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Third meeting
Montreal, 8-12 December 2003
Item 4 of the provisional agenda*

COMPOSITE REPORT ON THE STATUS AND TRENDS REGARDING THE KNOWLEDGE, INNOVATIONS AND PRACTICES OF INDIGENOUS AND LOCAL COMMUNITIES

Regional report: Africa

Note by the Executive Secretary

1. The Executive Secretary is circulating herewith, for the information of participants in the third meeting of the Ad Hoc Open-ended International Working Group on Article 8(j) and Related Provisions, the regional report for Africa on the status and trends regarding the knowledge, innovations and practices of indigenous and local communities, which was used as input to the first phase of the composite report on the same subject (UNEP/CBD/WG8J/INF/1).

2. The report is being circulated in the form and language in which it was received by the Secretariat.

* UNEP/CBD/WG8J/3/1.

/...

Traditional Lifestyles and Biodiversity Use

Regional report: AFRICA

**Composite Report on the Status and Trends
Regarding the Knowledge, Innovations and Practices
of Indigenous and Local Communities
Relevant to the Conservation and Sustainable Use of Biodiversity**

Prepared for the Secretariat of the Convention on Biological Diversity

Compiled by UNEP-WCMC

Project number: 1248

UNEP WCMC

June 2003

The **UNEP World Conservation Monitoring Centre** (UNEP-WCMC) is the biodiversity assessment and policy implementation arm of the United Nations Environment Programme, the world's foremost intergovernmental environmental organization. UNEP-WCMC aims to help decision-makers recognize the value of biodiversity to people everywhere, and to apply this knowledge in all that they do. The Centre's challenge is to transform complex data into policy-relevant information, to build tools and systems for analysis and integration of these data, and to support the needs of nations and the international community as they engage in joint programmes of action.

El **PNUMA Centro de Monitoreo de la Conservación Mundial** (UNEP-WCMC) es el brazo del Programa de las Naciones Unidas del Medio Ambiente, la principal organización intergubernamental ambiental en el mundo, encargado de evaluar la biodiversidad y la implementación de políticas ambientales. El UNEP-WCMC aspira a ayudar a tomadores de decisiones a reconocer el valor de la biodiversidad para la gente de todo el mundo, y a aplicar este conocimiento en todo lo que hacen. El desafío del Centro es transformar datos complejos en información relevante para las formulación de políticas de gestión, desarrollar instrumentos y sistemas para el análisis y la integración de esos datos, y apoyar las necesidades de las naciones y de la comunidad internacional en general en sus esfuerzos por desarrollar programas de acción conjunta.

Le **PNUE Centre de Surveillance Continue pour la Conservation de la Nature Mondiale** (UNEP-WCMC) est l'agence chargée de l'évaluation de la diversité biologique et de la mise en oeuvre des directives du Programme des Nations Unies pour l'Environnement, la principale organisation intergouvernementale environnementale au monde. Le Centre aspire à aider les gouvernements à reconnaître l'importance de la diversité biologique pour les êtres humains du monde entier et à appliquer cette connaissance à toutes leurs activités. Le défi du Centre consiste à transformer et simplifier des données complexes en informations pertinentes afin de trouver des outils et d'établir des systèmes permettant leur intégration et leur analyse dans la politique de tous les jours. Le Centre vise à appuyer les besoins des nations et de la communauté internationale dans leurs activités et programmes communs environnementaux.

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The proposal to produce this regional report for Africa was developed by the UNEP World Conservation Monitoring Centre (UNEP-WCMC), in response to the CBD Notification SCBD/SEL/HM of 27 June 2002 *Hiring of a consultant team for the preparation of a Composite Report on the Status and Trends Regarding the Knowledge, Innovations and Practices of Indigenous and Local Communities Embodying Traditional Lifestyles Relevant to the Conservation and Sustainable Use of Biological Diversity.* The proprosal was developed and the project managed by Harriet Gillett. The report was compiled by Alice Davies, Mark Elliott, Harriet Gillett, and Jenny Hodgson, and edited by Mark Elliott. Gerardo Fragoso was project supervisor, and is thanked for providing support and guidance throughout the project.

Henrietta Marie from the CBD Secretariat is thanked for her guidance, constructive comments and collaboration.

INTRODUCTION

Scope of this regional report

A list of countries reviewed for this region is given in Table 1, with information on which countries are Party to the CBD. For these Parties the status of information provided in the Second National Reports, in relation to Article 8j is provided. Only one country within the region (Somalia) is not Party to the CBD.

Figure 1 illustrates the response of Parties in their Second National Reports, to the issue of the relevance of traditional biodiversity-related knowledge. Thirty-five Parties did not provide a Second National Report, but the vast majority of the Parties that responded noted that this issue was highly relevant.

Responses to the Second National Report questions regarding the availability of resources and supportive measures taken are illustrated in Figure 2. These responses indicate that despite the importance of traditional knowledge within the region, the resources available to support this knowledge are severely limited.

Fig. 1 Africa: Information from CBD Second National Reports on the relevance of traditional biodiversity-related knowledge

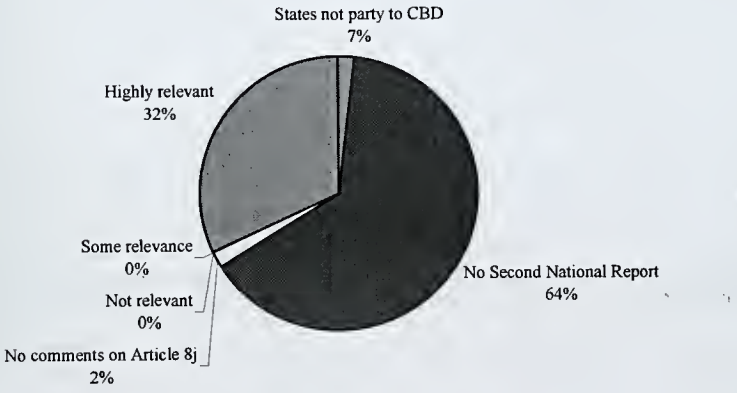
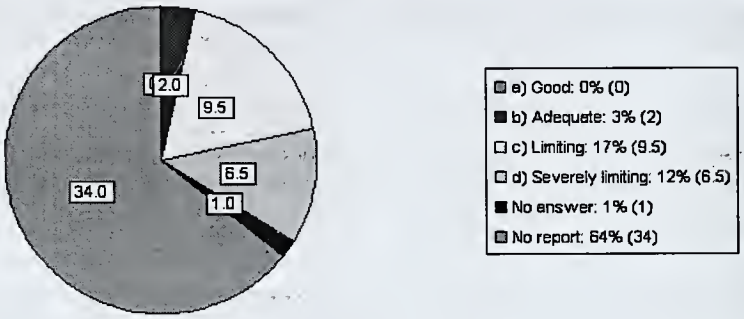


Table 1: Status of information according to Second National Reports to the CBD

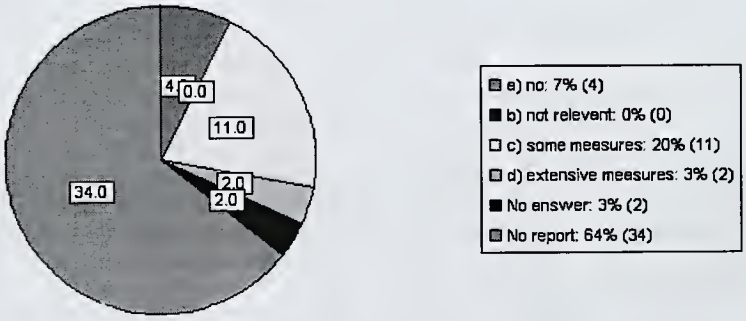
Country	Second report available	Report notes that traditional biodiversity-related knowledge is of relevance in the country
Algeria		
Angola		
Benin	x	x
Botswana	x	x
Burkina Faso	x	x
Burundi	x	x
Cameroon	x	x
Cape Verde		
Central African Republic		
Chad		
Comoros	x	x
Congo	x	x
Côte d'Ivoire		
Democratic Republic of Congo	x	x
Djibouti	x	x
Egypt		
Equatorial Guinea		
Eritrea		
Ethiopia	x	x
Gabon		
Gambia		
Ghana		
Guinea		
Guinea – Bissau	x	
Kenya		
Lesotho		
Liberia		
Libya		
Madagascar	x	x
Malawi	x	x
Mali	x	x
Mauritania		
Mauritius		
Morocco		
Mozambique		
Namibia	x	x
Niger	x	x
Nigeria		
Rwanda		
São Tomé and Príncipe		
Senegal		
Seychelles		
Sierra Leone		
Somalia	Not Party to CBD	Not Party to CBD
South Africa		
Sudan		
Swaziland		
Tanzania		
Togo		
Tunisia	x	x
Uganda	x	x
Zambia		
Zimbabwe		

Fig: 2 Response by Parties to Questions 104 and 120 from Second National Report

104. To what extent are the resources available adequate for meeting the obligations and recommendations made?



120. Has your country taken measures to promote the conservation and maintenance of knowledge, innovations, and practices of indigenous and local communities?



Indigenous People and Indigenous Knowledge in Africa

The issue of traditional knowledge in relation to biodiversity is of high importance in Africa.

The responses to Question 120 of the second National Report, presented in Table 1 and Figure 1, show that seventeen Parties appear to consider that the issue of traditional knowledge is of "some relevance" to the situation within their country. No Party suggested that the issue is of no relevance. Yet neither did any country state that it is of high relevance.

Terminology: the problem

As many of the examples in this report will demonstrate, the complexity and ambiguity of terms such as "indigenous" "local", "traditional", and the particular "knowledge" associated with each, makes clarity of description, to say nothing of analysis or policy-making, very difficult. 'Indigenous knowledge' (IK) refers to the knowledge and skills developed outside of formal education systems, and is widely identified with indigenous peoples. It is *dynamic*: the outcome of continuous "experimentation, innovation and adaptation", and enables communities to "survive" (UNDP-CSOPP 2000). No single, unambiguous or universally accepted definition exists of 'indigenous peoples', however.

To use the term indigenous in its *literal* sense, it is widely argued, is highly problematic. In relation to southern Africa, Krugmann (2001:8) recounts how successive migrants might realistically lay claim to indigenous identity. The hunter-gatherers or 'Bushmen" known collectively as the San were already living in the region when the Bantu came from the North, and both peoples were well established by the arrival of white settlers. Each group can be said to be "indigenous" in a sense which is not permitted by the literal sense of "original inhabitants".

Yet it is clear that to be indigenous is to be more than just "native to". Such a meaning is adopted by **Zimbabwe**, for example, where "indigenous" means "African" or "black". **Zimbabwe**'s *Biodiversity Strategy and Action Plan* (p.8) describes the country's "diverse" population as approximately 98% "indigenous Africans, while the remainder is mostly made up of Whites and Coloureds." Thus this figure makes no distinction between oppressed or marginalised groups such as "land-poor peasants" and better-off groups like "large-scale farmers" (Rutherford & Worby 1999:59). By defining the term in such a way, the difference – the special, marginal status – of "indigenous peoples" is suppressed, in "mockery" of their situation and enabling further denial of their material well-being (Kipuri 1999:19).

The situation is complicated throughout Africa by the enduring influence of the colonial past. Many national politicians, suggests Saugestad (1999:6), argue that all Africans are indigenous relative to the colonial settlers, as does the government of **Zimbabwe** (cf. Kenrick 2000:14) or even that the distinction between "indigenous" and not indigenous is not applicable to the African context. In either case, the distinctive status – and the particular problems – of indigenous peoples risk being denied.

To combat such a perception and its consequences, UNDP-CSOPP (2000) makes reference to two widely employed definitions, suggested by José Martínez-Cobo, Special Rapporteur to the Subcommission on Prevention of Discrimination and Protection of Minorities (Martínez-Cobo 1987), and in the International Labour Organization's *Convention (No. 169) concerning Indigenous and Tribal Peoples in Independent Countries* (ILO 169; 1989).

In Article 1 of ILO 169, 'indigenous peoples' is deemed to refer to 'tribal peoples' distinguished from other sections of a national population by their cultural and economic conditions, and for whom customs, traditions or special regulations (such as 'customary law') wholly or partially regulate their 'status'. Indigineity constitutes an identification with a land or territory which implies indigenous peoples' priority

over settler populations 'irrespective of their legal status'. Furthermore, ILO 169 supports the principle that *self-identification* is the fundamental criterion for determining whether a group is 'indigenous'. This principle is all the more essential given the lack of a satisfactory, single definition of indigenous peoples 'that captures their diversity' (UNDP-CSOPP 2000).

The International Working Group for Indigenous Affairs defines indigenous peoples as principally 'disadvantaged' groups descended from the inhabitants of a country *prior* to colonial settlement or state formation. Indigineity in this sense explicitly distinguishes certain groups 'culturally' from other peoples. In particular, this distinction may involve a history or a continued experience of marginalisation and discrimination by the 'dominant society' (IWGIA 2003). IWGIA states that there are at least 350 million 'indigenous people' world-wide, divided into over 5000 peoples and mostly living in 'remote areas of the world' (IWGIA 2003). It is specified that indigenous peoples have 'prior rights' to their territories, land and resources, but that these are often denied them by the state. Again, the fundamental right to self-determination is maintained.

In addition to those definitions presented by the UNDP and Martínez-Cobo, Erica-Irene Daes, Chair of the UN Working Group on Indigenous Populations, has suggested that indigenous peoples are those *descended* from (and therefore with a *historical continuity* and *identification* with - Martínez-Cobo 1987) those groups who inhabited a territory before "other groups of different cultures or ethnic origins". Such peoples have "preserved almost intact the customs and traditions of their ancestors". They are *isolated* from the majority of the national population, and yet subject to a state structure based on concepts that are alien to their social and cultural characteristics.

Essentially, then (as has been suggested by the anthropologist Adam Kuper), the category of 'indigenous people' is a *relational* one: indigenous peoples claim a historical *priority* over, and a cultural or ethnic distinctiveness from, other groups, by whom they are often marginalised and dominated culturally, politically or economically. This marginal status, and the identification of threats to the continuity, cultural distinctiveness and survival, have underpinned discussions about both indigenous people and indigenous knowledge, and have been the basis of many initiatives in the area:

"Because IK is handed over from generation to generation in an oral way, it is not easily accessible and has not been stored in a systematic way. Furthermore, as indigenous peoples become more integrated into Western society and economic systems, traditional knowledge and practices are being lost."
UNDP-CSOPP (2000)

Even where "indigenous" status is recognised, such recognition can be equally damaging. Pastoralists such as the Maasai, for example, have been accused by successive colonial and post-independence governments of damaging their environments through over-grazing: the so-called "tragedy of the commons". Such accusations have been the justification for large-scale expropriation of traditional lands and persistent attempts to "educate" pastoralists in "modern" (Western) methods to prevent such disasters.

Another potential danger arising from recognition of certain knowledge as "indigenous" or in some other way "at risk" is identified in another context by Ingold and Kurtilla (2000:186). These concepts can provide, and often have provided, justification for state policies of removing indigenous peoples from their land, effectively posing a greater threat to indigenous people's knowledge, cultural distinctiveness and traditions:

"To ensure the continuation of valuable traditional wisdom, it is argued, no more is needed than adequate institutional mechanisms for its storage and replication. Thus, resources for the preservation of indigenous cultures are put into museums, schooling in native language and handicraft, folklore research and so on. For local people, by contrast, traditional knowledge is inseparable from actual practices of

inhabiting the land. For it is in the relationships that are forged with the land, along with its animal and plant life, that their knowledge is generated."

Ingold and Kurtilla (2000:186)

To some extent, the problems surrounding the concepts of "indigenous" or "traditional" knowledge can be summed up in terms of a deficiency of esteem. The low opinion in which such knowledge continues to be held in many contexts is what makes Article 8(j), and similar articles, conventions and agreements which deal with indigenous peoples, so vital, but also represents one of the principal barriers to their successful implementation. A World Intellectual Property Organisation survey on traditional knowledge in Africa (WIPO 2001) highlighted that "traditional knowledge" was often discussed as "folklore", of which the pejorative colonial connotations of backwardness and superstition persist (Kongolo 2001:356).

Terminology followed in this report

The language used to discuss these issues is highly variable. In addition to the above examples, a number of sources make the point that it is often difficult, if not impossible, to distinguish between the terms "local", "traditional" and "indigenous". As a result the terms are often used interchangeably. This introduction has raised some of the connotations surrounding this politically sensitive, and potentially explosive, terminology. It has also suggested, however, following (Saugestad 1999:6) that questions of appropriate use of terminology and language are not necessarily the most significant problems in Africa. We have merely sought to point out potential pitfalls surrounding any future policy.

Since the terminology is often irregular, for the purpose of this report, information that was felt to be relevant was included whether it was given the title of "traditional" or "indigenous" knowledge. The terminology used by the original source has been retained.

1 THE STATE OF THE RETENTION OF TRADITIONAL BIODIVERSITY-RELATED KNOWLEDGE

"You dig the graves of our trees so that you can make fields, but after you have cultivated those fields for two years, the earth is exhausted and there is no more food, and the profit is gone. Even after destroying the trees that are our wealth; you plant something that is only temporary. Why do you not allow us to herd and to hunt, and use the knowledge and the wealth that God has given us? Why can't you work together with us, instead of taking everything for yourselves? Why do you make all the decisions on your own?"

Lesikar Ole Ngila, Co-director of Aang Serian: Closing address to a Survival International meeting, British Museum, London, November 2nd 2002

The general picture for indigenous knowledge in Africa seems to be that it is disappearing fast. The rapid loss of biodiversity is universally acknowledged to be linked to this.

'The loss of biodiversity in Africa results from various factors, including, most importantly, lack of recognition, understanding and use of Africa's indigenous knowledge, technology and practices.'

(Mulenkei 1998: 122)

By its very nature, then, it is vulnerable to change. indigenous knowledge is rarely documented, and is usually passed on by word of mouth between the generations; but much knowledge is only used in special circumstances and so may fail to be passed down to future generations or exchanged. It is often active knowledge that may only be retained if it is in use. Therefore the removal of peoples from the lands in which knowledge was developed, or the absence of the subject of knowledge (e.g. biodiversity) means it will be swiftly lost, and difficult if not impossible to restore. But there is also good news; in some areas indigenous knowledge is retained to a surprising extent, and a balance seems to have been reached, such that loss has slowed dramatically (e.g. **Chad**). In many cases, it is women who retain valuable knowledge, due to their active role in decision making for the household. Women, therefore, may be the major reserve of information relating to traditional medicines, crop varieties, animal products, fuel, fibre and food plants and many other biodiversity-related areas. As a result it is important to remember to include women equally in any initiative that takes place.

1.1 Status of traditional knowledge of plant genetic resources for food and agriculture (PGRFA)

"There is a wild plant that grows on the Somali border, under the driest conditions, less than 200 mm of rain a year... There are other crops, things people have known where to find in distress times. They go to the mountains and pick them and survive somehow. But if you destroy the natural environment of such plants, you lose these resources, and your monocultures won't save you."

(Worede in Seabrook 1993:31)

Africa's fluctuating climate means that for centuries the peoples there have had to rely on indigenous knowledge of local plants to survive in extreme conditions.

As a result, the indigenous peoples of Africa retain a wealth of information regarding local plants as food. This knowledge base may cover plants that can be gathered from the wild for consumption in times of need, or to supplement cultivated foods. It may also include knowledge of alternative varieties or relatives of crop plants. In addition knowledge and practice of traditional agricultural techniques often maintain both organismal and genetic diversity.

Plant genetic resources for food and agriculture (PGRFA) consist of the diversity of genetic material contained in traditional varieties and modern cultivars grown by farmers as well as crop wild relatives and other wild species that can be used as food, and as feed for domestic animals, fibre, clothing, shelter, wood , timber, energy, etc. These resources are the raw material used in the production of new cultivars - whether through traditional plant breeding or through biotechnology. Thirteen of the 27 minor and under-utilised species listed by FAO originate or are cultivated in Africa, making the question of PGRFA particularly relevant. Loss of traditional knowledge is cited as a major constraint in the promotion of these minor and under-utilised species (FAO 1998).

In most countries of Africa, farmers practise *de facto* conservation of landraces as part of their farming systems, and have done so for centuries. Farmers growing local crop varieties are not only custodians of PGRFA, but are also extremely knowledgeable about such varieties. Plants and seeds are selected according to preferred characteristics such as colour, size, genetic stability, disease tolerance, palatability and good processing qualities for planting. In western **Kenya**, the Bukusu tribe has a diet that includes over a hundred different fruits and vegetables drawn from at least 70 genera. This clearly shows that African cultivators stress food diversity and security over high productivity in their resource management. In **Botswana**, the "wild" relatives of cultivated crops form an important part of the diet of rural communities as these are part of the ecosystem that surrounds them. These "wild" vegetables are often seen on the table of many rural and urban dwellers and contribute towards the food security and nutrition of the population (FAO 1998; Botswana 1998)

Traditional agricultural techniques used by rural communities help to maintain species diversity, as well as preserving genetic resources in the form of alternative varieties and wild relatives of crop plants. In many countries women play a key role in agrobiodiversity conservation as they comprise the majority of the smallholder farmer population. Techniques include carefully managed crop species and cultivator diversity, staggered planting and harvesting dates, mixed cropping, relay cropping, cultivator mixtures within plots, and planting of scattered crops in a variety of micro-environments (Mulenkei 1998).

Alongside conserving the plants themselves, farmers often possess detailed knowledge about species and their environment that allows them to make appropriate decisions on the sustainable use of natural resources. For example, in **Zimbabwe** crops such as okra (*Abelmoschus esculentus*), pumpkins (*Cucurbita* spp. and *Lagenaria* spp), tsunga (*Brassica juncea*) and sweet sorghum (*Sorghum bicolor*) which require considerable moisture and high soil calcium and potassium are grown exclusively on ant hills, which are more fertile and retain more water. Such systems allow farmers to meet the nutritional requirements of their families and reduce the risk of crop failure by inter-cropping and cultivating a wide variety of crops (Zimbabwe NBSAP).

However these indigenous knowledge driven systems are gradually being eroded. This is largely due to the adoption of modern farming methods, which has undervalued the importance of agrobiodiversity and traditional knowledge. Together with the use of high-yield hybrid varieties and the adoption of exotic varieties by communities, this has led to the neglect of many traditional food crops and varieties. However, at least in some areas, farmers are still keeping traditional crop and animal varieties on their farms in order not to lose the rich genetic resources that have been developed on their farms for generations (Uganda NR1). This presents a potential for on-farm conservation. There are now many initiatives under way to retain these types of beneficial practice, and the knowledge related to them.

Many traditional peoples collect wild plants to supplement the plants that they cultivate. This is often necessary during the seasonal food shortages that are a part of rural life in many parts of Africa. For example, the pastoral Fulani of northern **Nigeria** collect various types of edible plant species during the dry and rainy seasons. Unfortunately, in this case it seems that the younger generations are losing this knowledge which has been accumulated over centuries (Mohamed Salih 1992). In **Ghana** hundreds of edible plant species are consumed as supplement to staple foods and during seasonal food shortages (FAO

1990). FAO have documented the utilization of 62 edible wild fruit species, 100 species used for their leaves and 19 species used for their roots. The San bushmen of **Namibia** are said to know as many as 150 edible plants including fruits, leaves, seeds and nuts, tubes and roots (Namibia FRA NFWP site). They also use numerous plants as sources of drinking water, notably the tubers *Raphionacme burkei* and *Coccinea rehmanni.* Throughout Africa, the indigenous knowledge relating to these wild plants is at risk. The knowledge itself may only be used sporadically, such as in times of extreme drought, and this decreases the likelihood that it will be passed onto the next generation. Even more of a threat is the loss of the species themselves, through loss of habitat or change in climate. If a species is lost from the area surrounding a community, then the information about it built up over many generations is likely to disappear as well.

"Nowadays, young people don't seem to know the many uses to which trees and plants can be put. Besides, certain plants that we used to gather such as saake which grew in the flood waters, have now disappeared."

Mbaré Ndiaye, Senegal (Cross & Baker 1991)

1.2 Status of traditional knowledge of animals and micro-organisms for food and other purposes

Animals are an important source of food to most people. Indigenous and traditional people may derive animal protein from domesticated animals and/or from the wild. Different groups rely on these two alternatives to different extents. Maasai groups are pastoralists and rely on domesticated animals for food. The San 'Bushmen' however, rely almost entirely on the hunting of wild animals.

The indigenous knowledge surrounding domestic animals covers traditional techniques used by groups which keep animals. Pastoralists have often accumulated a wealth of knowledge on how to keep their animals healthy and free from disease. For example, Tuareg in the Sahel have considerable control over stock breeding derived from knowledge of the timing of the sheep reproductive cycle and its relationship to the seasonal cycle. They use penis sheaths to ensure that lambs are not born at the end of the dry season, when ewes' nutritional status is poor (Mulenkei 1998). Many pastoralists use herd diversification to protect their livelihood. Keeping many different species alongside each other supports the presence of both browsers and grazers and reduces the probability that a single disease will wipe out an entire herd (Mulenkei 1998). The Fulani of northern **Nigeria** have traditional medicine men that can accurately diagnose and treat animal diseases using local plant species.. However, the Fulani themselves remark that there are, today, fewer of these medicine men than there were, and as a result this indigenous knowledge is disappearing (Mohamed Salih 1992).

Traditional methods are often very effective and can compete with more modern techniques. For example, **Ethiopia** is the 10th greatest world producer of honey, and the 4th of beeswax. Beekeeping is an ancient tradition in **Ethiopia**, and despite annual production of honey and beeswax being so high the system of production commonly utilised in the country is traditional (Russo 2000). In cases like these, traditional knowledge is likely to be maintained since it is still in use, and unlikely to be pushed out by new technology.

Wild animals may be the major source of animal protein in some indigenous groups. The hunting of bushmeat is commonplace in some areas (e.g. **Ghana**, **Botswana**). In some cases traditional knowledge is likely to be involved in hunting techniques, and in the choice of animals targeted. In such cases, it seems likely that as species of animal disappear (due to lack of habitat for example) the knowledge of hunting surrounding them will also be lost. However, in many rural communities, modern hunting methods are used and all animals are equally targeted, and in these cases, it would seem little indigenous knowledge is involved. (Russo 2001; DFID 2002)

Invertebrates provide another source of animal protein with which to supplement the diet. In **Namibia** caterpillars play an important role in the diet of the local people and are collected from different tree species. The mopane worm, for instance, known for its delicacy, is obtained from plant species such as *Colophospermum mopane,* which are found in the savannah vegetation in north-western part of the country. Also in **Namibia**, termites are consumed in the region of Owambo during the rainy season. They are collected by lighting fires after heavy rains, a time when termites are especially attracted by light (Russo 2001a). Once more, the knowledge regarding where to find and how to catch these creatures would disappear if the species themselves were lost.

In the context of marine and inland waters, fishing remains an important source of food for many Africans. Traditional knowledge of fisheries has been discussed by Cacaud (1999:50), making a distinction between "artisanal" and "traditional" fishing in the context of Lake Tanganyika as follows. Traditional fishing on Lake Tanganyika is primarily a subsistence activity, based on the use of *lusenga* or "scoop nets", or gill nets, long lines, hand lines, traps, spears and poisons for the capture of demersal species. Traditional fishing units usually consist of one or two people. Artisanal fishing, on the other hand, is primary commercial, using lift nets, *chiromila* seines and beach seines.

In **Tanzania**, "traditional (artisanal) village fishers still predominate in the fisheries sector in most parts of the country" (Isamu et al 2002). Riedmiller (2003), discussing programmes to conserve coral reefs along the East African coast, comments upon the apparent lack of traditional coral reef management practices, or indeed awareness of the limitations of fish stocks in **Tanzania** and Zanzibar. The idea that fish are somehow different from living things – that they constitute a near-limitless "resource" – is apparently shared by the Kavango people, in **Namibia** (Theart 2002). The Kavango people seldom eat eggs, or slaughter calfs, rather preferring to allow chickens and cattle to grow to maturity: "according to their traditional philosophy, chicken and cattle cannot be compared to fish. They further argue that God created fish for all to utilize and that if all the fish are eaten today, God will provide for more tomorrow". Traditional fishing methods in this region have involved drag baskets and paralysing poisons made from local plant ingredients as well as less destructive methods such as spear fishing. However, the introduction of net fishing has led to the widespread use of fine-mesh nets such as mosquito nets, which are emptying the waters of all fish stocks (Theart, ibid.).

Following the country's independence, traditional practices in **Senegal** were replaced by a "modern" system of centralised management by the Fishing Administration, who considered traditional methods inefficient. These "modern" methods have contributed to the degradation of the aquatic ecosystem. Studies of traditional management practices have enabled the formulation of a Participatory Planning Scheme for Fisheries, which seeks to rehabilitate "positive" traditional fishing practices. Again, in this context, the problem is over-fishing in due in part to the use of fine-mesh nets (Diouf et al 1999).

1.3 Status of traditional medicinal knowledge

1.3.1 Present status of traditional medicinal knowledge

In July 2001, the Organisation of African Unity (now the African Union) endorsed a statement in which traditional medicine was described as 'the most affordable and accessible system of health care for the majority of the African rural population'. The OAU has declared the decade 2001-2010 as a 'Decade for African Traditional Medicine'.

By far the most commonly cited example of traditional or indigenous knowledge in Africa is that of traditional medicinal knowledge and the wealth of this knowledge, held by indigenous and rural groups throughout the continent is widely documented. Typically the community as a whole, or often traditional healers, have a substantial understanding of the medicinal properties of biological resources in their

environment. The numbers of plant species whose medicinal qualities are understood by a community is frequently impressive:

"A total of 102 medicinal plants were obtained from 37 households belonging to the Baka pygmies."
(Jean Lagarde Betti ISI 7th congress)

"In the Ho district, approximately 75 percent of the fallow field trees have medicinal uses"
(FAO, 1990; Russo 2001a)

Table 2 gives an indication of the kinds of numbers of medicinal plants known for a few African countries.
The medicinal properties of many such plants have been scientifically proven in recent years. For example, *Hagenia abyssinica* and *Glinus lotoides* for the treatment of tapeworm, and *Phytolacca dodecandra* as a molluscicide in the control of schistosomiasis are plants from **Ethiopia** which have been proven as effective and safe (Russo 2000).

Table 2. Number of medicinal plant species known for certain African countries

Country and Reference	Number of Species
Ethiopia Russo 2000	600 (just over 10% of Ethiopia's vascular flora)
Ghana Russo 2001a	2,000 forest plants
Guinea Guinea 2002:70	1,200+
Nigeria Mulenkei 1998:125	92
Rwanda Rwanda 1998	Nearly all native plants have some use
Tanzania Pergola 2003:1-3	Over 1,000 of Tanzania's c.11,000 species of flora
Tsumkwe District in Namibia's Otjozondjupa region Russo 2001b	More than 80
Zimbabwe Zimbabwe NR1: 86	500 to 5000

The holders of traditional medicinal knowledge differ in different indigenous groups. In some cases all members of the community may know how to treat a wide range of common diseases and only seek the advice of a traditional healer for advice on specific diseases when their own treatments have failed. This self-medication is often missed by anthropologists and so not documented (Cocks & Dold, 2000:1505). In other cases traditional healers or medicine men hold the majority of the traditional medicinal knowledge. Traditional remedies maybe collected from the wild or from cultivation. In addition medicines may be purchased, often quite some distance from their source, from individual vendors or specific outlets (for example, *Amayeza* stores or "medicine shops") (Cocks & Dold, ibid.).

However, in contrast to "Western" knowledge systems, traditional or indigenous knowledge systems are much more holistic in nature and so information may lose much of its meaning out of the original context. As one source stated "[it] comprises both aesthetic (the arts) and useful (the technological, medicinal and

scientific) elements, as well as tangible (such as medicinal plants) and non-tangible (such as medicinal knowledge) components." (WIPO 2001: 86). Other sources go further, and are against the transfer of medicinal IK across communities, arguing that it could be irrelevant or even harmful outside its original context. Some experts say "Western" science cannot appreciate traditional cultures, and attempts to record, document and transfer IK could disempower indigenous people. It is important, therefore, to try and consider the context of any indigenous or traditional knowledge when using it in a "Western" framework of organisation.

1.3.2 Possible dangers for traditional medicinal knowledge

This abundance of information is in danger of disappearing. The knowledge of medicinal plants is normally passed on orally from one generation to the next. Transfer by word of mouth can be significantly more vulnerable to disruption and interference, resulting in the loss or distortion of ethno-medical information built around medicinal plants. In indigenous groups where traditional healers hold the majority of the knowledge this is likely to be even more of a problem. This is exacerbated by a wish to keep information secret and a refusal to reveal information – an issue of particular relevance to medicinal plants.

Kokwaro (1976) noted in *Medicinal Plants of East Africa* that "A lot of valuable information can be lost or distorted whenever a medicine man dies without revealing his knowledge to another. Some medicine men unfortunately keep the secret to themselves until the last minute before death when they call whoever is to inherit the knowledge, to give instruction. This is a dangerous method of passing on the knowledge since the recipient may easily forget or mistake the information.....Many of the herbal medicine men will not like this book since it may deprive them of their profession once their secrets are revealed. The majority of them were reluctant to show me the drug plants as a whole for this reason.....not all the information about the local drug plants is in this book since a few people categorically refused to reveal their secrets." However, this reluctance is by no means universal. The author then states "I found in some areas elders willing to provide the true information without hesitation".

It cannot be doubted that secret knowledge systems, and oral traditions, potentially result in the loss of indigenous knowledge with the passage of time. However, Kokwaro's statement above – though over twenty-five years old – demonstrates highly dangerous attitudes towards the value and indeed the *rights* of indigenous peoples, their knowledge and traditions, which continue to be widely held in contemporary Africa. To presume that indigenous knowledge is inherently more fragile and vulnerable because it is not written down is dangerous for two reasons. On one hand, it leads to the presumption of people such as Kokwaro that other, literate, cultures and groups have the right to record that information for the benefit of posterity – benefit which is perceived in terms of the recording culture rather than the knowledge-holders themselves. On the other hand, identifying this problem, and presenting this solution, misses the point frequently raised by indigenous rights movements that loss of indigenous knowledge is occuring as part of a wider problem of large-scale cultural genocide. Traditional knowledge holders face threats to their land tenure, their economic security, their cultural and traditional practices and values, and their very right to exist. These issues cannot be addressed by documenting indigenous knowledge which at worst entails the wholesale theft or appropriation of such knowledge by dominant groups.

Other factors may well lead to the loss of traditional medicinal knowledge. Changes in the lifestyles of the younger generations, such as a lack of respect for, and interest in traditional medicine and movement of young people away from their native areas can obstruct the oral transfer of information (e.g. the Fulani - Mohamed Salih 1992). The holistic nature of indigenous knowledge systems means that the loss of an indigenous language or religion may mean large amounts of traditional medicinal knowledge are lost with them.

The local extinction of a plant (or animal) required for a traditional medicinal remedy could also lead to the loss of the knowledge surrounding that species. Since many remedies are only found in the wild, unsustainable harvesting can lead to them becoming endangered, and this in turn endangers the knowledge that surrounds them.

"Protea gagnedi, *from northern* ***Namibia****, has been driven nearly to extinction through unsustainable use by traditional healers, and the so-called resurrection plant",* Myrothamnus flabellifolius, *from the Namib desert escarpment, is also under threat."*

(Krugmann 2001:8)

"For example, some information mentioned that African potato was good for AIDS in 1997. After two years, this particular species has completely disappeared in ***Democratic Republic of the Congo****."*

(Zhang 2000:3-4)

1.3.3 Positive influences on the retention of traditional medicinal knowledge.

Despite these dangers, traditional medicinal knowledge seems to be in a better state of retention than most other forms of indigenous knowledge. In a study of Luo children and adults of Ugingo, a village in Lake Victoria, **Kenya**, traditional medicinal knowledge was shown to be relatively stable. Of 91 herbal remedies mentioned by a sample of seven women, all but the rarest examples were also mentioned by a sample of 86 children aged 12-15 years (Geissler et al 2002: 41). In fact this study suggests "that Healers do not appear to have a wider repertoire of knowledge than the average mother, and indeed there is considerable inconsistency between individual healers." While this may be seen as a cause for concern, however, Geissler et al insist that, in contrast to expert-centred Western medicine, "Luo medicine is based upon communally shared knowledge... Medical specialists, like Healers, are only consulted in special situations, e.g. rare or serious illness, and – in contrast to Western doctors – they are not known for the completeness of their knowledge, but for special, often secret treatments" (Geissler et al 2002: 41).

Changes in the way that information is passed on may also aid retention. For example, in East Africa, medicine men traditionally passed on their knowledge to their first-born sons. However Kokwaro notes "that some medicine men pass on their knowledge to their first wives. Such women usually dominate the field of child disease and also female medicine, particularly that pertaining to pregnancy and childbirth. It is by this method that mothers frequently pass on plant drug knowledge to their daughters," (Kokwaro 1976). These practices may aid the retention of some traditional medicinal knowledge.

The major reason though for the probable ongoing stability of traditional medicinal knowledge is that it is likely to remain in constant use by the majority of the population. The World Health Organisation stated in 2000 that: "African Member States are aware of the fact that about 80% of the population living in the African Region depend on traditional medicine for their health care needs," (WHO 2000).

Traditional medicine is much more accessible than other forms of health care. In the Kwahu district of **Ghana**, for example, the ratio of traditional healers to total population is 1:224 in comparison with a medical doctors to total population ratio of 1:20 625 (Cunningham 1993) (Russo 2001a). In addition to its accessibility, traditional medicine also has the advantage of being very much more affordable than "modern medicine", which has become increasingly expensive (Ethiopia FRA NWFP site). Even where modern pharmaceuticals are used, herbal remedies are often used alongside (Geissler et al 2002). However, it is not just a case of cost. Traditional medicine is used "by every social category": mostly for curing minor infections, liver ailments, gynaecological ailments, mental illnesses (Aboubacrine 1998:121). It is possible to conclude, therefore, that a great deal of traditional medicinal knowledge is safe for the near future.

1.4 Status of traditional knowledge systems concerning ecosystem categories

1.4.1 Forests

According to the FAO Forest Resources Assessment 2000 (FRA 2000), forest covers 649m hectares (21.8%) of Africa's land (see figure 1) – this area has been reducing by 5.3m hectares per year on average since 1990 (FAO, 2001). As the area of forest, especially primary forest, declines, so do the associated traditional knowledge systems concerning their wise use. Important local knowledge persists in many parts of Africa in the realms of hunting-gathering, selective logging, swidden agriculture and/or agroforestry (the former two tend to affect a few target species, the latter two affect the whole landscape). For many communities, practices of using the forest are bound up with religious beliefs, such that changes in beliefs may cause changes in how the forest is used. The local knowledge and practices have also been threatened by the introduction of more intensive agriculture, and the pressures of population increase.

Fig. 1: FAO Global forest cover map of Africa *This map includes plantations and other non-primary forest. The map is an extract from the global forest cover map produced by FAO as part of the Global Forest Resources Assessment 2000. Shaded colour indicates areas dominated by forests according to the FAO definition.*

/...

1.4.1.1 Hunting/gathering Non-Wood Forest Products

Intact forest is often of immense value to the people living around it, because of a range of products that are gathered for medicine, for food, and for social and cultural uses (e.g. building, carving, weaving) (Cameroon 1997:16). This is especially true for areas of moist tropical forest in Central and West Africa (see below), but applies to other ecosystems as well, for example, **Ethiopia**'s important non-wood forest products include gum arabic, olibanum resin, honey, wax, and medicinal plants (FAO). Collecting non-wood forest products requires expert knowledge of the forest, for example "the ability to read animal tracks, to know the flowering and fruiting cycles of plants, to locate a bees' nest from the flight of a bee... the individual properties of thousands of plants for food or medicine"(Survival International 1998). Just as for other types of indigenous knowledge, this is orally transmitted, highly locally specific and vulnerable. It is important to recognise that 'hunter-gatherer people' and farming people have co-existed and been mutually dependent in Africa for hundreds of years, and that the practices of hunting-gathering change over time according to demand for forest products, and the relationship between hunter-gatherers and other people.

According to Kenrick (2000:11), the three largest groups of Forest Peoples who still, to a great extent, retain their forest resource base are: the Mbuti (or Bambuti) and Efe of the Ituri forest in the **DR Congo**, the Baka of south-eastern **Cameroon** and north-western Congo Brazzavilles, and the Aka (or Ba-aka) of northern Congo-Brazzaville and the **Central African Republic**. Those forest peoples whose forest is still largely intact spend some time of the year hunting and gathering in the forest, and some living near farmers' villages and working in their fields. They now also tend to work for a while for logging companies, conservation projects, safari hunters or large commercial meat traders. However they can also vehemently denounce the consequences of such activities once they become apparent. They can also bitterly resent their access to the forest being controlled or denied by governments' sedentarisation policies, by logging companies or by conservationist restrictions. Where, in the past, these hunter-gatherers have been crucial to farmers, enabling them to benefit from forest produce, protecting them from forest spirits, and ritually ensuring the fertility of their fields, today in many places the forests have dwindled in importance and as a result such hunter-gatherers and ex-hunter-gatherers have become marginalised and severely discriminated against (Kenrick 2000:11).

1.4.1.2 Timber

There are traditional methods of extracting timber for construction, etc., that do not involve clear felling of the forest. In **Zimbabwe**: such practices include selective harvesting of trees and non use of certain species. "Traditionally, there was selective tree harvesting through felling of old and dying trees. In situations where healthy trees were cut this was done in such a way that rapid coppicing would occur" (Zimbabwe NBSAP:33).

1.4.1.3 Swidden

Swidden cultivation is characterized "creating an equilibrium between forest dynamics and crop cultivation in order to sustain food production over the long term" (Carrière 2002). Sparing of remnant trees in cleared fields is an ancient agricultural practice in traditional Ntumu society in **Cameroon**, and in other communities in Central and West Africa; spared trees often belong to species of cultural significance – and therefore valuable for "social reasons" (Carrière 2002). The forest regenerates in between cycles of burning and cultivation, and a high biodiversity is preserved, but this system is only sustainable with a low population density on the land.

1.4.1.4 Agroforestry

The term agroforestry is used to cover a wide variety of locally-adapted practices where crops are grown and/or animals grazed under a canopy of trees. An example from **Ethiopia** suggests that traditional practices such as farm forestry practices in the central, south and south-west, tree based soil and water management practices in Konso, and forest based resource management in Borena are still in use and working well. The Gedeo people employ a land use system where fairly dense natural trees are left on the farm between which coffee, false banana (enset) and other food crops are inter-cropped. The people of Tigray, North Shoa and North Wello practice area closures which enhance the regeneration of the natural vegetation. (Ethiopia)

A further example from **Tanzania** and **Rwanda** indicates the versatility of agroforestry, and that it is actively being used and improved upon: "The Washambaa of the Usambara Mountains in **Tanzania** had developed a land use system emulating the climax vegetation of the deciduous natural forest. They integrated annuals and perennials on the same plot in a multi-story arrangement. The principles were transferred to Nyabisindu, **Rwanda** in a GTZ assisted project; and special multipurpose contour bunds with trees shrubs and fodder grasses were added to the system. The adapted practice was later re-transferred to the Washambaa once dense population and need for firewood had depleted the soil cover and demand for dairy products had initiated the introduction of improved cattle breeds." (World Bank 1998:6)

However, there are threats to agroforestry practices from, for example, the breakdown of pastoralist traditional lifestyles in the dry mountain forests on the **Kenya-Uganda** border (Loima hills) (Kenya 1998:29), and the extension of "modern" agricultural production technologies which encourage monocropping (Zimbabwe NBSAP:33). For further information see section 1.1.

1.4.1.5 Forests and spirituality (Sacred forests)

People's spiritual relationship to forests takes many different forms, and is often perceived to be very important, for example the 'Pygmy' people "see the forest as a personal god, fruitful and kind, and enact their relationship with it and with the spirits of the forest in ritual and song" (Survival 1998). The designation of certain patches of forest as sacred is a widespread traditional practice in Africa: We have found mention of sacred or fetish forests from **Benin**, **Burkina Faso**, **Burundi**, **Cameroon, Côte d'Ivoire, Gabon**, **Ghana**, **Guinea**, **Ivory coast, Kenya**, **Senegal** and **Zimbabwe**. Felling tends to be forbidden in these areas, and often ordinary people are forbidden from entering them at all. As well as sacred areas, there are sacred tree species, for example, in **Zimbabwe** *Parinari curatellifolia, Julbernardia globifiora* and *Warburgia salutaris.*

There are indications that sacred forests are less and less respected because pressure on the land to supply the needs of the population is so great, and/or because traditional beliefs and customs are breaking down (e.g. Burundi 2000, Zimbabwe NBSAP)

1.4.2 Dryland and steppes ecosystems

Pastoralism with seasonal transhumance is an important method of managing dryland ecosystems. Seasonal and frequent daily movements of herds between pasturage by the Maasai help prevent over-use of a single area's biomass (Mulenkei 1998:124). The ability to practice transhumance depends to a large extent on maintaining the traditional social structure – each Maasai homestead, maintained in a permanent water area, is made up of several independent polygamous family units and, although there may be cooperation in the watering and pasturing of livestock, each unit possesses its own herd and has the potential of autonomous movement (Forstater 2002:48). It also depends to some extent on exchange relationships with farming peoples (for example WaArusha and WaMeru in the Serengeti/Ngorongoro area) from whom the pastoralists can obtain grain (for more information see box 2). Across Africa there is a trend for pastoralists to turn to more mixed farming, a move which is often supported by

governments; their remains controversy over whether pastoralism is a sustainable way of managing the land, and whether it enhances biodiversity, or not (see section 1.6).

Niamir (1993) describes local systems of "water lore" among African pastoralists. The Fulani in Senegal differentiate (cleaner) water sources for human use from those used by livestock, for example. The Zaghawa of Chad and Sudan consider *Acacia albida* to be an indicator of good ground water for permanent wells.

The Borana of Ethiopia maintain shallow natural ponds, which would otherwise not outlast the dry season, by cleaning out the silt and placing a thorn fence around the perimeter to protect the slopes. The Dinka excavate natural ponds along river beds, fence them off and cover them with a reed mat. Niamir also describes a number of water cleaning techniques used by pastoralists: the Twareg dig small holes in natural ponds and place the soil of termite mounds in them to precipitate most impurities. The Fulani of Senegal purify pond water for human use by adding the bark of *Boscia senegalensis* mixed with termite mound soil, acidified curdled milk, and salt.

1.4.3 Marine and coastal ecosystems

There is an enormous amount of literature on threats posed to the economies, cultures and the biodiversity of coastal communities in Africa. Human interactions with the coastal ecosystems, entailing traditional knowledge, include: open water fishing, often involving the use of dynamite or poison; mangroves being used for fuelwood and to make charcoal; collection of small marine life like seaweed, crustaceans, oysters and turtle eggs, in East Africa (Golder and MacDonald 2002:11). Increased migration of men in search of waged employment is changing the traditional situation (ibid.).

Local and traditional knowledge is currently incorporated into marine conservation in the Niger Delta (**Nigeria**), which is the largest mangrove ecosystem in Africa, comprising approximately 35% of the total mangrove forest in West Africa There are low levels of stakeholder involvement, and conflict between ethnic groups hinders conservation (NOAA 2002). In Boloma Bijagos (**Guinea-Bissau**), **São Tomé and Príncipe** and **Equatorial Guinea** (including Annabon Island), too, local and traditional knowledge is integrated to a high level in marine resource use and conservation (ibid.).

In **Kenya**, which boasts four marine national parks and six marine national reserves with coral reefs, nearly all extractive activities are prohibited. Only traditional fishing by "approved methods", i.e. handlines and traps is permitted in Marine Reserves (Salm et al 1998).

As in other contexts discussed above, the identification of certain territories or species with deities or spirits, and as therefore "sacred", can result in some degree of protection. Over 70% of all turtle nests recorded in **Ghana** (Ntiamoa-Baidu, 1998) were located in the Ningo traditional area, where turtles are regarded as sacred animals and are protected (Khalikane and Asibey).

1.4.4. Island ecosystems

Many of the priorities referred to in the context of marine and coastal ecosystems are also relevant to island ecosystems. In addition, however, nations such as **São Tomé e Príncipe** and **Cape Verde**, for example, experience the added difficulties of so-called small island developing States. Traditional agriculture, utilising family labour and a small proportion of purchased inputs, remains the dominant form in small island developing States. Though generally environmentally friendly, it is characterised by low productivity, and moderate input systems are becoming increasingly popular. Such systems are not being managed effectively, however, leading to both economic losses and environmental damage (UNEP 1998).

A recent project has carried out research on indigenous knowledge on climate change in **Cape Verde** (ECART 2001).

1.4.5. Mountain and valley ecosystems

Mountain and valley ecosystems have been discussed to some extent in previous sections. As with knowledge and traditional practices related to other ecosystems in this section, much of it can be discussed in the context of agriculture, fore example, or forestry. Other examples of such knowledge and practices which have been maintained include the Iraqw people of the Arusha Region of **Tanzania**, who employ a range of traditional land management systems including terracing, mulching and help protect the fertility of slopes and hills while reducing susceptibility to erosion (UNEP 2002). The Dogon in **Mali** create elaborate compost piles, and tend and modify the structure and quality of the soil. They plant and tend groves of a variety of acacia which enriches the soil, and use the leaves for fodder and shade to shelter their crops (Mulenkei 1998: 124).

In many cases, too, however, exploitation of traditional products can have a detrimental impact on local biodiversity. In **Cameroon**, mountain biodiveristy has been an important asset to the local population, and exploitation of, for example, *Prunus africana* from Mount Cameroon and Kilum has been great (Republic of Cameroon 1997:144)

1.4.6 Inland waters

Traditional uses of wetland in Africa include gathering reeds and other plants, hunting animals and birds, irrigation and even cultivation. The document *Managing Ghana's Wetlands: A National Wetlands Conservation Strategy*, (Republic of Ghana, 1999), highlights the traditional use of wetlands in **Ghana** by local populations as sources of building materials and hunting and fishing areas as well as water sources. Mangroves and other wood products are harvested for fuel, timber and medicinal purposes; grasses and reeds are used for weaving mats and baskets, and for thatching. Management of these wetlands is governed, the *Strategy* states, by traditional knowledge systems and practices that have been developed by local populations. In addition, every river, lake and lagoon (such as the Sakumo lagoon) is associated with a particular spirit or deity, and thus 'preserved' through the observance of restrictions and prohibitions on its use. Such indigenous management practices, the *Strategy* asserts, provide a strong traditional base for the protection of wetlands in Ghana.

In **Uganda**, wetlands provide *ambatch*, used by fishermen as net floats. *Cyperus* papyrus, *Typha* and *Phragmites* are used in craft, thantching and for mulching, and *Phoenix reclinata* is used for construction. (Uganda 1998:17).

Dambos are grass-covered and generally tree-less wetlands which, were used by precolonial communities in **Zimbabwe** for flood recession irrigation. Most *dambos* have since been badly eroded due to increased and changing human interference (Zimbabwe NBSAP:66).

Reid (1994) describes the endurance of traditional fishing practices in West Africa. Fishing tribes such as the Efik and the Aro have been active in the region for centuries, and transhumant fishermen from more than 77 ethnic groups fish the region. Artisanal methods, though still in use, have been more often replaced by more "modern" methods, such as the introduction of nylon nets and commercial synthetic chemicals in place of natural poisons.

Access to fishing in Lake Victoria, once tightly controlled and carefully managed by the indigenous Luo, has been replaced by a "free for all", marked by drastically declining catches (Geheb and Binns 1997). (However, on the Ugandan shore, 70% of beach landings still fall under the control of a *gabunga*, or head fisherman (Alvarez and Nagy).)It has been argued (Geheb and Binns 1997) that future sustainability of fishing activity in Lake Victoria will ultimately depend on greater control over access, and possibly the reintroduction of communal fishing grounds and resource management such as existed in pre-colonial

times. But there are modern problems that any management system, traditional or not, would have to take account of. For example, the introduction of the Nile perch (*Lates niloticus*) to Lake Victoria in the 1950s led to the decimation of most of the Lake's other fish species and the transformation of the local fisheries. There are now only three commercially important fish species, where there were once many. Fish production has dramatically increased in value, and between 1980 and 1986 the number of fisheries in the Tanzanian portion of the lake increased by 46%.

For the communities living around Lagoa de Cufada, a large freshwater lake in **Guinea Bissau**, fishing using traditional techniques remains the most important activity. The land is entirely state-owned, although local people retain traditional land-use rights. "Almost the entire catchment of Lagoa de Cufada is included within the Ramsar site. Parts of the catchment have been cleared for banana and cashew nut production, while several areas have been exploited for wood. Large expanses of vegetation are burned annually for shifting rice cultivation and to facilitate hunting. Catches of fish in Lagoa de Cufada have declined in recent years and over fishing may be a problem."

The traditional knowledge systems and institutions of the Barotse, in the Western Province of **Zambia**, prohibit cultivation of headwaters of rivers and streams, and cultivation into rivers and streams. This community protection allows year-round stream flow and the protection of lagoons and fish breeding grounds, as well as maintaining traditional fishing techniques and fisheries yields. (Khalikane and Asibey).

1.5 Knowledge versus practice: state of retention of traditional knowledge concerning practices relevant to the customary management, conservation and sustainable use of biological diversity that are no longer maintained or are at risk of disappearing

Throughout sections 1.1-1.4, mentions have been made of threats or changes to traditional ways of life and the associated knowledge. Many factors seem to cause the break down of traditional customs and knowledge systems: trade in natural resource products, out-migration of individuals and groups from given local areas (e.g. rural-urban migration), displacement and loss of life through armed conflict, loss of life due to disease (viz. HIV/AIDS). More generally, forces of modernisation, commercialisation and globalisation penetrate further and deeper indigenous peoples' lives and lands. Traditional knowledge has also been the subject of ridicule, considered unscientific and thus worthless. This is more of a problem in countries such as **Namibia** with a history of racially based colonial policies. This institutionalised discrimination against all facets - including local knowledge systems - of traditional black African societies and communities is a major contributing factor to the loss of traditional knowledge. (Krugmann 2001:8). For example:

Despite the historically proven effectiveness of Maasai pastoralism in providing food security, and preserving and even enhancing the ecological base of its reproduction, it has nevertheless been dismissed by those who claim it does not provide security against 'natural shocks' such as drought and epidemic disease.

(Forstater 2002:49).

Many indigenous and traditional groups have knowledge systems linking together all aspects of the environment with cosmology and religion. The Fulani knowledge of their environment transcends technical notions such as carrying capacity and links ecology with cosmology and religious values. Land and its products are carefully utilized as a source of food, pasture and medicine to cure human beings and animals from various types of diseases. Prayers for rain or *salati el istisga* are often administered during drought. The Fulani widely hold the view that any misuse of the trees, water and grass would induce droughts and epidemics, and alienate human beings from the gifts of nature (Mohamed Salih 1992).

Beliefs and knowledge systems such as these may by default lead to the customary management, conservation and sustainable use of biological diversity.

"It is, therefore, only for a very good reason that a Fulani would cut down a tree. The only justifiable reasons for cutting down a tree include fencing, browsing, house building, and for making wooden beds and tools. Firewood is always collected from dead trees, and charcoal making was, until recently, not known to Fulani herders."

(Mohamed Salih 1992)

There is much evidence that as traditional knowledge and beliefs are eroded, these protective practices will also disappear, and unsustainable activities may take their place.

"It is only with the growth of towns and urban centres that the impoverished Fulani began to cut down trees for charcoal making. The Fulani still ridicule those who earn their living from wood selling or charcoal making."

(Mohamed Salih 1992)

The example of the Fulani, above, and the information in box 1, demonstrate how beliefs, customs and the state of the environment can interact with the net result that traditions are lost.

Box 1: Famine foods in Ethiopia

In Ethiopia the loss of availability of famine foods, and the continuation of severe droughts that forces many people to migrate from their home areas for good, constitute a pressing threat to the survival of knowledge about famine foods as well as a threat to the people themselves. The following information was collected in interviews by Anna Barnett in the northern provinces of Tigray and Amhara Famine foods are a little-publicised but very important natural resource utilised by all the peasant farmers that were interviewed. In each agroecological zone between 14 and 21 different famine foods were described, although some of these are no longer available due to lack of rain and/or over-use in recent years.

There were 3 areas of study, in each of Ethiopia's agroecological zones:

Mekane Birhan, Janamora: Dega zone (land above 2,500m above sea level);

"In the local market, famine foods such as 'gaba' and 'abashow gomen' are sold or exchanged for other crops e.g. barley. Some peasants are reluctant to sell these foods for money, preferring to exchange for necessary foodstuffs."

"Gathering 'famine' foods is not a coping strategy in itself but is used all the time in conjunction with day-to-day life, in good times and bad. However, the reliance on them is greater when there is food shortage and will be consistently greater to poorer families. Begging is not a solution because it is forbidden for any healthy, able person to beg."

Tsiska, Tekeze Lowlands: Kola zone (land lying up to 1,500m above sea level)

"Wild foods were often used by people, especially shepherds and farmers, even when the harvest was good. They were additions to the everyday diet. But many are no longer available as they have also suffered from the lack of rain in the last few years."

Debla Se'et, Tigray: Woyna Dega zone (land between 1500m and 2500m above sea level.)

Most of the famine foods have deteriorated due to lack of rain. People have no choice now but to rely on food aid and food-for-work schemes. The only surviving famine foods in this area are *Beles, Hamle tilian, Hamle tete*, and in some areas *Kuenti* and *Ango shahay*.

Source: Barnett A & Bryce J (2000) *Famine foods and other coping strategies* Ethiopian Venture website: http://www.ethiopian-venture.org.uk/famine_foods.htm

1.6 Assessing the feasibility of using existing traditional knowledge to maintain customary practices relevant for the management, conservation and sustainable use of biological diversity

The best way to assess the feasibility of using existing traditional knowledge to maintain customary practices relevant for the management, conservation and sustainable use of biological diversity is to consider projects where this has been undertaken. This is largely the content of section 2 of this report, and there these ideas are discussed in detail. However, it is worth mentioning here that there are aspects of many traditional and indigenous knowledge systems that predispose them to be suitable for measures to promote the management, conservation and sustainable use of biological diversity.

As mentioned in section 1.5 many indigenous knowledge systems share a holistic attitude toward the environment that surrounds them. This may mean that activities are traditionally carried out in a way that is sustainable and promotes the conservation of biodiversity.

People who live by traditional lifestyles, as part of their ecosystems, have developed ways of living with nature that do not result in over use of the resources upon which they depend. Once such lifestyles are lost, it is most unlikely that they will ever be recreated, though it is most desirable that traditional knowledge, especially of the various uses of species of plants and animals, should be recorded before it is lost.

(Gambia NR1:20)

There are many examples of activities that promote management, conservation and sustainable use of biodiversity. Indigenous communities often have areas that are forbidden or protected, or where hunting and harvesting of wild plants are only allowed in certain circumstances (**Eritrea** 1997, **Burundi** 2000, **Gabon** 1998, **Guinea** 2002, **Gambia** 1998, **Djibouti** 1999; 2000 e.t.c.). Reasons for their protection differ widely. The area may be one of particular social or cultural significance, such as a cemetery or the site of a particular ritual, or a spiritual importance, such as the sacred groves referred to in section 1.4.1. The collective result is the conservation of ecosystems and biodiversity. It is therefore relatively straightforward for governments to secure further official protection for these areas by erecting them as national parks, although as section 2.1 shows, Protected Areas can cause conflict for indigenous peoples and government officials.

Protection and conservation have always been central to ***Eritrean*** *society's perception on use of natural resources. The Tigrigna word Hezatti implying "protection or limitation" of use is a common vocabulary in peasant agriculture. A less frequently used term Herum Hezatti involves the absolute protection, rather like the category 1 protection concept that is contained in IUCN's system of protected areas."*

(Eritrea 1997:11)

Traditional customs in indigenous communities may also lead to the protection of specific species of plants and animals. In **Zimbabwe** certain indigenous fruit tree species such as *Strychnos* and *Uapaca* could not be cut under any circumstances. (Zimbabwe NBSAP:33). In **Djibouti** some tree species are protected from felling. (Djibouti 1999; 2000). In **Senegal** ("in the rural areas") taboos are common, where a family takes the name of an animal and identifies particularly with it, believing it protects them

as long as they don't kill or eat it (Senegal 1997). Whilst these practices may not protect biodiversity as a whole, they are still valuable in the conservation of certain species.

The National Reports of some Parties mention traditional practices that have a detrimental impact on the environment and biodiversity. Deforestation is mentioned as a result of traditional practices by the **Democratic Republic of Congo** (Democratic Republic of Congo 1997, 2000). Pastoralism is suggested to lead to overgrazing by the first National Reports of **Mali** and **Egypt**. Starting bush fires is also attributed to traditional practices. Such criticisms must be considered, but it is also important to take into account the factors that are causing this exploitation. General problems cited as factors include population pressure, poverty and therefore pressure to over-exploit the local environment in the short-term (Burkina Faso 1997). It is also important to remember that traditional customs vary a lot in space and time, traditional knowledge is not shared between tribes and that dramatic losses or gains of interest in certain species happen over time (Burkina Faso 1997). These differences and changes in traditional knowledge systems may well impact the customary practices that lead to sustainable use and conservation of biodiversity.

2 IDENTIFICATION AND ASSESSMENT OF MEASURES AND INITIATIVES TO PROTECT, PROMOTE AND FACILITATE THE USE OF TRADITIONAL KNOWLEDGE

2.1 Regional and national land use practices

Regional and national land use practices relevant to the sustainable use and conservation of biodiversity include the creation of legally gazetted protected areas. There are examples of cases where indigenous or traditional people and their knowledge have been involved. For example, three national parks in Senegal have been erected on sacred forests, thus giving them further protection (Parc National de Basse Casamance, the Réserve de Kalissaye and the Parc National du Niokolo-Koba).

Biosphere Reserves, established under the "Man and the Biosphere" (MAB) Programme were officially launched by UNESCO in 1970 are of particular relevance. Biosphere Reserves are areas where people can maintain their traditional land use practices, as well as improve their economic well-being through the use of culturally and environmentally appropriate technologies. Such traditional systems are highly useful for conserving ancient breeds of livestock and old land races of crops, which are invaluable gene pools for modern agriculture. As of November 2002, there were 60 Biosphere Reserves in 28 African countries (MAB, 2003).

Frequently, however, the experiences of indigenous peoples within protected areas has been negative, imposing restrictions upon the activities of inhabitants which can either preclude the exercise of traditional knowledge or practices, or, equally damagingly, force people to stay in a stereotypical mould of what is traditional. Often, the very premise for the establishment of protected areas has been antagonistic towards traditional practices.

One such case involves the Maasai in the Ngorongoro Conservation Area, in Tanzania (see also box 2). McCabe et al. (1992) highlight that the stereotypical image of the "ultra-conservative, isolated" Maasai, living on a diet of "milk, meat, and blood, and little else", continues to hold sway among policy-makers, with the result that "innovations" (or what administrators regard as such) are discouraged in favour of "traditional methods".

In contrast, some traditional practices are actively discouraged in the Ngorongoro Conservation Area, as in the case of the prohibitions on cattle grazing in certain areas. This policy is based on colonial stereotypes of "backward" livestock management practices - a view which is held by a number of governments is that "traditional" practices are environmentally destructive. There has been a long-running debate concerning the "tragedy of the commons", or the overgrazing controversy (Homewood & Rogers 1987), which demonstrates how the policies of protected areas management can devalue traditional knowledge and practices.

As McCabe et al assert, anthropological literature – as well as other sources – provides many accounts of pastoral peoples "who have not degraded the land, are extensively involved in regional exchange networks, and are engaged in the market economy". The well-known examples of protected areas in which continued human habitation has been encouraged are potentially of great assistance to projects which seek to preserve and make use of the traditional knowledge of indigenous communities. All too often, however, such projects continue to regard traditional knowledge and practices as inferior – suitable for "preservation", perhaps, but of little use in the conservation of local biodiversity.

Box 2: The Maasai in Ngorongoro Conservation Area, Tanzania

"Just look around. The parts of the world left with wildlife are peopled by pastoralists. Why is it so? How is it that supposed 'experts' and 'guardians of nature' come here after having failed to conserve trees and wildlife in their places of origin?"

(Shinana ole Moinga, Endulen, in Lane 2001)

The Ngorongoro Conservation Area (NCA) was created out of the Serengeti National Park in 1959, as an area in which multiple land use would be ensured, both to assist in conserving and developing natural resources, and to benefit the local Maasai. As a protected area in which the indigenous population were permitted to continue to pursue their traditional lifestyles, the NCA was innovative within Africa. Yet subsequently, the NCAA (Ngorongoro Conservation Area Authority) has often been the focus of conflict between Maasai and government officials

Grazing is permitted under permit in certain areas while it is totally prohibited in others, and all cultivation is prohibited within the NCA: pastoralists may obtain grain only by selling livestock and using the resultant funds to purchase from traders. The prohibition on agriculture, since 1976, on the grounds that it is incompatible with wildlife conservation, has brought to an end the traditional interdependence between pastoralists and local cultivators, which often involved intermarriage.

McCabe *et al*'s (1998) study of the nutritional status and food security of the resident pastoralists of the NCA identified a state of decline in the livestock production system, and malnutrition among a significant proportion of the population. It was clear that the Maasai blame the Conservation Authority for imposing restrictions on their economy to support conservation. The Conservation Area Authority, meanwhile, clearly blame the Maasai for mismanaging their livestock, echoing the old "overgrazing controversy".

In 1989 the Ngorongoro Conservation and Development Project produced a number of recommendations for future management of the NCA. Some of these have been acted upon, including the institution of a new veterinary programme, facilitation of grain delivery to some settlement areas, subsidized grain sales, a new Maasai handicrafts centre. Tourists are also encouraged to visit a Maasai *enkang* built and maintained by a Maasai NGO. Many recommendations have not been acted upon, however. Maasai continue to feel aggrieved that their interests are secondary in importance to those of the wildlife, and that their knowledge and expertise which assured the conservation of the flora and fauna populations prior to the advent of the "white man" are now ignored.

Population data recorded between 1960 and 1990 in the NCA show that the livestock figures have remained relatively stable, while the human population has increased, thus reducing the amount of food available to the Maasai. There has been a corresponding shift in pastoralist strategies towards small stock (McCabe et al: 357). In other parts of East Africa, most pastoralist peoples have seen a similar decline in the ratio of livestock to humans. Where restrictions such as those highlighted above have not been in place, this has seen a move towards alternatives to livestock raising, including cultivation. McCabe et al argue that development among pastoral peoples should not be limited to improving the livestock-based economy.

References: McCabe et al 1992; Lane 2001; UNEP-WCMC 2001

2.2 Incentive measures

There seem to be very few existing direct incentive measures that encourage the holders of traditional knowledge to keep it and apply it. Having said this, many projects of a capacity-building or legislative nature may be indirect incentives, such as the recognition of customary systems of land tenure (see section 2.6), and support for education in indigenous communities (see section 2.3). Also, there seem to be strong financial incentives to anyone (e.g. governments, NGOs) who plans to document traditional knowledge, coming from sources such as the World Bank, the European Union and development agencies. amongst others. The awareness of, and respect for, indigenous knowledge that has developed in recent years at the high levels of government, in contrast to the previous views of indigenous people as backward, acts as a political incentive for all governments to follow suit, and for indigenous communities to become more politically organised and vocal.

Small scale incentive measures can work by associating conservation with increased income, thereby improving the status of wildlife and conservation, for example the community based projects in the Chobe Enclave in northern **Botswana** (Botswana 1998:61). This involves increasing rural economic activity through sustainable utilisation and also to improving the attitudes on the part of communities living in areas abutting protected areas towards wildlife. In a similar vein, in the Korup Project (**Cameroon**) financed by the European Community, DFID, WWF and GTZ participatory management entails the rational use of non-timber forest products and engagement of the population into income-generating traditional-knowledge based activities with the bid to reducing pressure on the forest (Cameroon 1997:67).

Some providers of incentives seem very rigid in providing incentives that suit the provider's purposes, not necessarily the needs of the community recipients. For example, in the Medicinal Plants and Local Communities project (MPLC), which aims to conserve medicinal plants in their communities of origin, the incentives offered are listed thus: "Economic incentives include seed funds, the promotion of income-generating activities, and help with marketing. Social incentives include technical assistance and training, information and consciousness-raising related to conservation, the provision of equipment, and technical and scientific advice and assistance. Institutional incentives include guarantees of full property rights, and the establishment of local committees and associations for purposes of monitoring and planning." (MPLC).

Placing in local people's hands the power to manage their land and draw revenue from it is a potentially very strong incentive to conserve it wisely. The Community Forests scheme in **Cameroon** and the Communal-area Conservancies in **Namibia** make use of this incentive. In **Cameroon** this type of management is to be carried out through management plans drawn up at the behest of the community and approved by the services in charge of forest. In this way, the local community concerned manages the forest in question and reaps the attendant benefits. So far, the notion of community forests is still at its initial stage with the putting in place of a Community Forestry Manual through the financial and technical assistance of DFID (Bokwe, Fosi Mbantenkhu et al:4). In **Namibia** the management plan for each conservancy spells out ways of proper land use resource use planning (e.g. wildlife take-off quotas). Formulae for the sharing of benefits - both direct monetary benefits accruing from direct use of natural resources and indirect benefits in terms of local capacity building and technology transfer - among conservancy members are determined by the Conservancy Committee. To date, more than 30 applications have been received and more than 10 conservancies have been formally approved and established (Namibia Access & benefits: 19). For information on analogous Community Forests projects, see the Europe section of this report.

Box 3: Sustainably Harvested Devil's Claw

Location: Omaheke region of Namibia
Responsible organisation: The Centre for Research, Information and Action in Africa's Sustainably Harvested Devil's Claw (SHDC) project (CRIAA SH-DC)

Devil's Claw (*Harpagophytum procumbens*) has long been used for its medicinal properties, under traditional systems in the Kalahari Sands of **Namibia, Botswana** and **South Africa.** International biotrade from **Namibia** (and its neighbours) has grown substantially over the past four decades. The traditional knowledge about the medicinal properties and applications of Devil's Claw held mainly by the San in the eastern parts of **Namibia** has already been lost, as some patents on extraction and processing methods have been granted to commercial companies in Germany and the U.K.

A simple description of SHDC would be as follows. Donors (EU, Food Aid Counterpart Fund, the Canada Fund, Namdeb Social Fund ILO INDISCO and Oxfam) fund a service NGO (CRIAA SA-DC) to activate and organise groups of registered harvesters. Harvesters engage in an exchange of knowledge about sustainable resource use and voluntarily adopt sustainable resource management practices that they have helped to formulate. Harvests are assessed by ecological surveys to set sustainable harvesting quotas, and compliance with sustainable harvesting techniques is monitored. Harvesters elect a co-ordinator and/or record-keeper and are assisted with tools, record-books, storage facilities, extension/liaison services and in securing group harvesting permits. The product is certified "Organic" by the Soil Association (UK). When a group of harvesters have a full load of dried tubers, they contact the exporter (Gamagu) directly or through the SHDC extension worker. The exporter collects the load and pays cash on the spot.

In return for prefinancing, collating and transporting, the exporter makes a fair profit - negotiations are underway about ways to share this profit with harvesters, and in 2001 a pro-rata bonus was paid on the 2000 harvest. The next step in the process, which would be to link the "eco-friendly" product directly to a market segment in Europe, is currently being pursued, but has not been achieved yet.

Outcomes and Lessons Learnt
In relation to Article 8(j) the main point raised by the SHDC is that in this case, attention to sustainable harvesting - knowledge of which has been shared by the San people for generations – can improve the quality and quantity of the yield. This then leads, *in tandem with other capacity-building measures*, to greater benefits for the harvesters themselves.

- The organisation of harvesters at a local level, allowing them to exchange traditional harvesting knowledge. Disorganised and isolated harvesters are far more likely to resort to unsustainable harvesting out of desperation.
- A secure, fair cash income linked to sustainable utilisation of an important natural resource for traditional users and other poor people in rural areas. The use of organic certification allows access to ethical consumers.
- The recognition and legitimisation of traditional knowledge about sustainable harvesting. Exchange of such information was encouraged through organised grouping of harvesters. The increased price guaranteed by SHDC provides harvesters with a long-term incentive to implement sustainable harvesting techniques.
- A long-term and mutually beneficial relationship between harvesters and upstream operators (exporters, processors, pharmaceutical users)

- The primary beneficiaries of SHDC have been 328 registered harvesters of Devil's Claw (representing around 1,600 household members) organised into Harvesters' Committees on 18 pre-Independence resettlement farms in the Omaheke Region of **Namibia**. The target beneficiaries of SHDC are the estimated 10,000 very poor Namibians who earn a cash income from harvesting Devil's Claw. It is important not look to cultivation as an alternative source of supply without considering the impacts on the livelihoods of extremely poor people. If cultivation is seen as the only option, it must be practical for traditional harvesters, not just for rich farmers, and provide traditional harvesters with technical and financial support so that they can make use of the opportunity.

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Reference
Krugmann H. 2001 *Namibia thematic report on access and benefit sharing, particularly the Annex: Namibian Devil's Claw (*Harpagophytum *spp.) - A Case Study on Benefit-Sharing Arrangements*

2.3 Capacity-building measures

2.3.1 Projects concerning neglected and underutilized species of crops

Global food security has become increasingly dependent on only a handful of crops. Only 150 crops are commercialized on a significant global scale, yet ethnobotanic surveys indicate 7,000 plant species across the world across the world are cultivated or harvested from the wild for food. These species are extremely important. They represent an enormous wealth of agrobiodiversity with the potential to both improve nutrition and increase food security. This is especially the case in fragile niches where they may have a comparative advantage where they have been selected to withstand stress conditions, allowing their sustainable cultivation with low cost. They also provide a broad portfolio of crops to meet new environmental conditions, new markets and to improve global food security.

As mentioned in section 1.1, the indigenous knowledge surrounding neglected and underutilized varieties and species is essential to their development and promotion as crops. Hence the conservation of neglected and underutilized species and the indigenous knowledge surrounding them have been the focus of many capacity-building projects.

In Africa, **Ethiopia** is probably the country with the most advanced programme of on-farm conservation. The programme relies on cooperation between farmers and breeders to restore Ethiopian landraces such as those lost during the drought of the 1980s. It has generated great interest, particularly as a result of its high potential for replication in other countries in the region. **Eritrea**, for example, has shown interest in developing a similar project. In addition community seed banking by Tigray farmers in **Ethiopia** addresses the problems of loss of traditional seeds and traditional knowledge for selection and conservation.

Kenya also has an effective nationwide program. The Indigenous Food Plants Program (IFPP), **Kenya**, "aims to improve diets as well as preserve cultural practices and biodiversity". Since its inception, the IFPP has involved rural communities as sources of information on food plants and, subsequently, as

promoters of those plants within their communities. Rural communities have been encouraged to take an interest in the sustainable use and conservation of "wild" food plants. The results of food value analyses and other research is taken back to the communities in question, and form the basis of recommendations for future crop production. The research is also contributing to a database on the nutritional values, preferred habitat and conditions, and methods of preparation of food plants. The findings have been promoted through demonstration gardens at museums and wider educational programmes for schools and communities – providing information and even seeds, conducting training workshops and encouraging projects on wild food plants (Kabuye 1992).

Other projects target specific species. In **Namibia** Marula fruit (*Sclerocarya birrea*) has been traditionally used as a food supplement by the San and by the Ovambo peoples. Some germplasm has left **Namibia** for **South Africa** and Israel. **South Africa** has done improvements on Marula fruit trees, with a view to juice and liqueur production as commercial application, and has offered **Namibia** free access to the improved varieties. Meanwhile, **Namibia** is focusing its efforts on the commercialization of Marula oil, building on traditional knowledge and practices of oil extraction. (Krugmann 2001:6)

2.3.1.1 International Plant Genetic Resources Institute (IPGRI)

IPGRI is supporting the conservation and use of neglected and underutilized crop species. Through participatory regional programs focusing on a wide range of neglected crops across the world, IPGRI is assessing crop diversity and conservation status, implementing plant breeding programs to improve varieties and improving marketing. IPGRI have been active within Africa, on projects relevant to this report.

Box 4: IPGRI Project Case History

Improving the nutritional resource base in Africa through the use enhancement of indigenous vegetables (activity 3.1)

IPGRI's socio-economic research work in sub Saharan Africa is opening up ways to increase the food supply of local populations, raise incomes and stimulate economic activity, as well as increase the effectiveness of *in situ* conservation of valuable biodiversity. Leafy vegetables are important in the diet of many African countries.

Prior to IPGRI's involvement, there was a general understanding that leafy vegetables were not cultivated very widely, but they were rather gathered from the wild. Socio-economic research sponsored by IPGRI found in fact a reverse situation. Farmers actively cultivate leafy vegetables and also manage their growing activities according to their knowledge of the diversity within the species. For example, bitter leaf (*Vernonia amygdalina*) has several distinct genotypes with different degrees of bitterness that different cultural groups prefer. Farmers would select the material they planted depending on who would be buying and eating the leaves. The work also highlighted how important it is to maintain the genetic base of the crops and the stability of the ecosystem within the forest farming system to protect the livelihood of low-income farmers in West Africa.

The IPGRI Global Home Gardens Project (Genebank (IPK) 2001) will be carried out with key national partners, members of the CGIAR, and local NGO's in Guatemala, Venezuela, Cuba, **Ghana**, and Vietnam. The main questions that the project will address are whether and how home gardens can contribute to *in situ* conservation systems. Starting from the premise that genetic diversity, ethnobotanical knowledge and traditional agricultural practices are currently eroding, the project will attempt to assess the extent and type of genetic diversity which is preserved in the home garden at the

ecosystem, species, and intra-specific levels. Secondly, data will be collected to determine what factors or combination of factors affect the conservation and use of this diversity. Information on both plant diversity and home garden structure, including information on farmer selection practices and indigenous knowledge related to the cultivars, will be obtained. This will then be combined with social data and household typologies in order to identify parameters that allow individual gardens to be grouped into viable conservation systems or "conservation management units".

2.3.2 Projects concerning traditional medicine

Traditional medicine is an area of great interest at present and there have been a wealth of capacity-building projects dedicated to the use of traditional medicinal knowledge. These projects differ in their aims as well as their outcomes, and generalisations would not do justice to the diversity of approaches that have been used. But the number of relevant case studies makes considering them individually unrealistic, and so some similarities are drawn below.

Traditional medicinal knowledge has also been the subject of considerable bio-prospecting in Africa by pharmaceutical companies. However, more often than not, there is little or no return of benefits to the communities whose information was used.

2.3.2.1 Registration of Traditional Medicine Practitioners

The registration of traditional medicine practitioners (TMPs) is often a first step in initiatives to promote and protect traditional medicinal knowledge. Following this process it is common for TMPs to form co-operatives or associations. This allows collaboration and exchange of traditional knowledge between TMPs. Examples include the Banfora Centre for Traditional Medicine («Centre de pharmacopée traditionnelle de Banfora»), which was created to promote traditional medicine through the registration of TMPs and the Medicinal Plants and Local Communities (MPLC) project active in a number of African countries where traditional healers' co-operatives have been established, for commercially producing, processing and marketing their remedies. Some initiatives act to promote collaboration between TMPs in a number of countries. For example, the Association of Commonwealth Traditional Medical Practitioners for West Africa (ACTPMWA) promotes collaboration & exchange of traditional knowledge between TMPs in **Cameroon**, **Ghana**, the **Gambia** and **Nigeria** (Commonwealth Scientist 2001:1). In The **Gambia**, the ACTPMWA under the leadership of Mr Dauda Colley of Tanjeh Community Centre, has enabled Gambian traditional medicine practitioners to establish the first national association of traditional healers, the Tanjeh Herbal Agency which has been registered with the Ministry of Justice (Commonwealth Scientist 2001:1).

2.3.2.2 Documentation of information and the creation of traditional medicinal knowledge databases.

The recording of traditional medicinal knowledge is often part of initiatives to promote and protect traditional medicinal knowledge. This is frequently a contentious issue, since once indigenous knowledge of any kind is recorded, it is felt to be in more danger of exploitation, for example by pharmaceutical companies (for more discussion see section 1.3.2). As one example, in **South Africa**, the Research Group for Traditional Medicines has established a database on traditional medicinal knowledge to enhance the output of the Research Group's core activity, namely research into traditional medicine and its possible role in alleviating conditions that are a particular burden to local society, such as malaria and tuberculosis. (WIPO 2001: 89). Documentation and recording of non-medicinal indigenous knowledge is discussed later in this section.

2.3.2.3 Education

Education is central to many capacity-building projects. It allows more local people to become involved in projects based in their communities. The areas targeted depend on the aims of the project itself, but common themes include teaching the cultivation of endangered medicinal plants to prevent harvesting of wild specimens, the advantages of continuing sustainable practices, and information handling to facilitate the creation and use of traditional medicinal knowledge databases. One example where education is central to the approach is the Medicinal Plants and Local Communities (MPLC) project (also mentioned in section 2.3.2.1 and 2.2). MPLC is the product of consultations, begun in April 1995, between the Environmental Liaison Centre International (ELCI), the International Development Research Centre (IDRC), the government of the Netherlands, community-based organizations, and traditional practitioners. Operating in **South Africa, Central African Republic, Guinea, Malawi, Kenya** and **Côte d'Ivoire**, the project's goal is "to promote the conservation of bio-diversity by helping local communities to make the best possible use of their own knowledge of plants." It encourages communities to act on the basis of their *own* knowledge, and for their *own* benefit, thus encouraging the conservation and sustainable use of medicinal plants. It also aims to raise awareness of the importance of sustainability, to reinforce indigenous knowledge, and to "develop tools and methodologies which enable them to benefit from their own knowledge and practices." Training centres have been established in each country to achieve these objectives. (MPLC).

2.3.2.4 Creating traditional medicinal hospitals

A number of initiatives have established traditional medicine hospitals. These provide an arena not only for traditional medicinal healthcare, but often as centres for exchange and preservation of traditional medicinal knowledge. Following workshops on education and "updating the knolwedge" of traditional medicinal practitioners in Osun State, **Nigeria** (Commonwealth Knowledge Network, 2003), it was recommended that the local government should establish a hospital, and provide equipment, for treatment with, and preparation of, traditional medicines.

The Centre for Scientific Research into Herbal Medicine in Mampong, **Ghana**, was established in 1972. It also runs a clinic, where three doctors see over 100 patients every day, most of whom are referred from the hospital next door. The Centre specialises in "lifestyle" diseases such as hypertension, diabetes and arthritis, although malaria and pre-menstrual pain are also specialities. (Tsey 1997:1070-1)

The Government of **Mali** has established three "Phytothérapeutique" units to care for people living with HIV in Ouagadougou, Bobo-Dioulasso and Banfora (see also section 2.3.2.1). In these centres, patients are given medicines made from local plants which traditional medical practitioners have used successfully on their patients, and observed by doctors and traditional healers. (Dakuyo 2000)

2.3.2.5 Establishment of medicinal gardens

In many cases, gardens for medicinal plants have provided *ex situ* conservation for endangered species. They also act as a resource for education about traditional medicinal knowledge itself, and can help teach local people about the benefits of cultivation. A Medicinal Garden was an objective of the workshop for the Ife North Local Government Area (Report on Ife North Local Government Area workshop from commonwealthknowledge.net). The Banfora Centre for Traditional Medicine, already mentioned above, has also created a "botanical garden" within the walls of the hospital (Dakuyo 2000).

Box 5: Conservation and sustainable use of medicinal plants in Ghana

Location: Coastal and Aburi Hills region, Ghana

Responsible organisations
The Aburi Botanic Gardens, the Department of Botany and the Centre for Remote Sensing and Geographic Information Services, University of Ghana, Legon, Botanic Gardens Conservation International, the Royal Botanic Garden Edinburgh and the UNEP World Conservation Monitoring Centre.

Funded by the Darwin Initiative for the Survival of Species

Objectives and goals
Establishment of a comprehensive medicinal plants information system to provide a picture of issues relating to the use and importance of medicinal plants in **Ghana** to help establish priorities in conservation, cultivation and sustainable use. Promotion of the cultivation of medicinal plants in people's home gardens to help reduce pressure on medicinal plants of wild origin.

Summary
A capacity building project involving a range of approaches to support the conservation and sustainable use of medicinal plants. Activities included: an ethnobotanical survey of six villages documenting plant species used; development of medicinal plant nurseries as source of material for local use; production of manual on cultivation techniques; development and documentation of medicinal plant reference collection at Royal Botanic Garden Aburi; development of computerised systems of living and specimen collections from the Ghana Herbarium; analyses of specimen data using geographic information system (GIS) against habitat and protected area data; awareness raising activities involving local communities, traditional rulers, academics and government representatives; production of CD-ROM of project outputs as research and educational tool.

The project included the funds to install computer hardware and software at the Ghana Herbarium and at Aburi Botanic Garden, as well as funds to recruit members of staff to enter data for the project.

Outcomes and lessons learned
- Involvement of all stakeholders at early stage in project through awareness raising events
- Provision of hardware, software and training essential for accurate data management
- Repeat training/data review sessions important to keep work on course
- Provision of project T shirts very effective in maintaining sense of project identity
- Large permanent project display board in prominent position in Botanic Garden maintains interest in medicinal plant nursery beyond life of project
- Genuine interest in work from Botanic Garden Director critical to continued success of project
- Production of results on CD-ROM makes project accessible to wide audience, including use as teaching item for schools
- Involvement of local villagers at all stages including contribution to ethnobotanical suvery, development of nursery at Botanic Garden and development of village medicinal plant garden populated with seedlings from Botanic Garden lead to comment "Ah, now I understand. Before we used to collect from the wild, but now I can see we can cultivate the plants even though the forest has gone".

Box 5 cntd.

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Reference

Gillett, H.J. 2002. *Conservation and sustainable use of medicinal plants in Ghana 1999-2002. CD-ROM and* http://www.unep-wcmc.org/species/plants/ghana

2.3.2.6 Testing and commercialisation of traditional medicinal recipes

Testing traditional medicinal recipes can promote the use of associated knowledge, especially if their efficacy is scientifically proven. This combats the perception of traditional medicine as primitive and inefficient, and in turn improves the retention of knowledge. The Centre for Scientific Research into Herbal Medicine in Mampong, **Ghana**, already mentioned above, was established in 1972. A publicly-funded Government research institution, the Centre's activities focus on "biomedical and pharmacological analysis of medical plants": of the Centre's collection of 730 medicinal plant specimens, the efficacy of 30% has been scientificaliy proven.

Most initiatives to protect and promote traditional medicinal knowledge include more than one of these approaches, and a good project would use as many as possible and fully integrate them for maximum benefit. The projects mentioned are by no means exhaustive, and cases like those mentioned are relatively common. In addition it is important to remember that communities differ greatly meaning that an approach that would be of use in one case, may be ineffective in another. Therefore, it is essential that initiatives are tailored to individual communities and that generalised approaches are limited.

2.3.3 Research projects & Documentation

"The prevailing situation in ***Cameroon*** *is similar to that of most of the developing countries of the world. Lack of inventory of the various forms of traditional knowledge, innovations and practices of indigenous and local communities relevant to the conservation and sustainable management of biodiversity, lack of appropriate legislation to ensure the protection of the state of indigenous peoples within the country and lack of a well defined benefit sharing mechanism constitute a major handicap which prevent the government from benefiting from this rich heritage"*

(Cameroon 1997).

The nature of the transmission of traditional and indigenous knowledge is such that distortion and loss of information is likely to occur. For this reason the recording of knowledge would seem to be beneficial. However, whilst the documentation of traditional and indigenous knowledge preserves it for future generations, it also leaves knowledge potentially more vulnerable to exploitation. It is essential therefore

that any recording is done within a framework of agreements that cover all the problems that are of concern.

There are also those who believe that the recording of indigenous knowledge is not necessary, counter-productive, and even dangerous (see section I.3).

Documentation and recording of traditional and indigenous knowledge are central to the majority of projects aiming to protect and promote indigenous knowledge. Different projects record different areas of traditional and indigenous knowledge, and as a result most areas are covered. Some examples include NGOs like Bioresources Development Programme of **Cameroon** (BDCP-C), in collaboration with Smithsonian Institute of USA and Shaman Pharmaceuticals who have carried out certain research geared towards pharmaceutical leads on traditional healers and nutritionists in **Cameroon** (Bokwe et al:9). A considerable amount of research has been carried out by the Institute of Ethiopian Studies (IES) and the Sociology and Anthropology Departments of Addis Ababa University, including the use of biological resources, particularly plants, by the various ethnic societies of the country. These data are available in the extensive library of IES and a limited number of corroborating specimens are in the National Herbarium (Ethiopia). A joint research project conducted by the National Museums of **Kenya** and the Leiden Ethnosystems and Development Programme has begun to document and revitalize indigenous knowledge in agricultural and natural resource management for sustainable development (Slikkerveer 1992).

Box 6: Medicinal plant use and conservation scoping project in Tanzania
Location: Olarash and Eluay villages, Arusha region, Tanzania
Responsible organisation: Terrawatu

The project compared and contrasted a rural and a peri-urban community in order to discern the influence of urbanization on patterns of plant utilization. It groundtruthed the widespread perception that supplies of priority plant species are decreasing in the district, and identified the threats to their preservation from both inside and outside the communities.

A scoping project on medicinal plant use and conservation under the aegis of the UNDP-GEF-NEMC East African Cross Borders Biodiversity Project was carried out in association with the Tropical Pesticides Research Institute, Ngaramtoni, Arusha, the Natural Resources Division of Monduli District Council, and the Institute of Traditional Medicine, Muhimbili Medical Centre, Dar es Salaam
A series of plant walks were carried out with community members, professional botanists, and an interviewing team followed by semistructured household interviews in which was gathered in-depth information about the uses of the plants, their supply, and reasons for changes in supply.

The research produced a list of species (including both local and scientific names), habitats and uses, and a description of the patterns of use (medicinal, ritual, nutritional, cosmetic, hygienic, construction, fuel, fodder, etc.), importance, cultural significance, perceived availability and sustainability of harvest.

Outcomes and lessons learned

- *Several factors are contributing to declining use, and declining availability, of wild medicinal plants*
- In Olarash, a peri-urban village, availability of medicinal plants and knowledge of how to use them are both declining.
- Perceived causes are lack of interest from young people, decline in animistic religious beliefs in favour of Christianity, the commercialisation of traditional medicine, and change from pastoralism to agriculturalism.

- Commercialisation has come about by a few people making a living out of collecting medicinal cures and selling them in towns. They exploit large areas and are more likely to collect destructively, a negative cycle of travelling further and collecting more on each trip can develop as the target plants become scarcer in the environment.
- The transition to agriculturalism involves more tree felling on fields and for building permanent dwellings, thus threatening trees that are medicinal, and the habitat of other medicinal plants.
- In Eluay, a more remote village, supplies and knowledge of medicinal plants are only just beginning to decline, probably due to a change to agriculturalism, as in Olarash, but not to commercialisation.

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Pergola, T (2003) *Changes in using and conserving medicinal plants in Maasai villages in Monduli district, Tanzania.* Summary paper at www.terrawatu.org/undp-gef_brief.htm

Aang Serian, a Tanzania-based NGO, (see also Box 7) is collating and translating published information on medicinal plants utilised in the communities where Aang Serian works. This information falls into two categories: (1) medicinal and other uses of the plant species elsewhere in the world, and (2) the results of pharmacological and toxicological tests carried out in laboratories to determine the efficacy and safety of these medicines. This allows the information to be put to practical use in the communities it was obtained from. (Aang Serian 2003).

2.3.3.1 Books recording traditional knowledge

A number of books record traditional and indigenous knowledge. These are only of use to the communities they feature if they are in an accessible context (e.g. language) and are affordable.

A study being conducted on the traditional use (cultural, mystical, symbolic and magical) of plants throughout West Africa (Abbiw, in progress) relays both historic information and updates from current field research (based on interviews and oral histories). The material is arranged by function rather than plant species. For example, the heading "Death and dying" includes plants which are associated with death, plants used to send or receive messages from the dead, plants associated with burial rites and ceremonies; "Marriage" includes plants believed to protect marriages, plants believed to improve marriages (e.g. a charm of Datura metel is believed to give the patience to tolerate one's spouse). There are over 50 subject areas described. The material contains a great deal of information on possible "conservation practices" such as the protection of sacred groves and protective taboos .

2.3.4 Establishment of traditional knowledge registers

The establishment of traditional knowledge registers is in essence another form of documentation and recording, but potentially more useful and accessible. However great debate surrounds their proposal, and many indigenous communities are "openly opposed" to their establishment (UNEP/CBD/COP/6/ INF/35:9). Many national reports mention proposed registers, or those in progress, but there is little evidence of completed databases. A project in Bangassou, in the Central African Republic, is compiling an inventory of traditional knowledge prior to an envisaged partnership between government and indigenous populations (Central African Republic 2000; Djibouti 2000).

Other reports support their establishment in principle, but require further assurance of security for indigenous knowledge holders (Namibia NR2). **Namibia** has in fact included the mechanism of a community register in draft *sui generis* legislation (Article 29 vi). This would aid the difficulty of protecting orally transmitted knowledge as intellectual property (Krugmann 2001:15-16).

The "famine foods" database was created by the United Nations Emergency Unit for **Ethiopia** (Barnett & Bryce 2000). "Famine foods" are the wild plants communities depend on in times of need and the communities involved in **Ethiopia** retain a great deal of knowledge regarding such resources. For more information about this project see box 1.

2.3.5 Education

One of the most frequently-mentioned threats to the conservation of traditional knowledge is the fact that young people do not learn as much from their elders as they used to, and so the knowledge literally dies with the people who hold it. There may be many reasons why the knowledge is not passed on: migration, especially rural-to-urban, can separate families; the teachings of monotheistic religions can replace those of animistic religions, etc. A possible way to reverse this trend would be to favour and build capacity for initiatives which replace the teaching/learning functions that have been lost. Some relevant projects have been discussed in box 5 and box 6.

Box 7: Aang Serian Community College

Location: Arusha region, Tanzania

Responsible organisation: Aang Serian
Education, capacity building and documentation of traditional knowledge, by and for young Tanzanians

Speaking at the United Nations General Assembly in New York in August 2001, two of Aang Serian's leaders, Yunus Rafiki and Lesikar Ole Ngila, drew attention to a contradiction in the world's educational systems. "People come to our communities to study our ways of life, stay for six months, and go home to get a degree or doctorate," they told delegates. "But what do we get? People are still calling us uneducated and backward. We should get proper credit for the indigenous knowledge that we have."

Aang Serian, meaning "House of Peace in the Arusha dialect of Maasai language, is an association founded in 1999 by young Tanzanians and a recent Oxford graduate. It aims to "empower young people by helping them to explore their identity at the tribal, national and global levels".

Foundation Certificate in Indigenous Knowledge and Globalisation (started August 2002)
Their Community College in Arusha, **Tanzania**, provides primary education to around 40 young adults between the ages of 16 and 35. Fees are low, 3,000/= (three thousand) Tanzanian shillings on passing the course, and those unable to pay cash are permitted to contribute in kind or to assist with work instead. Alongside classes in basic literacy, English, Kiswahili and computer studies is offered an innovative seminar course on Indigenous Knowledge : *Mila na Desturi* ('culture and traditions').

This course aims to encourage students to carry out their own research, by discussing their culture and history with their elders, and thus contribute to bridging the widening 'generation gap'. This is a particularly relevant issue for those who have grown up in urban areas living non-traditional lifestyles. The curriculum has been developed by indigenous youth from a variety of ethnic groups, in collaboration with the co-directors.

The course is intended for discussion in small groups of 5-15 people, ideally from a mixture of ethnic groups, led by a trained local facilitator. Each student is given a workbook of questions and, through interviewing parents, grandparents and community elders, is required to fill in the answers. The emphasis is on learning in the home environment: "rather than despising older relatives for their illiteracy, our students are expected to recognise them as holders of valuable knowledge, and to acknowledge their contributions at the back of the completed workbook." Some of the questions have simple factual answers, and others require the student to analyse, evaluate and compare concepts. Students should select one question from each unit - history, culture, environment or health - to answer in depth (a full side of A4). As well as completing the booklet, students are given a practical examination and interview. Assessment is through the completion of three of the following five tasks - and an explanation of their cultural significance - before an Aang Serian faculty member and a community elder: medical plant identification; construction of a material object relevant to his/her ethnic group; performance of a traditional song; performance of a dance and/or drum routine or preparation of a local dish.

Documentation of traditional knowledge
In addition to detailed research on traditional medicines of the Wamaasai and Waarusha (see section 2.3.3), Aang Serian also have students of other ethnic groups (notably Wachagga, Wahadzabe and Warangi). A copy of each student's completed booklet is retained by Aang Serian as part of an archive of indigenous knowledge from various ethnic groups. Access to the information will be strictly limited to researchers who have signed an agreement not to publish, distribute or use the information without full written consent of the students and elders from whom it was obtained.

Outcomes and lessons learned

- The key feature of the Community College is that everyone is involved in decision-making, resulting in a curriculum that meets the needs of the students and serves the wider community (by being a repository of research).
- Due to the success of the Aang Serian, a rural branch of the Community College in Eluwai Village in the Monduli district of **Tanzania** is being developed. Ultimately, the college is expected to become self-sustaining, in part by offering courses to international students, whose fees will go to subsidise the costs borne by local students.

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Burford, G, Ole Ngila, L & Rafiki, Y 2003 *Education, indigenous knowledge and globalisation,* Science In Africa 25, March 2003. http://www.scienceinafrica.co.za/2003/march/ik.htm

2.3.6 Language programmes to recover and/or maintain local languages

Languages are essential to the retention of traditional and indigenous knowledge in Africa. Out of the context of the language within which it developed, knowledge is easily distorted and lost. Therefore, language programmes are important means of protecting indigenous knowledge. One example of the recovery of an indigenous knowledge is referred to by Hugh Brody who describes the 'resurrection' of the language of the =Khomani San of the southern Kalahari. The San were systematically evicted from their ancestral lands, dispossessed and destroyed. "In the 1970s, both the apartheid government and experts on Bushman cultures decreed that the =Khomani had ceased to exist. Linguists announced that the language had died out. But in 1997, Petrus Vaalboi began working with the **South Africa** San Institute (SASI), SASI worked with Roger Chennells, a human rights lawyer, to reclaim the =Khomani lands in the Kalahari Gemsbok National Park. By the beginning of 2000, 15 =Khomani speakers had been found. The survivors got together, traded stories, knowledge, and history. (Brody 2000:7-9)

2.4 Repatriation of objects and associated information to communities of origin

Research on indigenous knowledge systems conducted by outsiders has been published in a wealth of books and academic journals which are practically (if not theoretically) inaccessible to the indigenous communities where the research took place. Although nowadays anthropological research is often participatory, and provision is made for sharing the findings (see also section 2.6.5), past studies could and should be 'repatriated'. Aang Serian is working on a small-scale project to return published information on medicinal plants (gleaned from the international scientific and medical literature) in a

comprehensible format to Maasai communities in Arusha region (Aang Serian questionnaire 2003). As we have not found any other evidence of similar schemes, we assume that they are not widespread.

A related issue is that documented information needs to be provided in affordable format. This would avoid the problem met by Abbiw. (1990) of a book costing £30 - prohibitively expensive in **Ghana**. There are examples of affordable books being produced in country, such as Enti (1988) and Ayitey-Smith (1989).

Repatriation of museum objects remains a difficult and contentious issue. Much progress has been made in recent years, and a variety of artefacts have been returned by European museums to originating communities in Africa. In the main, however, these repatriations have involved sacred objects, human remains or otherwise sensitive objects (see Simpson 1997), not particularly related to biodiversity.

2.5 Strategic planning for conservation and sustainable use of biological diversity within the context of community development planning

This section reviews the degree to which conservation and development projects have involved traditional and local communities in consultation and planning, making room for wide stakeholder participation and taking full account of the existing traditional knowledge.

Cameroon, **Eritrea**, **Lesotho**, **Madagascar**, **Niger** and **Tunisia** mention in their national reports the need for full participation of local communities in management planning. The **Eritrean** People's Forum on the Environment, a mechanism under development, will co-ordinate and catalyse a more intense popular participation in the development of the biodiversity strategy and action plan (Eritrea 1997:19). In **Lesotho** many participants; including farmers, pastoralists, herbalists and medicine men, conservationists, home makers, educators, planners, Government officials, non-governmental organizations, and community-based organizations attended workshops leading to the formulation of the Biodiversity Strategies and Action Plans. In **Cameroon** "A timid approach towards the incorporation of traditional knowledge of indigenous and local communities into development and resource-management decision-making processes is being made through enlarged consultation meetings" (Cameroon 1997:67)

Although integrated participatory management of biodiversity is not applied in a widespread way in any country at present, it has been used in several projects with success. For example, the Management Plans of the Waza National Park and the Dja Reserve in **Cameroon** have made provisions for the involvement of local communities in the management committee of the reserves (Bokwe et al:13); the Dja Biosphere Reserve Project is sponsored by ECOFAC and IUCN. In the Kilum, Ijim Project sponsored by Birdlife International, village communities are encouraged to plant *Pygeum africana*, (a medicinal plant which is being threatened and heavily used as the raw material for a processing pharmaceutical factory,) along the Oku Forest and to protect the fragile Oku Forest Montane vegetation (ibid.).

"The positive aspect of engaging in a participatory planning and implementation approach is the fact that the technologies developed are driven by need, priorities and expectations of communities, which is in itself a powerful driving force that gives local people the confidence and motivation to succeed." - such was the experience of a project to involve Maasai pastoralists in Kajiado district, **Kenya**, in project planning for the improvement of their rangeland resources (Evelyne Kiptot 2002). Similar positive outcomes were seen in the Dobe and Ncwaagom areas of Ngramiland, **Botswana**, where mapping has enabled local groups to participate in identifying and demarcating their traditional lands. "The impacts of these efforts range from enhanced knowledge of the groups' resources and history to greater degrees of social and political cohesion. They have not yet, however, resulted in the formal recognition of the land and resource rights of the communities in these areas" (Hitchcock 2001:45).

One of the provisions of **Malawi's** Environmental Management Act (EMA) is the "identification and integration of traditional knowledge into the conservation and sustainable utilisation of biological diversity." (Malawi)

2.6 Legislative (including policy and administrative) measures

Legislation which deals specifically with traditional knowledge in relation to the conservation and sustainable use of biological diversity has been introduced, or is in the process of being developed, in a number of African countries. At the regional level, too, there are a number of treaties and declarations adopted by bodies such as the African Union (prior to 9 July 2002, the Organisation of African Unity), and the African Intellectual Property Organisation (OAPI). The Yaounde Declaration of the Heads of States of Countries of the Central African sub-region Summit on the Conservation and Sustainable Management of Tropical Forest Ecosystems, for example, encourages African states to increasingly involve the rural population in the planning and sustainable use of natural resources, and allow for their socio-economic development.

The Global Strategy for Plant Conservation was adopted by the Convention of Biological Diversity at the 6th Conference of the Parties (Decision VI/9) (CBD, 2002). Although not regionally specific, two targets are of relevance to this section (the latter target supports production of the current report):

- Target 9: 70 per cent of the genetic diversity of crops and other major socio-economically valuable plant species conserved, and associated indigenous and local knowledge maintained

Rationale: Theory and practice demonstrate that, with an appropriate strategy, 70% of the genetic diversity of a crop can be contained in a relatively small sample (generally, less than one thousand accessions). For any one species, therefore, the target is readily attainable. For some 200-300 crops, it is expected that 70% of genetic diversity is already conserved *ex situ* in gene banks. Genetic diversity is also conserved through on farm management. ***By working with local communities, associated indigenous and local knowledge can also be maintained.*** Combining genebank, on farm, and other in situ approaches, the target could be reached for all crops in production, as well as major forage and tree species Other major socio-economically important species, such as medicinal plants, could be selected on a case-by-case basis, according to national priorities. Through the combined actions of countries, some 2,000 or 3,000 species could be covered in all.

- Target 13: The decline of plant resources, and associated indigenous and local knowledge innovations and practices, that support sustainable livelihoods, local food security and health care, halted.

Rationale: Plant diversity underpins livelihoods, food security and health care. This target is consistent with one of the widely agreed international development targets, namely to "ensure that current trends in the loss of environmental resources are effectively reversed at both global and national levels by 2015". It is recommended feasible to halt the decline by 2010 and subsequently to reverse the decline. Relevant plant resources and methods to address their decline are largely site specific and thus implementation must be locally driven. The scope of the target is understood to encompass plant resources and associated ethnobotanical knowledge. ***Measures to address the decline in associated indigenous and local knowledge should be implemented consistent with the Convention's programme of work on Article 8(j) and related provisions.***

2.6.1 Legislation governing access to genetic resources that also requires the free prior informed consent of affected indigenous and local communities

The issue of the requirement of free, prior, informed consent of indigenous peoples is not merely confined to questions of access to genetic resources in Africa. Lack of consultation, or even notification, has been

a bone of contention in a variety of contexts. In **Cameroon**, prior consent is seldom sought in the creation of protected areas, or in questions of access to genetic resources and subsequent benefit sharing arrangements. The establishment of protected areas, such as the Waza and Korup National Parks and the Campo Ma'an Reserve have involved the resettlement of resident communities. In many such cases, indigenous peoples "are usually informed of decisions already taken during consultation meetings and after studies have been carried out" (Bokwe et al:1).

In **Namibia**, numerous items of legislation have been drafted, including the draft Act on Access to Biological Resources and Associated Traditional Knowledge, which provides for the practice of prior informed consent, protection under "Community Intellectual Rights" and "Farmer's Rights". Mention is also made in the Thematic Report on Access and Benefit Sharing of new policies on the "Use of Wildlife (plants and animals) for Medicinal Purposes" (Ministry of Environment and Tourism) and "Regulation of Access to Genetic Resources and the Protection of Associated Traditional Knowledge in Namibia" Namibia passed the legislation on Access to Genetic Resources in June 2000. The Access to Biological Resources and Associated Traditional Knowledge Act was in its draft stages in 2001 (Krugmann 2001:4) However, it is also acknowledged that there is a gulf between policy formation and implementation, owing to limited organisational and operational capacity (Krugmann 2001:16-17)

Benin's second National report refers to legislation, also in the draft stage, on access to genetic resources, benefit sharing and the protection of traditional knowledge. (Benin NR2)

2.6.2 Recognition of customary systems of land tenure

"Ownership and security of land is central to the cultural survival of ethnic minorities"
(W Ringo Tenga 1999:60)

The general picture with regard to state recognition of customary systems of land tenure, or even basic ownership rights, is a bleak one in Africa. Customary land rights tend to be collective, ambiguous and negotiable; they are less *certain* than formal registration and title (Galaty & Ole Munei 1999:68), and thus frequently incompatible with national systems. Since the evictions and appropriations of the colonial era, indigenous peoples' land security has often worsened, rather than improved. It remains the case that most of the world's indigenous people live on land to which they have no legal title (Galaty & Ole Munei 1999:68). Especially in view of many statements demanding recognition of land rights for indigenous peoples (e.g. ILO 169), this represents a further threat to the survival of indigenous culture and indigenous knowledge.

Land tenure in **Tanzania** is essentially defined by the Land Ordinance of 1923. The Arusha declaration of 1967 declared all lands in **Tanzania** to be "public lands", under the control of the President. The President must ensure that all lands are held and administered for the use and common benefit of native Tanzanians, but village authorities have been gradually giving up land to commercial farmers and corporations without Presidential consent. (Ben Lobulu 1999:64). **Tanzanian** courts recognise the equal status of Deemed Rights of Occupancy (customary title), and Granted Right of Occupancy (legal title). Indigenous communities' ownership of pastures can be verified in the courts on proof of the existence of relevant customary laws. However, the courts do *not* recognise statutory corporate bodies, such as village councils, as holders of collective customary title. To make a claim, therefore, either a representative must be filed, listing all potential beneficiaries, or all the beneficiaries must appear in court. Since organising such a potentially large group of people can take time, and claims are invalid three years from the instance of the claim, this can present difficulties for claimants (W Ringo Tenga 1999:60).

In **Cameroon**, the Land Tenure Act of 1974 abolished the concept of "native" and customary" lands. Following the Act, the government has legal title to indigenous land, and indigenous peoples have user rights, i.e. are free to exercise their customary rights within reserves, farmland, pastures, fishing territories

etc (Bokwe et al:1, 13). However, the Land Tenure Act only guarantees indigenous peoples' rights to occupy these lands "*until such a time as the state has assigned the land to a specific purpose.*" Thus in most of **Cameroon**'s protected areas, such as the Dja Faunal Reserve – a World Heritage Site and Biosphere Reserve with a scattered Pygmy population – local populations live in constant fear of imminent expropriation or eviction from the ancestral lands which they no longer legally own.

Although it is in many ways desirable to confer responsibility for in situ conservation on local/indigenous populations, these communities may not have the capacity to protect their lands from threats such as illegal exploitation from outsiders. Poachers, illegal research and other illegal exploitation of natural resources can even be facilitated by local populations. It is argued, in fact, that it is precisely as a result of the prevailing insecurity endured by local populations that they enter into such damaging partnerships with illegal exploiters, at the expense both of their quality of life and the surrounding biodiversity (Bokwe et al:1, 13).

Under the traditional land tenure system of **Lesotho** (in which the Basotho are the only 'indigenous' tribe), land was administered and allocated by chiefs and no one held freehold title to land. After independence, this system was maintained; land being regarded as property of the nation. The 1979 Land Act introduced leases, titles and other institutions of land administration to deal with "land use mismanagement", and removed the traditional authority of chiefs over land (Nthunya 2002:137).

In the **Democratic Republic of Congo**, too indigenous people's land rights are not properly recognised (Democratic republic of Congo 1997;2002). In **Namibia**, traditional structures of land ownership have rarely even been considered in the development of local structures, or the drafting of new legislation (Krugmann 2001)

In western **Botswana**, the Tribal Land Act (1970) ended the tradition of obtaining land and resources through self allocation, and the granting of land to San by headmen and chiefs. The Act required people to apply to the land board, or the sub-land board (for arable or residential land). This has encouraged the mapping of lands, which has often assisted in securing title (Hitchcock 2001:45; see section 2.5)

The Tribal Grazing Land Policy (1984) created commercial leasehold ranches which aim to protect pastures from poor management (Botswana 1998:20). The controversial evictions of the San Bushmen from their lands in 2002 have drawn global attention to the condition of indigenous peoples in the region. In 2001 the **Botswanan** Ministry of Local Government withdrew the rights of local community trusts to manage the funds generated through their own community-based natural resource management activities, on the basis that natural resources are the property of the nation as a whole, and that more people should benefit from their exploitation (Hitchcock 2001:45).

In **Zimbabwe**, "Plans are now under way to replace the colonial protectionist approach to conserving ... forests to one which considers communities living on the "forest edge" as partners in the conservation, management and utilisation of the forests through Resource Sharing Committee schemes" (Zimbabwe NBSAP:29).

Legislation passed in **Namibia** in 1996 granted exclusive use rights over game animals to so-called communal area Conservancies (Krugmann 2001; see section 2.5).

The Maasai notion of *e-rishata* divides land and resources, but boundaries are more "zones" than "lines": families with rights derived from those of the community mingle together on land they use in common on the basis of negotiation, which can lead to conflict. In the 1960s the **Kenyan** government began to divide Maasai pastoral regions into "ranches", the titles to which were held by groups. These groups split up over time, encouraging claims that land be officially subdivided among them, thus destroying the traditional system (Galaty & Ole Munei 1999:68).

2.6.3 Introduction of *sui generis* laws to protect traditional knowledge

Many African countries, until recently, provided no pharmaceuticals protection, on the grounds that such protection "interferes with the health and welfare of the people" (Kongolo 2001). It was argued that pharmaceutical products would increase in cost, putting them out of the reach of most consumers. Under the Bangui Agreement (1977), on the creation of the African Intellectual Property Organization (OAPI), states had been given a free hand in deciding the degree of protection afforded. The Agreement has been revised, however, to conform to the WTO's TRIPs Agreement. Both pharmaceutical *products* and *processes* are now "protected", where the item in question is "new", involves an "inventive step" and is "industrially applicable". Surgical or therapeutic treatments or diagnostic methods are excluded from protection (Kongolo 2001). The Organization of African Unity (OAU) has developed the African Model Law for the Protection of the Rights of Local Communities, Farmers and Plant Breeders, and for the Regulation of Access to Biological Resources, in line with Article 8(j). The Model Law was adopted at the OAU Summit in Ouagadougou in June 1998.

The **Central African Republic** argues that the Accord Bangui is not very well suited to the protection of traditional knowledge relating to sustainable use of the environment (Central African Republic 2000).

Cameroon has signed agreements with member states of the OAPI. However (Cameroon 1997:67), there is no national legislation on Intellectual Property Rights related to biological diversity. Cameroon's first National Report outlines the need for a *sui generis* system to affirm and protect traditional ecological knowledge, and to prevent biopiracy.

"In Cameroon, the indigenous people or villagers constantly have the apprehension that any researcher or exploiter coming into contact with them is likely to unfairly exploit their knowledge."

Bokwe et al:7-8

The authors cite the example of the Bioresources Development and Conservation Programme Cameroon (BDCP-C), an NGO dealing with indigenous people and local communities. The BDCP-C has signed contracts with US pharmaceutical companies to ensure that any exploitation of the traditional knowledge and innovations of indigenous peoples in **Cameroon** will involve some sharing of whatever benefits accrue as a result.

Pygeum africana, a plant containing properties for the treatment of prostate cancer, is being exploited by Plantecam, a company based in Mutengene in the country's south-west province. Plantecam gives 'some compensation' to the local people who provide the raw materials.

"This is, however, a timid approach to the principle of fair and equitable sharing. In the first case it is even difficult for the NGO concerned to monitor the drug development process to ascertain that the material supplied from a given traditional healer did or did not yield positive results in the drug discovery programme."

(Bokwe, Fosi Mbantenkhu et al:7-8)

Ethiopia has drafted legislation based on the African Model Law for the Protection of the Rights of Local Communities, Farmers and Plant Breeders, and for the Regulation of Access to Biological Resources (Ethiopia NR2).

None of the legislation related to conservation in the **Central African Republic** specifically concerns indigenous and local knowledge (Central African Republic 2000). **Zimbabwe** has no policy or legal framework governing intellectual property rights, nor any legal mechanisms that control access to genetic

resources, or protect and reward traditional knowledge and innovations related to the conservation and development of genetic resources (Zimbabwe NBSAP:118).

2.6.4 Constitutional Recognition of the rights of indigenous and local communities

The constitutional recognition of indigenous rights in Africa, as in other regions world-wide, is of fundamental importance. Such recognition is rarely assured.

The International Labour Organization's Convention (No. 169) concerning Indigenous and Tribal Peoples in Independent Countries (ILO 169, 1989) is the only legally binding statement on indigenous peoples. It has not been ratified by any African country. Furthermore, African nations continue to be among the strongest opponents to the United Nations Draft Declaration on the Rights of Indigenous Peoples (Saugestad 1999:6).

While this section has contained a number of examples of legal recognition of indigenous people's traditional land rights, Kipuri (1999:19) emphasises that the denial of indigenous people's human rights involves not only "expropriation of their resources for other purposes", but more fundamentally "the denial of their humanity". The general picture of indigenous people's rights in Africa, therefore, remains bleak.

Indigenous Rights Organisations have, as yet, made comparatively little progress in securing the constitutional and material bases for their continued existence, let alone the protection of their traditional knowledge and practices. By and large, indigenous peoples continue to be subsumed by local, regional and national governments. Empowerment to provide legal protection for the local community is as yet unrealised for the majority of indigenous communities within nation states.

2.6.5 Establishment of Codes of Ethics, to be determined by indigenous peoples, to guide conduct of researchers

A number of National Reports and other sources highlight the lack of consideration of indigenous peoples by researchers, bioprospectors, etc. The need for the development *and enforcement* of ethical guidelines on such a policy is clear. However, there is no information from National Focal Points on the development of such policies. Where such policies have been drawn up, they themselves often give inadequate attention to the needs of indigenous peoples themselves.

One specific issue in terms of the ethical *exchange* of knowledge and innovation is the provision of access by indigenous peoples to 'scientific' knowledge. This is highlighted by Bokwe et al (p.1) in the context of forest dwellers such as the Pygmies of **Cameroon**'s equatorial forests, and the mountain peoples of the north. Despite constant interaction between such peoples and researchers, exploiters, government officials, etc., they have little or no access to the knowledge possessed by such outsiders. A fair and equitable system of knowledge extraction must involve *mutual* benefit. All too often the definition of one community or group as "indigenous" or holders of traditional or indigenous knowledge can be used as an excuse to deny them access to "modern" or "scientific" knowledge and resources on the grounds that indigenous knowledge will be lost. Finding a *balance* between conservation and development demands that indigenous or local communities are treated fairly and equally, and not as living museum pieces.

RECOMMENDATIONS

	Recommendations: Africa	Level			
		CBD	Regional	National	I
1	**Establish baseline indicators for the state of retention of traditional, local and indigenous knowledge.** The development of baseline indicators for the state of retention of traditional knowledge requires further research than could be achieved in this 12-week study. It is essential to determine indicators based on sources other than the existing literature, actively engaging indigenous and local communities.	X			
2	**Establish baseline indicators to assess the success or failure of measures to promote or preserve traditional knowledge and practices.** Baseline indicators regarding the success or failure of measures to promote or preserve traditional knowledge and practices could not be determined in this 12-week study. It is essential to determine indicators based on sources other than the existing literature, actively engaging indigenous and local communities.	X			
3	**Take steps to ensure parity between the submissions of indigenous peoples and, for example, Parties through National Focal Points.** The "full and effective participation" of indigenous and local communities has not been achieved in the compilation of this report. Ensuring parity of esteem between all stakeholders at this level could encourage this further.	X			
4	**Put in place mechanisms to encourage representatives of indigenous groups and local communities to present information to the CBD.** The aim of an "accurate and comprehensive assessment" of the status and trends regarding the state of traditional knowledge, and methods taken to ensure its promotion or preservation, requires further concrete steps to be taken by the CBD. Participation by indigenous groups *cannot* be achieved simply by issuing invitations: Parties must accept that this involves capacity-building and incentive measures, which require financial outlay and considerable political will.	X			
5	**Working definitions of "indigenous" and "traditional knowledge" must be decided upon as a matter of urgency.** "Indigenous" is a highly politically sensitive term in Africa and elsewhere and should be recognised as such by the CBD. However, a working definition of "indigenous" and related terms is essential for the implementation of 8(j) the development of such a definition, and its dissemination to all Parties, NGOs and stakeholders, must be seen as a priority.	X			

		Level			
6	**Develop mechanisms to ensure input from overseas territories and autonomous or semi-autonomous regions.** National Reporting constituted an excellent starting point for assessing the state of retention of traditional ecological knowledge in many countries. However, in a number of important and highly politicised contexts, geographical and administrative distance (e.g. Reunion), or the autonomy of indigenous peoples' regions excludes such peoples from this forum.	X			
7	**Develop mechanisms to ensure input from groups within states who are not Party to the CBD.** In Africa, only one state is not Party to the CBD. In other regions, however, this presents a much more serious problem.	X			
8	**The CBD should define conditions for traditional knowledge in the context of 8(j) to be considered "in use".** There is an apparent acceptance that traditional knowledge is least threatened when actively 'in use' (being of a 'practical nature' and transmitted orally). Yet TK can be said to be 'in use' by a variety of groups and interests (multinationals, bioprospectors, 'indigenous' businesses, or neighbouring indigenous groups), and to a variety of ends (TK holders' economic development, treatment of diseases, conserving biodiversity or tourism). Traditional knowledge which is exploited by 'outsiders', without the involvement and subsequent benefit of traditional knowledge holders, is still 'in use'. When does such 'use' cease to be healthy?	X			
9	**Actively involve local communities in the management of protected areas.** Local communities must be actively involved in the management of protected areas in which they live, work or have culturally significant sites. This must go beyond "consultation", failures of which have been referred to in this report.			X	
10	**Incorporate restrictions of use and access to "sacred" or otherwise culturally significant sites into appropriate local or national legislation.** Where appropriate, such legislative action can strengthen and enforce traditional laws and restrictions, and preserve intact the local biodiversity in keeping with local traditions. This should be done only after *full consultation* with local indigenous groups.			X	
11	**National Focal Points should compile information on basic information and quantitative indices related to the status of traditional knowledge, and measures taken to protect it, to provide a 'thumbnail' sketch of simple trends.** As repeatedly stated in this and other regional reports, the task of arriving at an "accurate and comprehensive assessment" of			X	

		Level			
	both the state of retention of, and measures to promote, indigenous, local and traditional knowledge is a significant undertaking, for which the resources have not been available. In the meantime, it would be helpful to have basic quantitative data, e.g. on the number of books/papers translated into indigenous and local languages, or legislation passed and cases which have come to court that have had a *positive or negative impact* on indigenous and traditional knowledge. Collection of such data may point to trends, and assist in garnering political and financial support where this is most lacking.				
12	**Appropriate, indigenous knowledge should be integrated into formal, local or national systems of education, which are directed towards local or indigenous communities.**		X	X	
13	**Offer appropriate education and training to indigenous and local communities that can enable sustainable development while being compatible with their traditions.** Education and training programmes should be established, by or with the close involvement of local and indigenous communities, with the purpose of passing on traditional knowledge and appropriate education to members of the community (e.g. Aang Serian).			X	

REFERENCES

Aang Serian, 2003: *Completed questionnaire inquiring the state of the retention of traditional biodiversity-related knowledge and aiming to identify and to assess measures and initiatives to protect, promote and facilitate the use of traditional knowledge.* Held by the Secretariat of the Convention on Biological Diversity

Aang Serian, 2000: *Statement on Indigenous Peoples, Tourism and Biodiversity*. Presented to the COP-5 to the Convention On Biodiversity, Aang Serian Peace Village, Arusha, Tanzania, May 2000. http://groups.yahoo.com/group/Greentour/message/115

Abbiw, D. (in progress). *Plants and tradition in West Africa.* Department of Botany, University of Ghana, Legon, Ghana

Aboubacrine, Daoudata, 1998: 'The Value of Traditional Medicine'. In A Van Achterburg (ed), *Out of the Shadows: the first African Indigenous Women's Conference*

Alvarez, M. and Nagy, R 2002. *Lake Victoria: The Sick Giant.* International River Management: the Lake Victoria Case Study. Last modified 2nd December 2002. http://www.eawag.ch/research_e/apec/seminars/Case%20studies/LAKE%20VICTORIA%20CASE%20STUDY.pdf

Ayitey-Smith, E. 1989: *Prospects and scope of plant medicine in health care.* Ghana Universities Press, Accra, Ghana. 31pp.

Barnett A & J. Bryce, 2000 *Famine foods and other coping strategies* Ethiopian Venture website http://www.ethiopian-venture.org.uk/famine_foods.htmBenin, 1998: *Rapport National sur la Diversite Biologique.* Direction de l'Environment, Cotonou, Benin, April 1998

Benin, ____: *Deuxième Rapport National de la Diversité Biologique.* Ministère de l'Environnement, de l'Habitat et de l'Urbanisme, Cotonou.

Betti, Jean Lagarde, 2002: 'Ethnobotanical Studies of Medicinal Plants in the Dja Biosphere Reserve, Cameroon: popular pharmacopoeia of the Baka Pigmies'. Paper presented to the 8th International congress of the International Society of Ethnobiology, Addis Ababa, December 2002

Bokwe, A, D A Mbah, E Lysinge, Fosi Mbantekhu B Satabie J C Njock, R Foteu, 1997: Republic of Cameroon, Ministry of the Environment and Forestry, Convention on Biological Diversity National Report 1997,

Bokwe, Augustine; Fosi Mbantenkhu, Mary & Neckmen, Samson, ____: *Case Studies and other Relevant Information on the Implementation of Article 8(j) of the Convention on Biological Diversity (Decision IV/9 of the 4th Conference of Parties to the CBD)* Presented by the Government of The Republic of Cameroon. https://www.biodiv.org/doc/restricted/tk/scbd/scbd-03-en.pdf

Brody, Hugh, 2000: 'Taking the words from their mouths' *Indigenous Affairs* 2000, Number 2, pp.4-9

Burford, G, L Ole Ngila & Y Rafiki, 2003: 'Education, indigenous knowledge and globalisation'. *Science In Africa* 25, March 2003. http://www.scienceinafrica.co.za/2003/march/ik.htm

Burkina Faso, 1997: *Rapport Interimaire Du Burkina Faso Sur la Diversite Biologique a la Conference Des Parties*, Ministere de l'Envionment et de l'Eau, Secretartat Permanent du Conseil National Pour la Gestion de l'Environnement Ouagadougou, Décembre 1997

Burundi, 2000: Rapport de Pays à La Conference des Parties, Convention Sur la Diversite Biologique, Ministere De L'Amenagement Du Territoire Et De L'environnement. Bujumbura, Republique du Burundi. Juillet 2000.

Cacaud, Philippe (1999): *Fishcode Management: Review Of Institutional And Legal Aspects Relating to the Management of Lake Tanganyika Fisheries*. Food and Agriculture Organization of The United Nations, Rome, March 1999. http://www.fao.org/fi/projects/fishcode/publicationpdffiles/Fseries/F-1.pdf

Cameroon, 1999: *Biodiversity Status Strategy and Action Plan.* Yaounde, 31st December 1999

Cape Verde, 1999: *Rapport National Sur L'etat De La Biodiversite.* Ministere De L'agriculture, De l'Alimentation et de L'environnement, Secretariat Executif pour l'Environnement (SEPA), Republique Du Cap Vert

Carrière, S M, 2002: "'Orphan trees of the forest": why do Ntumu farmers of southern Cameroon protect trees in their swidden fields?' *Journal of ethnobiology*, Summer 2002, Vol.22, No.1, pp.133-162

Central African Republic, 2000:*Rapport National sur la Diversité Biologique.* Ministère de l'Environnement, des Eaux, Forêts, Chasses et Pêches, *BANGUI: République Centrafricaine.* 27 Septembre 2000

Chad, 1998: *Rapport Interimaire Sur La Mise En Oeuvre Au Niveau National De La Convention Sur La Diversite Biologique (Application De L'article 6 De La Convention).* Ministere de l'Environment et de l'Eau, Direction de Protection de la Faune Et des Parcs Nationaux, N'Djamena, Republique du Tchad, March 1998.

Cocks, M & A. Dold, 2000: 'The role of "African Chemists" in the health care system of the Eastern Cape province of South Africa', *Social Science & Medicine* 51(2000) 1505-1515

Commonwealth Knowledge Network (2003): *Workshop Communique on Providing Herbal Education at the Grass Root Level: Updating the Knowledge of Herbal Medicine Practitioners in Aiyedade Local Government Area of Osun State, 30th October – 1st November 2001* http://www.commonwealthknowledge.net/documents/Seyani/Aiyedaad-CKN%20Workshop%20Report.pdf (17 April 2003)

Commonwealth Scientist 2001: 'Association of Commonwealth Traditional Medicine Practitioners for West Africa takes root'. *Commonwealth Scientist* 13. Commonwealth Science Council, September 2001. http://www.commonwealthknowledge.net/documents/CommScientist/Commonwealth%20Scientist%2013.PDF

Cross, N. & R.Barker 1991: At the Desert's Edge: Oral Histories from the Sahel. PANOS/ SOS SAHEL

Dakuyo, Zefirin P, 2000: 'Rôle des connaissances traditionnelles dans le développement socio-économique : cas de la médecine traditionnelle au Burkino Faso'. Paper presented at UNCTAD Expert Meeting on *Systems and National Experiences for Protecting Traditional Knowledge, Innovations and Practices*. UNCTAD, United Nations, Palais des Nations, Geneva, 30 October 2000.

Democratic Republic of Congo, 1997: *Rapport Intermediaire sur la Mise En Œuvre dela Convention Relative á la Biodiversite en Republique Democratique du Congo.* Ministere de L'environnement, Conservation de la Nature et Tourisme, Republique Democratique du Congo. Decembre 1997

Democratic Republic of Congo, 2002: *Plan National Strategique D'action en Matiere de la Diversite Biologique: Période de 2002 à 2010.* Ministère des Affaires Foncières, Environnement et Tourisme, Direction de Developpement Durable, Division de *Diversité Biologique.* January 2002.

DFID, 2002: *Wildlife and Poverty Study.* Livestock and Wildlife Advisory Group. http://62.189.42.51/DFIDstage/Pubs/files/wildlife_poverty_study.pdf

Diouf, Papa Samba, D. Thiam, C. Sene, A. Dia, M. Ly, N. Ndiaye, F. Ngom, K. Sane, M. Faye (1999): *Combining traditional and modern practices in fisheries / Sine-Saloum-Senegal.* Wise Coastal Practices for Sustainable Human Development Forum. 20 July 1999. http://www.csiwisepractices.org/?read=48

Djibouti , 1999: *Rapport National á la Conférence des Parties a la Convention sur la Diversité Biologique.* Ministère de l'Environnement, du Tourisme et de l'Artisanat, Direction de l'Environnement. Avril 1999

Djibouti, 2000: *Strategie et programme d'action national sur la diversite biologique – version finale 11/09/2000*

Edmund, 2002: *The role of culture in forest conservation: a case of Ijombe/Ntangano Ward in Mbeya Region*, Paper presented to the 8th International congress of the International Society of Ethnobiology, Addis Ababa, December 2002

Egypt, 1997: *First national Report to the Convention on Biological Diversity.* Ministry of State for Environmental Affairs, Egyptian Environmental Affairs Agency, National Biodiversity Unit. December, 1997

Enti, A.A. 1988: *The Rejuvenating Plants of Tropical Africa.* The North Scale Institute. 56pp.

Eritrea, 1997: *National Report on the Implementation of Article 6 of the Convention on Biological Diversity (CBD)*. The State of Eritrea, Ministry of Land, Water and Environment. Department of The Environment, Asmara, Eritrea. December 1997

Ethiopia,____: *Second National Report.* Environmental Protection Authority, Ethiopia.

ECART (European Consortium for Agricultural Research in the Tropics) 2001: 'Ethno-Agronomy', 26 October 2001 http://ecart.iao.florence.it/capstat/presentations/ea.ppt

FAO, 1998: *The state of the world's plant genetic resources for food and agriculture.* FAO, Rome. 510pp.

Forstater, M, 2002: 'Bones for sale: 'development', environment and food security in East Africa' *Review of political economy*, Jan 2002, Vol.14, No.1, pp.47-68

Gabon, 1998: *Rapport National Biodiversite.*Ministere de la Planification de l'Environment et du Tourisme, Cellule de Coordinnation Biodiversite Gabon. March, 1998

Gambia, 1998: *Draft National Report on the implementation of the Convention on Biological Diversity.* Agriculture and Natural Resources Working Group/ Taskforce on the NBSAP Process. January 1998

Galaty, John G & Kimpei ole Munei, 1999: 'Maasai land, law and disposession'. *Cultural Survival Quarterly*, 22(4): 68-71.

Geheb, K and Binns, T 1997: 'Fishing Farmers' or Farming Fishermen'? The quest for household income and nutritional security on the Kenyan shores of Lake Victoria, African Affairs, 96

Geissler P.W.; S A Harris, R J Prince, A Olsen, R A Odhiambo H Oketch-Rabah PA Madiega, A Andersen & P Molgaard 2002: 'Medicinal plants used by Luo mothers and children in Bondo district, Kenya' *Journal of Ethnopharmacology*, November 2002, vol. 83, no. 1, pp. 39-54(16)

Genebank (IPK), 2001: *Methodological Supplement to the "Contribution of Home Gardens to In Situ Conservation of Plant Genetic resources in Farming Systems".* http://mansfeld.ipk-gatersleben.de/homegardens/info.htm

Golder, Bronwen *and* Mia MacDonald (2002): *'Population and gender dynamics in coastal conservation in East Africa'. Women in Fisheries* 11 – November 2002. Secretariat of the Pacific Community. pp.10-13

Government of Botswana, 1998: *National Report on Measures Taken to Implement the Convention on Biological Diversity,* Presented to the Fourth Conference of Parties to the CBD, 5th-15th May 1998, Bratislava, Republic of Slovakia

Grandin, Barbara E, 1989: 'Labor sufficiency, livestock management, and time allocation on Maasai group ranches'. *Research in economic anthropology*, Vol.11, pp.143-179

Guarino, L & E Friis-Hansen, 1995: 'Collecting plant genetic resources and documenting associated indigenous knowledge in the field: a participatory approach'. In: Guarino, L., V Ramanatha Rao, and R Reid (eds.) *Collecting plant genetic diversity: technical guidelines*, p. 345-366. Commonwealth Agricultural Bureaux International; Oxford, UK.

Guinea, 2002: *National Strategy & Action Plan for Biological Diversity.* Ministry of mines, geology and the environment, Conakry, January 2002

Hitchcock, Robert K, 1999: 'Resource Rights and resettlement among the San of Botswana' *Cultural Survival Quarterly* 22(4):51-55

Hitchcock, Robert K, 2001: 'Decentralization, Natural Resource Management and Community-Based Conservation Institutions in Southern Africa'. *Indigenous Affairs* 2001, No.4, pp.38-49

ILO, 1989: *Convention (No 169) concerning Indigenous and Tribal peoples in Independent Countries.* Adopted 27 June 1989 by the General Conference of the International Labour Organisation at its seventy-sixth session. Entry into force 2 September 1991.

Ingold, Tim & Tehri Kurttila, 2000: 'Perceiving the Environment in Finnish Lapland' *Body and Society* 6)3-4):183-196

Isamu, Theo, Rex Baleña, Sibylle Riedmiller, Antonio Garciá Allut, Gladys Torres, Nikki Shaw (2002) Indigenous fishers' knowledge: ownership, predicaments and research. Tuesday, 15 January 2002, http://www.csiwisepractices.org/?read=402

IWGIA, 2003: *Indigenous peoples - Who are they?* http://www.iwgia.org/sw155.asp

Jones, Tim (ed) *A Directory of Wetlands of International Importance (Ramsar, 1993)*, 4th ed. Volume I: Africa.

Kabuye, Christine , 1992: 'The Indigenous Food Plants Program of Kenya' Paper presented at the *International Symposium on Indigenous Knowledge and Sustainable Development*, International Institute of Rural Reconstruction, Silang, Philippines, 20-26 September. 1992.

Kenrick, Justin, 2000: 'The Forest Peoples of Africa in the 21st Century'. *Indigenous Affairs* 2000(2):10-24.

Kenya, 1998: *Draft First National Report to the Conference of Parties – National Biodiversity Strategy and Action Plan.* Ministry of Environmental Conservation, Nairobi, March 1998

Khalikane, M. G. and Asibey, E. O. A. *An Overview of African Indigenous Knowledge for Sustainable Development.* Scandinavian Seminar College: African Perspectives of Policies and Practices Supporting Sustainable Development (SSC-Africa project). http://www.cdr.dk/sscafrica/kh&as-sa.htm

Kiptot, E, 2002: *Incorporating indigenous knowledge in biodiversity conservation: the case of rangeland improvement in Kenya.* Paper presented to the 8th International Congress of the International Society of Ethnobiology (ISE): 'People and Biodiversity', 16-20 September 2002, Addis Abeba. http://www.cieer.org/pdf/program8.pdf

Kipuri, Naomi, 1999: 'The Human Rights Situation of Indigenous Peoples in Africa'. *Indigenous Affairs* 1999(3):18-25.

Kokwaro, J.O. 1976. *Medicinal Plants of East Africa.* East Africa Literature Bureau, Kampal, Nairobi, Dar Es Salaam. 384pp

Kongolo, T, 2001: 'Towards a More Balanced Coexistence of Traditional Knowledge and Pharmaceuticals Protection in Africa', *Journal of World Trade*, 35(2): 349-361, 2001

Krugmann, Dr Hartmut, 2001; *Namibia's thematic report on Benefit-sharing mechanisms for the use of biological resources,* 15 May, 2001

Lane, Charles, 2001: *Ngorongoro Voices*, Swedish University of Agricultural Sciences, University of Uppsala, Sweden http://www-trees.slu.se/publ/online/lanebibl.htm .

Lobulu, Ben, 1999: 'Dispossession and Land Tenure in Tanzania: What hope from the Courts?' *Cultural Survival Quarterly* 22(4):64-67.

Lyon, Linda, 2002: *One eye on the future one eye on the past: the potential for medicinal plant conservation among the Antanosy of Madagascar*, Paper presented to the 8th International congress of the International Society of Ethnobiology, Addis Ababa, December 2002

Madagascar, ____: *Rapport National sur la Convention sur la Diversité Biologique.*

Malawi, 1998: *Interim First National Report to the Convention on Biological Diversity.* Ministry of Forestry, Fisheries Environmental Affairs, Environmental Affairs Department, Lilongwe, January 1998

Mali, 1998: *Rapport Interimaire sur la conservation de la Diversité Biologique.* Ministere de l'Environment, March 1998

McCabe, JT, S Perkin, and C Schofield, 1992: Can conservation and development be coupled among pastoral people? An examination of the Maasai of the Ngorongoro Conservation Area, Tanzania *Human Organization* 51(4) 1992: 353-366

Mhame, Paulo P, 2000: 'The Role of Traditional Knowledge (TK) in the National Economy: The Importance and Scope of TK, Particularly Traditional Medicine in Tanzania'Paper presented at UNCTAD Expert Meeting on Systems and National Experiences for Protecting Traditional Knowledge, Innovations and Practices, UNCTAD, United Nations, Palais des Nations, Geneva, 30 October 2000

Mohamed Salih, 1992: Pastoralists and Planners: Local Knowledge and Resource Management in Gidan Magajia Grazing Reserve, Northern Nigeria. Paper No. 32 IIED

Martinez-Cobo 1987: UN Doc. No.E/CN.4/Sub.2/1986/87

Medard, Modesta, and Douglas C. Wilson (1996) "Changing Economic Problems for Women in the Nile Perch Fishing Communities on Lake Victoria". Presented at "Voices from the Commons," the

Sixth Annual Conference of the International Association for the Study of Common Property, Berkeley, CA, June 5-8, 1996. http://www.indiana.edu/~iascp/abstracts/383.html

MPLC, ____: 'Medicinal Plants and Local Communities (MPLC) in Africa: Promotion of local communities' strategies for the conservation of medicinal-plant genetic resources in Africa.' http://www.unesco.org/most/bpik1.htm

Muchae, John E K, 2001: 'Indigenous Knowledge and intellectual property rights: Kenyan experience. In *Report of the Inter-Regional Workshop on Intellectual Property Rights in the Context of Traditional Medicine*, Bangkok, Thailand, 6-8 December 2000. World Health Organization, New Delhi, pp.25-6.

Mugabe, John, 1998: *Intellectual Property Protection and Traditional Knowledge: an exploration in international policy discourse*, Paper Prepared for the World Intellectual Property Organization, Geneva, Switzerland, December 1998

Mulenkei, Lucy, 1998: 'African indigenous Women and Biodiversity Conservation' in A Van Achterburg (ed), *Out of the Shadows: the first African Indigenous Women's Conference*

Mulenkei, Lucy, 2000: African Indigenous Women in the 21st Century. *Indigenous Affairs* 2000(3):42-45.

Namibia, 2002:*National Report to the Conference of the Parties on the Implementation of the Convention on Biological Diversity In Namibia*. Ministry of Environment and Tourism, Windhoek, April 2002

National Oceanic and Atmospheric Administration, 2002: *Filling Critical Gaps and Promoting Multi-Site Approaches to New Nominations of Tropical Coastal, Marine and Small Island Ecosystems*. Website of the Whttp://international.nos.noaa.gov/heritage/docs/wrkspdoc/Attach8_Prior_Areas.docorld Heritage Biodiversity Workshop, Hanoi, Vietnam, 25 February – 1 March 1..

Nepal, 2000: *Case Study 6: Simen Mountain National Park, Ethiopia*. In Javier Beltrán (ed) *Indigenous and Traditional People and Protected Areas: Principles, Guidelines and Case Studies*. World Commission on Protected Areas, Best practice Area Guidelines Series, No.4 (Series Ed. Adrian Philips),IUCN – The World Conservation Unit, 2000

Niamir, Maryam 1993. *Community Forestry: Herders' Decision-Making in Natural Resources Management in Arid and Semi-arid Africa.* Food And Agriculture Organization Of The United Nations. Forests, Trees And People. Rome, 1990 (reprinted 1993).

Nthunya, E, 2002: The role of information in environmental management and governance in Lesotho. Local environment, May 2002, Vol.7, No.2, pp.135-148

Ntiamoa-Baidu, Y. (1998): Indigenous Biodiversity Conservation Strategies in Africa: Fallacy or Reality? P. 153 in Amlalo, D. S., Atsiatorme, L. D. and Fiati, C. (ed..) *Biodiversity Conservation: Traditional Knowledge and Modern Concepts.* Xviii+157pp. EPA, Accra.

Ole Ngila, Lesikar, 2002: Closing Address to Survival International meeting, British Museum, November 2nd 2002

Pergola T, 2003: *Changes in using and conserving medicinal plants in Maasai villages in Monduli district, Tanzania.* Summary paper at www.terrawatu.org/undp-gef_brief.htm

Reid, Gordon McGregor, 1994: 'The Conservation of West African Fresh and Brackish Water Fish and Fisheries'. *Aquatic Survival*, Bulletin of the Aquatic Conservation Network, Volume 3, Number 3 - September 1994. http://www.peter.unmack.net/acn/as/3/vol3no3.txt

Republic of Ghana, 1999. *Managing Ghana's Wetlands: a National Wetlands Conservation Strategy.* Ministry of Lands and Forestry. http://www.ramsar.org/wurc_policy_ghana.htm

Riedmiller, Sibylle (2003) *Private Sector Management of Marine Protected Areas: The Chumbe Island Coral Park Project in Zanzibar/Tanzania*. Environment and development in coastal regions and in small islands (UNESCO-CSI) http://www.unesco.org/csi/pub/papers2/mapp14.htm

Ringo Tenga, W, 1999: 'Legitimizing Dispossession: The Tanzanian High Court on the Eviction of Maasai Pastoralists from Mkomazi Game Reserve'. *Cultural Survival Quarterly* 22(4):60-63

Russo, L, 2000: *Ethiopia - Non-Wood Forest Products and Forest Services*. FAO Forestry. http://www.fao.org/forestry/fo/country/index.jsp?lang_id=1&geo_id=60 (06 May 2003)

Russo, L. 2001: *Botswana - Non-Wood Forest Products and Forest Services* http://www.fao.org/forestry/fo/country/index.jsp?lang_id=1&geo_id=14 (April 2003)

Russo, L. 2001a: *Ghana - Non-Wood Forest Products and Forest Services* http://www.fao.org/forestry/fo/country/index.jsp?lang_id=1&geo_id=76 Data owner: Laura Russo. Last updated, 9 March 2001.

Russo, L 2001b: *Namibia - Non-Wood Forest Products and Forest Services* http://www.fao.org/forestry/fo/country/index.jsp?geo_id=17&lang_id=1 Data owner: Laura Russo. Last updated, 19 October 2001.

Rutherford, Blair, and Eric Worby, 1999: 'Zimbabwe's Agrarian Answer: The Rhetoric of Redistribution. *Cultural Surivival Quarterly* 22(4):56-59

Rwanda, 1998: *Rapport National sur la Convention de la Diversité Biologique.* Ministere de l'Agriculture, de l'Elevage, de l'Environnement et du Developpement Rural, Kigali, January 1998

Salm, Rod, Nyawira Muthiga and Chris Muhando, 1998. *Status of coral reefs in the western Indian Ocean and evolving coral reef programmes.* Status of coral reefs of the world: 1998. http://www.aims.gov.au/pages/research/coral-bleaching/scr1998/scr-04.html

Senegal, 1997: *Rapport National Biodiversité.* Ministère de l'Environment et de la Protection de la Nature, Dakar, Decembre 1997

Saugestad, Sidsel, 1999: 'Contested Images: Indigenous Peoples in Africa'. *Indigenous Affairs* 1999(2):6-9.

Simpson, Moira, 1997: *Museums and Repatriation: an account of contested items in museum collections in the UK, with comparative material from other countries.* London: The Museums Association

Slikkerveer, L. Jan, 1993: 'Indigenous Agricultural Knowledge Systems in Kenya (East Africa): Origins, Development and Prospects'. Paper presented at the International Symposium on Indigenous Knowledge and Sustainable Development, International Institute of Rural Reconstruction, Silang, Philippines, 20-26 September 1992.

South Africa, 1998: *South African National Report to the Fourth Conference of the Parties.* Department of Environmental Affairs and Tourism, January 1998

Survival, 1998: *Peoples of the Forest.* Survival International, London

Theart, Oswald (2002). Traditional economy of the Kavango: Fishing. Series of 10 articles published in *The Namibia Economist*, 18 January –22 March 2002. http://www.economist.com.na/2002/18jan/01-18-17.htm

Titilola , T, 1994: 'IKS and sustainable agricultural development in Africa: essential linkages' *Indigenous Knowledge and Development Monitor* 2(2), September 1994

Tsey, Komla, 1997: 'Traditional medicine in contemporary Ghana: a public policy analysis' *Social Science & Medicine* 45(7):1064-74.

Tunisia, ____: *Rapport National sur la Diversité Biologique*

Uganda, 1998: *First National Report on the Conservation Biodiversity in Uganda.* January 1998

UNDP-CSOPP, 2000: *Guidelines for support to indigenous peoples II definitions.* http://www.undp.org/csopp/CSO/NewFiles/policiesip.html#Anchor-Definition-7590

UNEP 1998: 'Biodiversity resources in small island developing States' 12 February 1998. http://www.unep.ch/islands/dd98-7a5.htm

UNEP 2002, 'Earthquake risk alert for Africa's mountain regions' 6 May 2002. http://www.unep.org/Documents/Default.asp?DocumentID=248&ArticleID=3047

UNEP/CBD/COP/6/INF/19, 2002: *Report of the Southern Africa Regional Training Workshop on the Commonwealth Knowledge Network/Clearing -House Mechanism*, 4 March 2002

UNEP/CBD/COP/6/INF/35, 2002: *Report of the African regional preparatory meeting for the sixth meeting of the Conference of the Parties to the Convention on Biological Diversity, 24 March 2002*

UNEP-WCMC, 2001: *Ngorongoro Conservation Area.* World Heritage Sites, Protected Areas Programme, UNEP-WCMC. http://www.wcmc.org.uk/protected_areas/data/wh/ngorongo.html (*13 May 2003)*

WHO, 2000: *Promoting the Role of Traditional Medicine in Health Systems: A Strategy for the African Region 2001-2010*, WHO, 2000, (AFR/RC50/)

WIMSA, 2002: *Wimsa Annual Report April 2001-March 2002* http://www.san.org.za/wimsa/home.htm

WIPO, 2001: *Intellectual Property Needs and Expectations of Traditional Knowledge Holders: WIPO Report on Fact-Finding Missions on Intellectual Property and Traditional Knowledge (1998-1999).* Geneva, April 2001

Wolson, Rosemary A, 2001: "Towards TRIPS compliance: South Africa's experience and legislative reforms". Paper presented to the *Eastern and Southern Africa Multi-Stakeholder Dialogue on Trafe, Intellectual Property Rights and Biological Resources in Eastern and Southern Africa*, Organised by The International Centre for Trade and Sustainable Development (ICSTD) and the African Centre for Technology Studies (ACTS) in collaboration with the Quaker United Nations Office (QUNO), at the Aberdares Country Club, Kenya 30-31 July 2001

World Bank, 1998: *Indigenous Knowledge for Development: A framework for action.* Knowledge and Learning Centre, Africa Region, World Bank

Zhang, Xiaorui, 2000: "Traditional Medicine and Its Knowledge". Paper presented at UNCTAD Expert Meeting on *Systems and National Experiences for Protecting Traditional Knowledge, Innovations and Practices.* UNCTAD, United Nations, Palais des Nations, Geneva, 30 October 2000

Zimbabwe, ____: *Zimbabwe Biodiversity Strategy and Action Plan: Status of Biodiversity, Unmet Needs, Strategies and Actions*

Zimbabwe, 1998: *"Interim" Report On Zimbabwe's Biodiversity Strategy And Action Plan (BSAP) Project: May - December, 1997*
