RURAL DEVELOPMENT FORESTRY NETWORK

Controls and Sanctions Over the Use of Forest Products in the Kafue River Basin of Zambia

Carol Sorensen

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AUTHOR NOTE: Carol Sorensen is a research consultant and can be contacted at Horndrup skovvej 5, 8660 Skanderborg, Denmark.

INTRODUCTION

The Kafue River basin, which covers 153,000 km^2 in central Zambia, is one of the most productive wetland ecosystems in the world, supporting prolific wildlife, abundant fish stocks and one of the richest livestock economies in south-central Africa. It has been declared a Wetland of International Importance following Zambian accession to the Ramsar convention (Jeffrey 1991). The basin is made up of a seasonally flooded plain fringed by semi-deciduous savanna woodland of various types. People have favoured the ecotone at the margins of the Flats for many thousands of years: inhabiting the higher land and using it for cultivation, wet-season grazing, and hunting and gathering in the woodlands; and fishing and dry-season grazing on the floodplain itself (see Figure 1). The Tonga/Ila peoples which now occupy the area have done so since the beginning of this millenium.

The considerable variation in both time and space of grazing and water resources of the basin results in extensive movement of fish, birds, wild and domestic animals. As noted by Rennie (1980), the inhabitants of the Flats have long understood, and made use of, the interactions between these different components of the ecosystem, referring to the great floodplain as their garden (see Figure 2). In response to the unpredictable nature of the ecosystem past management was extremely flexible, but with strongly held and protected rights and obligations.
Following construction of a dam to produce hydroelectricity at the base of the Flats in the late 1970s, and a holding dam up-stream, there have been considerable changes in the extent, timing and duration of the floods, and in the areas permanently inundated. Nearly half of Zambia's foreign exchange earnings come indirectly from the Kafue Gorge power station and the value of this enterprise must be recognized. On the other hand, the consequences on the ecosystem are not yet well understood, and many local people believe that modifications to the flooding regime are leading to a disruption and degradation of the resource flows.

The objectives of the research on which this paper is based were to learn about traditional management practices of the resources of the Flats; to determine if they are still viable and functioning; and, if so, to ascertain in what ways they are being adapted to the changing socio-economic and ecological conditions of the area. The research looked

Figure 1: A Diagrammatic Cross Section of the Kafue Flats and Their Margins

Showing relief, vegetation, soils, human population and economic activity

PLATEAU		MARGINS		FLOODPLAIN	RIVER	
Vegetation	Miombo	Munga	Termit-aria	Floodplain	Lagoon	Floodplain
Soils and Drainage	Poorly drained infertile ferralsols	Well drained fertile loams (or Kalahari sands)		Badly drained infertile black cracking clays	Sands	Black Clays
Human Population	Farmers low population	Farmers high population		Unpopulated except for dry season herders	Fishermen high population	
Agriculture	Mixed maize/cattle	Mixed maize/cattle Transhumant		Dry season rangeland Pastoralism		Herding
Access to water	Poor	Good		Fair	Good	

into all aspects of natural resource management on the Flats including crop cultivation, livestock husbandry, fishing, hunting and the gathering of forest products. In this paper, attention is given to the patterns of useage of products gathered from the savanna woodlands surrounding the flood-plain.

Information was gained by way of a series of semi-structured interviews and meetings with householders, women's groups and local leaders as well as government officials. Individuals interviewed usually called in assistance from knowledgable neighbours or family members, so interviews often became a forum of men and women with variations in age, social position, education and expertise.

Having gained information on use of different forest products, our investigations led us on to three other important aspects of resource management

in the area. Firstly, the ways in which patterns of useage are determined by tenure relations. Secondly, people's perceptions of the resource, particularly in relation to the changing ecological status of the Flats, the changing availability of different products and the knowledge base in the community. And thirdly, the cultural foundations behind the systems of management. The purpose of this paper is to describe these links between actual use and the system of control and sanctions.

RIGHTS TO GATHER AND MANAGEMENT OF INDIGENOUS PLANTS

Woodland products are central to the livelihood of the people of the Flats and are subject to various traditional laws. These regulations vary slightly from place to place, dependent on the needs that the tree or plant fulfils in the local economy, on the scarcity value attributed to the plant or product, and the degree of respect given to the traditional control systems.

No fruit trees may be felled without permission of the Owner of the Land[1], nor may certain other trees considered beneficial to the soil or welfare of the people. If permission to fell the trees is given a tribute may be paid to the ancestors of the land. If customarily protected trees are planted or deliberately nurtured they are still under the custody of the Owner of the Land whose permission must be sought in felling. Permission to fell a tree is given if the tree is too old to bear fruit or for a specific use. For example, permission to fell **munga** (*Faidherbia albida*) will only be granted for the production of a dug-out canoe and then only if there are other trees in the field to take its place. As will be explained in a following section, all plants found in a **Malende** (shrine) anywhere in the area are totally exempted from use.

Fruit, bark, leaves and roots or other tree produce are free and may be used freely by anyone as long as the tree is not in a homestead and so long as it does not involve destruction of the tree. Similarly, gathering of non-woody plants, roots, greens and fungi is free except in the vicinity of a homestead, where wild plants are considered the property of the home, or in planted fields, where the plants belong to the cultivator.

The produce of a tree has no commercial value until marketed or converted into a marketable object. Even a valuable canoe will only cost the maker an offering to the ancestors of the Owner in propitiation for its use. This varies from 10 to 100 kwacha and has no bearing on the commercial value of the canoe or on the granting of permission to fell. This gives an indication of the complexity of the inter-linkages between the formal (cash) and informal (subsistence)

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[1] All land is controlled by clan leaders, named after the original owner and inherited through the female bloodline by a person chosen from a pool of contenders. These clan leaders are referred to here as `Owners of the Land'. The land has boundaries marked by swamps, rivers or hills and the extent of these lands is commonly known and respected. Land was formerly bought with livestock, or acquired by raiding in which case it had to be protected. As the land was sparsely populated the Owner of the Land was willing to allocate areas for use of other families or clans. These areas, known as **Katongo**, are used and managed exclusively by the holders of the katongo in perpetuity, being inherited in the same way as above. Land buying ceased in this area around 1910 when the British administration came into effect. However, as in many other parts of south-central Africa, there is in existence today a dual legislative context, inasmuch as the Owners of the Land still make all the effective decisions about allocation, while the modern Chiefs authorize such decisions on behalf of the state.

economies surrounding the procurement and distribution of woodland products.

All firewood is free and may be collected by anyone anywhere, except from near homesteads. Firewood must be used for household purposes only: charcoal production, sale of firewood, use of firewood for brewing of beer for sale or burning of bricks for sale, are all prohibited by traditional law, unless the wood used is from trees felled in the process of clearing land for crop cultivation. There are different categories of firewood, which are collected for various burning properties. Firewood collected daily is usually from dead branches and the choice is likely to be conditioned more by accessibility than preferred quality. Firewood collected and stored for rain-season use will on the other hand be of preferred species, and may be felled and left to dry.

Many trees are kept in farmers' fields. The reasons for this are not obvious as the trees present the farmer with many problems - competing with the crop for light, nutrients and water, getting in the way of ploughing and providing shelter for crop predators such as birds and monkeys. Their value lies not in timber but in their various other uses: from the obvious and immediate utility value of fruit trees to the long term soil amelioration value of some other trees.

Some trees provide an open canopy in the farmed parkland, where they are a component of an indigenous agroforestry system (Pullan 1975). This system is practised wherever suitable ecological conditions are found. This is especially in the natural **munga** woodland areas, and appears to be spreading, also being found in the miombo woodland areas. The trees most commonly found in the farmers' fields are: *Faidherbia albida* (**munga**), *Ficus* species (**mukuyu**), *Adansonia digitata* (**mubuyu**), *Kigelia africana* (**musunguni** or **namuntengwa**), *Parinari curatellifolia* (**mubola**). Some trees are recognised for their ability to increase soil fertility by attracting cattle into the field to manure the land.

The most important tree component in this agroforestry system is the **munga** tree (*Faidherbia albida*) which is seen to provide soil fertility: the small nutrient rich leaves are shed when the first agriculturally significant rains fall providing soil fertility without competing with the crop for light, water or nutrients. Research in the area indicates that **munga** may be incompatible on fertile land with hybrid maize cultivation in that vegetative growth in hybrids may be encouraged at the expense of cob production (Olsen 1992). The **munga** pods, which drop throughout the final period of the dry season, are a valued cattle feed supplement to grazing which in this period lacks nutrients (Honérou 1980). As in many other areas of savanna Africa, *Faidherbia albida* is a dominant feature of the landscape.

Uncultivated plants provide a range of goods and services, and although vegetation is complex and variable, the pressure put on the resources by human activity and management is equally adaptable. This again is reflected in the use to which people put the vegetation that they find. For example, the recent increase in the areas under crop cultivation have led to a greater pressure put on uncultivated plants by cattle, leading to competition between humans and cattle for favoured greens, leading to the use of new or untraditional greens for human consumption. Most trees are multipurpose, thus the felling of a tree for one purpose means forgoing the other uses of the tree.

The most evident use of the uncultivated resource is as food. Leaves from many forbes and trees, roots, tubers, flowers, fungi, seeds and fruit kernels are all part of the daily cooked meals of the households. Their use as `snacks' is also crucial, often being the only food a herdsboy, or school child, a labourer or a traveller may have at midday. Wild foods may be eaten raw, dried, cooked

or pounded, eaten alone or mixed with other foods. Salt may be extracted from leaves, while good quality oil is extracted from some seed kernels. Some foods need special preparation before they are edible and others are used as substitutes for cultivated plants when these have not survived drought or insect attack.

Although undocumented and unquantified, some of these wild foods are also very important items of trade, both within the local community and to other parts of Zambia. Dried fungi and leaves as well as fresh seasonal fruit are to be found in all local urban markets. For instance, **Munkoyo** roots (*Rhychosia* & *Eriosema* spp) are to be found in markets throughout Zambia throughout the year. It is an essential ingredient of a maize based beverage which is prevalent in the diet of women and children in the region. Trade in wild foodstuffs is conducted by women and is a very important source of income to them.

PERCEPTIONS OF THE RESOURCE

The perception that valuable trees are under the control of the Owner of the Land does not appear to hamper tree protection, probably because the restrictions on the use are in harmony with the perceived needs of the inhabitants of the area: people may use the fruits, bark, leaves and roots of these trees as long as the tree is not killed. The tree is protected by controls which do not need to be individually enforced or policed and the tree is available over time for use by anyone in the community. This means that if a person has land not ecologically suited to a certain tree, that person does not have to forgo the rights to use the product, as it will be found in a suitable habitat on someone else's land, and will be legally available for use by any person needing it.

There is a perception of vegetation change over the whole area and the species composition is seen to be changing. Many people attribute this to the construction of the dam. Areas where there were no trees are experiencing tree growth, grass species favoured by cattle are disappearing, thorny scrub is invading both crop and grazing land, and recently formed lagoons have no water vegetation allowing large waves to build up which have capsized canoes, drowning fishermen. In other places palm trees are dying of drought. Fruits of fig are considered to be no longer sweet and **mubola** (*Parinari curatellifolia*) trees which fruited anually before only fruit every three years now, with thin fleshed fruit.

The non-cultivated resource is diminishing and women now compete with cattle for greens as there is less bush and more crops on the land. Greens are seen to be more important than ever, species being eaten now that were never traditionally included in the Ila/Tonga diet. The reason for this is given in the diminishing fish resource and the competition for favoured greens with cattle. Cattle are unable to make good use of the Flats due to the changed vegetation and to cattle rustling, and therefore are forced to graze around the homesteads even in the dry season. This leads to increased grazing pressure. The situation is compounded by the lack of capital investment opportunities other than cattle. Most wage or cash crop earnings are therefore invested in cattle.

Although it was said of the uncultivated plants by the wives of a polygynous household - "If they finish, so do we!" - there is a perception amongst women that their knowledge in no way equals their mothers' knowledge. This was most clearly expressed in a forum of women from chief Choongo's area during a seminar on uses of plants in the household. Although the knowledge

held by the assembly appeared to be extensive, the women knew that valuable information has been lost forever with the death of the old women. Whether this loss is due to the observed recent scarcity of certain plants or the changed concepts of needs was not determined.

There is a perception that previously people lived to a great old age and were very healthy and strong. This is seen to be because people ate great quantities of food, especially fish and fruit; as Chief Choongo said - "Depending heavily on fruit was not seen as a hardship" . In some areas on the plateau people have rejected their traditional values and no longer eat indigenous fruits and vegetables. However, this does not seem to be the case in the Flats area, rather the lack of fruit in the diet is seen to be because fruit are unavailable due to the degeneration of the environment.

CONSERVATION STRATEGIES

Scarcity of resources has led in some areas to new conservation regulations being introduced and enforced. These in no way appear to interfere with the local needs but have the effect of preventing outsiders from exploiting the trees. This occurred in two areas where interviews were conducted, both in relation to the *Hyphaena ventricosa* (**mankomone**) tree of which the leaf fibres are used for basket making. In Maala there are good stands of **mankomone** but outsiders came and instead of climbing the tree to harvest leaves they felled the tree. Now outsiders need permission from the Owner of the Land to harvest leaves, and if permission is given the headman of the area in which the trees are must be informed. In Kantengwa from 1980 to 1983 foreigners from Tanzania came for **mankomone** fibres, causing considerable damage to the trees. When the Owners of the Land realised this, the foreigners were refused rights to the leaves. Even though there are no longer any foreigners in Kantengwa, permission has to be obtained from the Owner of the Land to collect leaves, but when permission is given the leaves are free.

Hunting for the cooking pot is practised in the woodlands sourrounding the flats and very often thickets along the river banks are protected cover for game. One old man known to the author, although living in a comparatively highly populated area, is a keen hunter. He maintains areas of wilderness within his holding as habitat for game. Near the homestead thorny branches are spread out over uncleared land for guinea fowl to nest, providing protection from dogs and birds of prey. Although there is no means of checking his assertion, he claims to maintain the `carrying capacity' of wilderness areas on his farm, culling the excess.

Domestication of some game, such as spur-winged geese (*Plectoropterus gambensis*), Egyptian geese (*Alopochen aegyptiacus*), Guinea fowl (*Numida meliagris*) and duiker (*Sylvicapra grimmia*) has been successfully attempted and is seen as one way of protecting game animals. However, as game laws now stand, these practices are illegal and are thus inappropriate to the villagers' options.

As has been described, trees and some non-woody plants are protected in fields. It was found that in areas where the uncultivated plants are in demand by both cattle and many people, some women were planting wild plants in habitats similar to where they were collected, and protecting them, saving the seeds from the most productive plants and distributing these to other interested women. This was recorded in some plateau areas where seeds of *Hibiscus* sp. used for flavouring fish and meat, were collected and sown in suitable areas, giving over time very productive specimens. Some species used as leaf vegetables grow as weeds in crops (**hahipa**, *Bidens*

shimperii; **cikway**, *Commelia benghalense*; **bbondwe**, *Amaranthus hybridus*) and the best plants are selected during weeding. The **lusala** root (*Diascorea* sp.) is becoming difficult to find in some areas and women on the plateau are known to plant the root in a favourable place near the house providing support for the vines. Another example of planting is **namunungwa** (*Cissus quadrangularis*), which is used for preventative and curative veterinary treatment and for providing shelter for small game. It is propagated by planting and watering a stem section.

In the area of the Flats, it seems that difficult access to needed plants will set a value on them making it worth while growing them. These early stages of plant domestication in the area remain undocumented and merit research, especially as it is claimed that the plants become more productive when cultivated. As suggested elsewhere by Falconer (198x), one of the best ways of determining which of the many non-timber forest products in an area to work with, is to identify those plants which are receiving increased protection due to their increasing scarcity.

CONTROLS AND SANCTIONS

Generally, in order to effect regulation of resource use, there must be an institution surmounting political, ethnic and economic divisions, which is able to endorse commonly respected, enforceable sanctions. In the research area it is the clan which provides the accepted parameters for social behaviour as well as controlling resource use in terms of land distribution and conservation regulations regarding tree, fish and game resources. The source of such control is found in what have been termed `territorial cults' (Schoffeleers 1978, Binsbergen 1981), called **malende**, which are the cultural foundation behind the systems of management. Mutinta describes their philosophy in the following way:

> "It was believed that outward signs of disorder in the order of nature reflected disorder within the living society of the lands. If severe signs of interrupted order were found, such as prolonged drought, hunger, disease, or blight, a cause had to be found in society, the cause righted, cleansed or destroyed."

Social disorder might be classified in the following way:

1. Disobedience of clan laws regarding resource use, such as the felling of protected trees without permission, fishing out of season and so on.

2. Failure to honour customs and rituals such as failure to cleanse the area where suicide has been committed or when a girl commences her first menstruation in bed.

3. Manifestation of disorder (ie. physical abnormality) such as deformity in a new born child or a child cutting its upper incisors before the lower.

4. Social misdeeds such as murder, incest or adultery.

These things might be reflected in `natural' disorder. In severe drought, epidemics etc, the clan would search its land for signs of disruption until the cause of the misfortune was agreed upon and atonement made. In some cases sacrifice is required. Smith and Dale (1920) refer to `weregild' of 10-20 cattle being paid in fines for murder.

> "This idea of social causation of environmental ills was said to constitute an essential element in the ecological philosophies of African societies...What are the fundamentals of this African philosophy of the earth? What constrains entire communities to accept it and let their activities be directed? What institutional patterns are found?" (Schoffeleers, 1978)

It was outside the scope of field work to investigate Schoffeleers questions in depth, and the following is correspondingly a brief illustration of the philosophy behind the various shrines of the Flats. There is a concept of power in all natural things and which might be recognised as **Leza**, who is not always mentioned by name, but by praise names such as **Namakungwe** meaning `who owns all things' or **Mutalabala** meaning `protector from adversity'. The word **Leza** is often used for rain: "**Leza** has come" means "the rains have come". **Mamakungwe**, or other expressions of power, cannot be directly contacted, but may be approached through an individual's ancestors, or through a medium, to affect a goal. A diagrammatic example of how beings and forces are related is shown below.

	BEINGS	FORCES
OBSERVABLE	human	earth
NON-OBSERVABLE	spirit	rain

Influencing this relationship between the observable and non-observable world in a beneficial manner may be achieved in a variety of ways usually at what might be termed shrines. Although there are often no material structures involved, there are many forms of shrine: miniture huts, the doorway of a house, tree planted graves, individual trees and areas of protected landscape. Characteristic rights are performed at the relevant shrine and these, the function and distribution of which overlap, cover the needs of the individual, the household, the village and the clan or world at large.

It is this last shrine type, called **malende**, which covers the needs and regulations of the clan and the world at large, that are most relevant to envrionmental management.

Malende, the territorial cult shrine, belongs to the clan, although membership is a consequence of residence rather than kinship. The shrine may be some trees, a river, a valley, a hill; sometimes with phenomena, such as hot springs, and/or have once been the home of a prophet, or a place where supernatural occurrence has taken place. In any clan lands there may be several **malende**, but there is always a main shrine. These interlocking cult shrines provide the necessary basis for wide ecological cooperation (Schoffeleers, 1978) and were found throughout the research area and are reported by local people to cover an extensive area beyond national boundaries. They are referred to as rain shrines by researchers including Colson (1951), Scudder (1962) and Smith and Dale (1920) who, although recognizing the political significance of the shrine, do not fully explore their ecological significance.

Malende is however not only a shrine to rain, or the forces of nature, but also the home of the ancestral spirits of the clan. Nor is **malende** only an ancestral cult shrine, as the forces of nature affect territories rather than individuals. The dual nature of **malende** is described by Headman Shakopa and Mamanganza from Bwanamwaze in the following way:

> "**Malende** is for all the people of an area. **Malende** is for the spirits of the people and is also a rain shrine".

Returning the clan's spirits to **malende** is also considered vital to the well-being of the people and it is still considered very important for the Tonga-Ila to be buried at home. The following description was given by a group of women in Mbeza:

> Spirits of the dead are returned to their ancestors at a ceremony at burial. The body is buried, usually at home. The crowd will rush from the grave to the malende. They will not look behind them as they will see the ghost of the deceased immediately behind them. At the malende they will break branches off the bushes and trees to indicate to the ancestors that they are taking a part of the ancestor's and substituting it for part of the living people. They then turn and run as fast as possible, not looking back, to the grave and they beat the grave with the branches from the malende. Now only the body remains, the spirit is with the ancestors and the ghost will not trouble them.

Malende is totally protected: it may not be burned, but it may be grazed or browsed. Water from **malende** may be used for watering cattle, but not for fishing, watering gardens, moulding bricks, or any economic activity. There is no organised or hierarchical priesthood. The spirit of **malende** chooses the successor of the original prophet, not from the matrikin of the deceased, but from within the clan, and possesses that person who then assumes the spiritual leadership of the clan. This process may take time and is never instigated by the community.

Rain rites are performed anually at **malende**. Mutinta and Munakampe describe the rites in case of drought:

> "If there is seen to be disorder in the land, that is delayed rain or drought within the growing season, the people go to the Owners of the Lands asking for assistance. The spiritual leader will inform them of the day of ceremony, or may, at any time become possessed. Everyone in the community should take part in the rituals and taking water with them in calabashes, they gather at the **malende** and sit on the ground. They clap their hands, sing and praise God and remember their ancestors. The spiritual leader takes water from a gourd into the mouth and sprays it forcefully out in praise, a black animal is slaughtered. If there is a spirit house the blood is collected in a gourd, and that and some beer and some roasted maize is left in the house. The unsalted meat is roasted on a fire, never boiled in a pot. All is eaten at the **malende**. Nothing is taken home, blood, feathers, bones etc are left at the place. At a given time all the people leave, not looking back, and as they reach home, rains fall."

Objects used in ceremonies, such as calabashes containing water and beer, or the optional spirit hut, have no spiritual significance. There is no belief in the power of any given object, nor are there any objects specifically used in ritual. Rather the shrine is a protected part of the landscape in which people have their everyday activities.

These `wild' places represent forces on which people are dependent for their livelihood, and through their ancestral spirits, who on death are returned to **malende**, people hope to influence the forces to benefit them; or at least to prevent these forces from doing them harm. Of wild places, Binsbergen (1981) says:

> "They tend to represent the hidden forces on which man draws for his survival...These natural objects are outside the cycle of ecological transformations and do not serve any direct utilitarian purpose for those people concerned."

Binsbergen (1981) suggests that territorial cults are a claim on the part of the community of autonomy as a social and political unit. This confirms findings from the Flats, where the authority of the clan was stressed. The Chila, the great annual clan hunt in which the whole community, whether clan members or not, took part, is also a territorial clan activity. Chief Coongo says that:

> "Chila was made illegal in 1955 but carried on because of culture until 1972."

The political significance of the hunt is in formally linking clan territories. **Mulombo**, the ritual payment to the Owners of the Land in compensation for the use of a protected resource, is associated with **malende**. This is not a fine but a propitiation.

The most famous territorial activity in the area is the Shimunenga held in Maala in honour of the prophet Shimunenga. This is an annual two day festival, attended by many hundreds of people, involving rain rites, a women's day, dance and song, the recitation of the story of Shimunenga, a mock leopard hunt, and finally the driving of the community's herds of cattle onto the floodplain.

Rain induction is practised annually to this day in most places, however all traditional leaders say that the Christian church has destroyed the efficiency of rain making, blaming the people's lack of faith in the ceremonies. The Seventh Day Adventist (SDA) church in particular proclaims the wickedness of the old religion, preaching against indigenous funeral and rain calling rituals. In Kantengwa the SDA have succeeded in destroying **malende** by felling trees and ploughing the earth. It is hard for traditional religions to compete with world religions which are supported both financially and with personnel from outside. However, in Kantengwa traditional leaders retained enough authority to alter and enforce regulations on the harvesting of palm fibres when this resource was threatened by outside exploitation.

Previously punishments in the form of fines, bondage into slavery or, in extreme cases, death, were imposed on those who disregarded resource use regulations, and these age old systems were seen to conserve resources. In recent times moral, physical and social degradation are perceived by traditional leaders to afflict the people. This is seen to be caused by the removal of responsibility for resources from the people, who are also seen to be losing their political autonomy. However, it seems that most traditional regulations regarding the use of trees are respected, as are fishing regulations, despite the local people losing both their title to game and their national political integrity. As rainfall is unreliable, and at the same time the basis of production, regulations prescribed by the clans may be honoured in order to avert disaster, or they may be recognised for the wisdom they contain.

IMPLICATIONS FOR FUTURE MANAGEMENT

These findings suggest that in the subsistence economy of the Flats the utilization and regulation of natural resources is linked in a fundamental way to political and religious organisation. Asking people about the actual use of plant and animal products naturally led on to discussions on social organisation which appears difficult to deduce from other, more direct angles. There is a perception of being part of a larger universe, and social action is seen as being responsible for ecological order or disorder. This perception of social responsibility for regulation and conservation of natural resources for sustainable use by society is a philosophy being relearned by the industrialized world (Scfoffeleers 1978), while the strategy laid down by the IUCN in 1990 (Maltby 1988), that ecosystems are not inherited from our ancestors, but borrowed from our descendants, is a concept that is inherent in the consciousness of the people of the Flats.

Conservation innovations become vital when management founded on a cultural basis is confronted by new socio-economic and ecological conditions. The long lasting influence of the colonial alienation of land in the region, and the extraneous control over certain resources (such as water, game and fish) have damaged the autonomy of the autocthonal communities; while world religion, by negating the cultural basis of management, is undermining resource conservation.

Although local communities still control land use, this has to be achieved within a dual legislative context the terms of which are not entirely under their control. For example, certain trees are protected for sustainable use by the whole community, but resource control by outsiders, in this case the use of water for hydroelectric production, detroys the trees through drought caused by water regulation. Grazing and fire management have been crontrolled by local leaders for over 1000 years, with the Kafue Flats becoming one of the most productive grasslands of the world. Again control of the management systems is as powerfull as ever, but outside control of one resource, water, has begun to damage grazing lands.

Where such massive outside influences have not been involved, traditional systems are able to quickly and efficiently respond to threats to the resource. It appeared from interviews that the more marginal the area, the stronger was the management. This supports the view put forward by Chambers (1983), who suggests that strongly maintained traditions are predominant in marginal areas. However, areas where influences came violently from outside seem to have lost much of the traditional knowledge, such as the eastern part of the Flats where people and their livestock were re-located with construction of the dam.

Nonetheless, the indigenous political systems have generally proved resilient and have been able to assimilate foreign control of the country without losing their power in the local community. The foundations of resource management and their adaptation to change through time merits further research. In particular, aspects of territiorial management should also be explored as a basis for future management of the Flats, involving mapping the clan lands and Malende and relating these to each other. There is also probably an interrelationship between these and traditional watering and grazing areas, as well as trekking routes.

It is clear that the inhabitants of the Flats have access to funds of indigenous knowledge held by various experts and that these holders of knowledge vary in age and status. Neither medicinal, veterinary or any other of the many uses of plants, animals or minierals has been systematically

recorded or analysed amongst people of the Flats. The knowledge held by these people is considerable and research into the uses to which these resources are put should be undertaken as soon as possible.

The expertise that specialists have is respected, and compensated for; for instance, a weir owner may give fish to neighbours, the payment being in time spent cultivating the fields belonging to the weir owner, who has had to forgo crop cultivation to attend to the fish traps. Generally old people hold the knowledge of land distribution and therefore the history of the people and their culture. It is usually the old (and this may be their most important function) who speculate on the reasoning behind regulations and customs,; these things are not held secret and are available to those who are interested.

Useful knowledge of indicators of weather and soil fertility and of planting and harvesting times is kept alive. And there is also knowledge of the type that has no apparent utilitarian value, but shows the need to record and interpret information for its own sake; an example is in the naming of a creeper which is only found on the tallest trees as `that which tries to reach the sun'. However, field work revealed that there is much indigenous technical knowledge which is threatened with obscurity; such as the preparation and tanning of skins, the extraction of oil from seeds, the making of perfumes and soaps, and the compatibility bertween certain cultivated and wild plants. Esoteric abilities, such as to heal over distance or to call rain, are also disappearing.

On the other hand, there are clear examples of people using this store of knowledge to adapt to the changing ecological conditions of the area. This is most evident in the attempts to domesticate wild plants and animals as their scarcity value increases. It is the capacity for change, reliant on the common access to information, which is the strength of the traditional system.

* indicates fruit or vegetables which are dried and stored
m indicates fruit or vegetables observed marketed

Botanical name ChiTonga name	**m/***	**Habitat**	**When used**	**Part used**	**How used (and other uses)**
Ameranthus hybridus Bbondwe/Bonko	m	around homes	rains	leaf	Vegetable relish
Bidens schiperii Hahipa/Kampumbu	*	weed in field	Dec-March	leaf	Vegetable relish
Cleome gynandra Chiyuniyuni	*	around craal	Dec-Jan	leaf	Vegetable relish (med: genital pain relief)
Cleome hirta Kabanjebanje				leaf	Vegetable relish
Cochorus olitorius Bbuyu				leaf	Vegetable relish
Commelina benghalense Cikway		Field weed		leaf	Vegetable relish
Cyperus papyrus Matebe		river edge	all year	root	Dried and pounded nsima flour (roots used for fuel)
Discorea hirtiflora Lusala	m	sandy thicket	April Dec	root	Relish with groundnuts or as potatoes (juice stimulates lactation)
Fungii Bowa	* m	termite & bush	Dec-March	fruit	Relish
Hibiscus meeusei Hukukwe	*	fields and bush	rains	leaf	Flavouring to fish & meat (used as hair rinse)

* indicates fruit or vegetables which are dried and stored
m indicates fruit or vegetables observed marketed

Botanical name ChiTonga name	**m/***	**Habitat**	**When used**	**Part used**	**How used (and other uses)**
Nymphea cearulea Impana		ponds & lagoons	all year	root	Dried & pounded nsima flour
Nymphea lotus Hikusu	*	flooded areas		root seed	Roots used for porridge and seeds for nsima
Sesamum calycinum Hankilomoka		sandy bush		leaf	Traditional Tonga vegetable
Sesamum sesamoides Hazyeembe	*	grazed & arable	after May	leaf	Traditional Tonga vegetable (used as hair rinse)
Sorghum verticillifolia Muswenge	*	river edge		seed	Pounded nsima flour. (stems: fuel or building)

Appendix 2: Names and Uses of Some Indigenous Fruit Trees

* indicates fruit or vegetables which are dried and stored
m indicates fruit or vegetables observed marketed

Botanical Name ChiTonga Name	***/ m**	**Time of Fruiting**	**Uses of Fruit**	**Other uses of the Tree**
Adansonia digitata Mubuyu	* m	April-Oct	snack or added to milk	Leaves: traditional vegetable. Bark: fibres and baby bath
Amblygonocarpus andogensis Muyu	*		nuts are eaten	Bark: fish poison and anticide. Seeds: dance rattles, fruits, fodder
Azanza garckeana Muneko	*	Aug-	snack	
Berchemia discolor Muzinzila		Feb-March	snack	Bark: purple dye
Borassus aethiopum Mahuma	* m	Oct-	snack/ boiled with maize	Leaf spines: baskets, brooms, fish traps. Leaves: mats
Diospyros kirkii Muchenje	* m	July-Oct	snack	
Diospyros mesipiliformis Muchenje	m	April-Sept	snack	Indicates accessible ground water
Dombeyo rotundifolia Mutubo		Nov-	snack	
Ficus sycamorus Mukuyu	*	Sept-March	snack, or famine food	Canoes, fodder, shade
Hyphaene ventricosa Mankomone	* m	Sept-Dec	snack or porridge	Leaves: baskets, palm wine, edible shoot. Timber: insect proof

Appendix 2: Names and Uses of Some Indigenous Fruit Trees

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Botanical Name ChiTonga Name	***/ m**	**Time of Fruiting**	**Uses of Fruit**	**Other uses of the Tree**
Lannea species Mubumbu		Oct-	snack	
Mimusops zeyheri Muchenje	m	March-June	snack	
Parinari curatellifolia Mubola	*	May-Nov	fruit and seeds as snack. Pulp dried and stored	Shade in fields. Seeds: dried and used as ground nut substitute in meals.
Piliostygma thonningii Musekese		May-Sept	snack	Bark: fibres and red/browm dye. Maintains soil fertility. Fuelwood. Leaves and fruit: fodder.
Popovia obovata Muchinga		March-August	snack	
Pseudolachnostylis maprouneifolia Mukunku		June-Oct	snack	Fuelwood. Medicinal cure for worms.
Ricinodendron rautanenii Mulalaba	*	April-Sept	Oil extracted from seed kernels	
Sclerocarya caffra Muongo		March-June	snack	Canoes
Strychnos cocculoides Mawi		Dec-	snack	Leaves: cure for eye infections in cattle

Appendix 2: Names and Uses of Some Indigenous Fruit Trees

* indicates fruit or vegetables which are dried and stored
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Botanical Name ChiTonga Name	***/ m**	**Time of Fruiting**	**Uses of Fruit**	**Other uses of the Tree**
Strychnos species Muawa & Maabo	m	Nov-Jan	snack	
Uapaca kirkiana Musuku	m	Sept-Nov	snack	
Vanueria tomentosa Mububu			snack or cooked	
Vangueriopsis lanciflora Mahumo	*	June-	snack, dried fruit pulp, porridge, wine, spirits	Shade tree
Ximenia americana Mungomba		Sept-Jan	snack, wine	

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