will the bill retro-act? How long will such a process of identification of IK take? Will it hinder exploitation and income generation?
- Is this a new form of IPRP or are IK being covered under the existing IPR with modifications? What are the rights enjoyed e.g. filing requirements, life-span of protection etc.
- Under existing IPRP, the owner of the IPR determines the amount of utilization of the IPR.
- Much IK is in the custody of many communities and individuals crossing cultural, tribal and country boundaries. How is it possible to determine ownership of such communal goods and within South Africa's borders?
- The promotion of exploitation and economic gain from IK and their improvement in view of the cost of protection and the strong legislation concerning protection and illegitimate exploitation (regulations)
- The bill only covers undescribed species?
- How does the bill conform to the international agreements under WIPO?
- How does the bill relate to the convention on biological diversity that specifies ownership of biodiversity to a country?
- How does the bill allow for protection of IK originating from other countries?

The Rooibos Tea Production Cycle

1) Rooibos tea is only found in the beautiful Cedarberg area of the Cape, where the climate is ideal for growing this unique tea.

2) The Rooibos tea plant is hard seeded by nature and the seeds are scarified to increase their germinating potential before being sowed.

3) During February to March, the tiny seeds are sowed in well prepared seedbeds. Between June and July, the plants which have by then reached a height of 10-15cm, are planted out into plantations.

4) The producer can harvest his first Rooibos tea after one and a half years, and thereafter the plant is harvested every year by cutting off the branches 35cm above the ground.

5) The sheaves are then cut by a cutting machine to uniform length of 5mm.

6) The tea cutting are then transported to the bruiser. This rolling process ensures that the important chemical reaction which develops the characteristic color and flavor of the tea can take place.

7) After watering and airing the tea is left to "sweat" in heaps. During this time the tea obtains its typical reddish brown color and develops its sweet flavor.

8) After the sweating process has been completed the sheaves is spread out to dry in the sun.

9) When dry, collection starts

10) The finished product is delivered to the Rooibos Tea Board, where the tea is sorted and graded according to cutting length, color, flavor and taste.

11) After sifting the tea is purified by steam pasteurization after which it is dried over hot air beds

12) Quality and bacteriological control is maintained throughout.

13) The dried tea is weight and packaged

14) Packers then buy from the Rooibos Tea Board

The Rooibos Tea is packaged by various packers in a variety of brands, either in tea bags or as leaf tea.

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