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## Traditional woodland management techniques of African pastoralists

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*Over thousands of years, pastoralists in arid and semi-arid Africa have developed a set of principles and strategies that have enabled them to meet their physical and social needs in a harsh and variable environment. Under conditions of relatively low population density-pastoralist societies are generally characterized by very low fertility rates and high infant mortality-these strategies also resulted in the sustained management of key natural resources, particularly range and woodlands. Recently, however, rapid population growth and an associated series of external pressures including crop expansion into rangelands, nationalization of land by governments, forced sedentarization, expanding urban and rural demand for fuelwood, and indiscriminate water development, have combined to upset the delicate balance between the herders and their fragile environment.*

### **[THE IMPORTANCE OF TREES has always been recognized by African pastoralists](#)**

This article is based on a literature survey commissioned by the community forestry unit of the Food and Agriculture Organization of the United Nations (FAO), to collect details on traditional African natural resource management by arid-zone pastoralists, and to evaluate the survival of traditional techniques and their potential for the development process in Africa. The study concentrates on four aspects: the descriptive knowledge of the physical environment (e.g. names of plants and soil types); daily natural resource management techniques (e.g. which tree or pasture to use, when and why); the social controls and organization of daily management (e.g. communal grazing controls); and the sociopolitical structure of resource management (e.g. resource tenure issues). This article covers only daily woodland management techniques and woodland/forest reserves. Copies of the full report, *Herders' decision-making in natural resources management in arid and semi-arid Africa* can be obtained from the Community Forestry Officer, Forest Policy and Institutions Service, FAO, Via delle Terme di Caracalla, Rome, Italy.

It is increasingly apparent that, under present conditions, many of the traditional pastoralist techniques no longer enable herders to meet their needs, and are contributing to pasture and woodland degradation. With the adaptability that has always characterized herders, many pastoralists are changing their ways, diversifying into crop cultivation, engaging in commerce and trade, or moving to urban or semi-urban locations. In the process, many of the traditional techniques and systems of management are being partially or totally abandoned but others could still be adapted or modified to make them of value today.

In the following sections, several types of traditional woodland management techniques are described, including mobility and pasture rotation strategies; harvest, regeneration and protection of trees and shrubs; grazing and forest reserves; sacred groves; and traditional social controls. In all cases, the intent is to identify methodologies with potential applications under contemporary conditions.

## Grazing strategies

Although the quantity and quality of water, forage and browse, and how they meet the needs of their animals are of paramount concern to pastoralists, other factors also determine their movement patterns. These include the location of salt licks; soil conditions; other environmental factors such as dew and the presence of wildlife; avoiding pests and diseased areas; avoiding damage to crops; being close to markets; labour availability; cultural gatherings; territorial boundaries; and social relations with neighbours (especially alliances and enmities). These factors introduce a high degree of flexibility into the movements of the pastoralist, which is often erroneously interpreted by development workers and governments as inconsistency and irrationality.

In fact, the strategy of mobility is one of the most adapted and deliberate means of obtaining livestock needs in an ever changing environment. It is not chaotic but regulated by socio-political controls, cooperation among individual herding units, and technical know-how. It necessitates large land areas which most groups obtain by a combination of territorial rights and alliances with neighbours. Herders from the same social unit are free to use any part of their territory, but in practice people confine themselves to the area they know best, and prefer to stay with the same group of people, especially relatives. This usually ensures continuity and consistency in land use by the same managers.

Some rotation and deferment techniques are designed to save forage and browse for critical periods. For example, the Zaghawa of Chad move their sheep and camels north to Saharan pastures in separate parallel paths, leaving a portion of the land ungrazed for their way back south (Tubiana and Tubiana, 1977). The Masai of Kenya widen the grazing radius and delay going into the dry-season area by using donkeys to transport water (Jacobs, 1980). In Kenya's Amboseli National Park, the implementation of a similar strategy increased the total carrying capacity by 50 percent (Western, 1982).

In some ecological zones, rotation strategies based on deliberate overgrazing are used to increase woodland carrying capacity. For example, the Fulani of northern Sierra Leone practice "shifting pasturage": they graze one area for two to three years and then move elsewhere, allowing the first area to "rest" for 15-20 years (Allen, 1965). The Sukuma (south of Lake Victoria) use a similar technique but allow a rest period of 30-50 years (Brandstrom, Hultin and Lindstrom, 1979). However, not all ecological zones can withstand strong grazing pressure.

Overall, the information on traditional rotation strategies is very limited, perhaps because very few natural resource experts have been involved in studying traditional systems. Any particular type of traditional rotation strategy is an indicator of the ecological requirements of local woodlands, and can help scientists develop new strategies. Where the condition of natural resources has been substantially altered, or where population density has increased significantly, traditional rotation strategies will probably have to be modified to fit the needs of the environment and the people.

Pastoralists are faced with many constraints. One of these is nationalized rangelands. In areas where this has taken place, there is effectively a "free for all" situation-legally "open access" land-with no restraints on crop expansion or abuse by herders, whether resident or non-resident. Some form of local collective land tenure (based on current patterns of cooperation, or on reviving and modifying traditional ones) is a prerequisite to woodland

development. However, local land tenure cannot by itself bring about the resumption of traditional range management practices. Other constraints, especially those resulting in a decrease in grazing cooperation and social controls—the abolition of traditional political authority, urbanization and commercialization, and the widening income gap—are also important.

## Management of trees and shrubs

Existing knowledge regarding the trees and shrubs used by pastoralists is much greater than our understanding of how these are managed, i.e. how, when, and to what degree they are harvested, regenerated and protected. Conventional knowledge has it that pastoralists are either careless or deliberately destroy trees and shrubs, but the results of a number of recent and not so recent studies give evidence to the contrary.

*Harvesting.* Woody species are used by pastoralists for browse, fuelwood, house construction, corrals and fences, food, medicine and shade, etc. Most groups tend to harvest in such a way as to avoid destroying the plants; some groups go further by utilizing techniques that enhance productivity. For example, the people of northern Burkina Faso increase the productivity of *Faidherbia albida* (formerly termed *Acacia albida*) in their fields by periodic pruning (Marchal, 1983). Carelessness or even deliberate misuse of trees and shrubs seem to occur more frequently by individuals away from their traditional "home" territory. For example, in central Mali, the transhumant Fulani and Moors do more damage to trees than the more settled Fulani herders hired by Bambara farmers (C. Toulmin, IIED, personal communication, 1988). In this respect, the abolition of traditional land tenure has probably contributed a great deal to the abuse of trees and shrubs.

A few groups have formal or informal rules that regulate the harvesting of trees and shrubs. The Pokot and Turkana of Kenya are selective in how they coppice trees. Valuable trees are rarely cut down, and only less useful bushes are cut back in order to make fences and to reduce bush encroachment on rangelands (Barrow, 1988). The Lahawin of the eastern Sudan traditionally use special sticks to shake down leaves for fodder, rather than cutting down branches; recently, however, outsiders and merchants have been observed cutting branches and even whole trees (Morton, 1988). After coppicing *Parinari curatellifolia*, the Mbeere of Kenya leave it to rest for a season or two to regenerate (Brokensha and Riley, 1980). The Dina Land Use Code, set up in the nineteenth century by the ruler of the Macina Fulani in Mali, had provisions for controlling the unauthorized coppicing of trees (Riesman, 1984).

The manner in which pastoralists harvest wood for construction appears to be more damaging to the plants than the way wood is harvested for fodder or fuelwood. Harvesting trees and shrubs for construction wood for houses and fences usually entails cutting down live trees. But in the case of fuelwood, when not faced with shortages, pastoralists prefer to collect dry and dead wood.

Among the southern Turkana fuelwood use has been estimated at 1.14 kg/caput/day, and fuelwood entirely consists of dead wood. Live-wood utilization to construct houses and corrals (every time the Turkana move to a new camp) is 2.76 kg/caput/day. Usually small trees of abundant species are used for construction and although some trees are only pruned, others are cut down (Ellis *et al.*, 1984).

According to the traditions of the Gabra of northern Kenya, *Salvadora persica* may be used for many other purposes but not as fuelwood; and in general live wood is not cut for fuel. The Gabra are conservative in their use of fuelwood, and will not let a fire burn needlessly. They use live wood for huts and corrals, but some buildings can only be made out of certain species, and wood for the poles of houses can only be collected at

certain ritually prescribed times of the year (Stiles and Kassam, 1986).

**[SOME PASTORALISTS traditionally herd different species of animals in separate areas to avoid overgrazing](#)**

In the past, most arid and semi-arid woodlands were sparsely populated and the pastoral strategies of mobility, dispersion and frequent movement of camps were still possible. Thus, the use of wood for fuel and construction wood was brief and localized, and did not appear to have reduced regional wood supplies. With recent population increases and resource shortages, pastoralists are forced to be less mobile and rest periods between use have been shortened. Under these conditions, short-term needs for both wood and fodder will override any knowledge and consideration of long-term conservation practices, and changes in management practices have been recorded among many groups, including the Mbeere (Brokensha and Riley, 1980).

*Regeneration.* Many dry-zone trees sprout naturally when cut. However, deliberate regeneration of trees and shrubs, either through seed germination or cuttings, is very rarely discussed by research studies on pastoralists, and there are more reports that speak of pastoralists lacking rather than having some form of regeneration practice. Where they have been recorded, regeneration techniques can be either protection of spontaneous seedlings, or active planting.

The practice of frequent movement by pastoralists often results in high spontaneous germination of tree seeds on abandoned camp sites. Seeds that have been scarified by passage through the digestive system of livestock seem to germinate particularly well, especially given the high levels of organic fertilizer on the sites (Ellis *et al.*, 1984). These trees are often protected by the next occupants of the camp for shade and as foundations for their huts.

**[PROTECTING TREE SEEDLINGS cones of thorn-bush cuttings protect young trees from grazing animals In Kenya.](#)**

Most groups have a clear knowledge of the germination requirements of different species (Brokensha and Riley, 1980), but records of deliberate tree and shrub regeneration from seed have not been found among pastoralists. Regeneration by cuttings or transplanting naturally germinated seedlings, however, have been recorded. For example, the Gabra and Boran of northern Kenya build live fences by placing a tree or shrub cutting in a hole filled with wet dung; the overall survival rate is 50 percent (Legesse, 1984). The Lozi of Zimbabwe mark the graves of their kings and other royalty with trees transplanted from the surrounding bushland (Gluckman, 1951).

**[PROTECTING TREE SEEDLINGS A similar method, using reeds, is practised in Chad](#)**

*Protection.* The protection of trees and shrubs from all kinds of use takes two forms among pastoralists: prohibition of or restriction on the use of highly valued individual species; and the protection of all trees and shrubs in sacred groves (see below). In West Africa, more than 40 species of trees are preserved on farmland in densities of fewer than 40 trees/ha, by both agropastoralists and farmers, and traditionally only light use is allowed. Four species dominate the list: baobab (*Adansonia digitata*), karite (*Vitellaria paradoxa*), *Parkia biglobosa*, and *Faidherbia albida* (Pullan, 1974 in Wiersum, 1985). In East Africa, the Gabra and Boran (Legesse, 1984) and Turkana (Barrow, 1988) prohibit cutting of valuable mature species, such as *Acacia tortilis*, *Hyphaena coriaca*, *Cordia sinensis*, *Ziziphus mauritiana*, *Dobera glabra*, and *F. albida*.

Many agropastoral groups are known to protect spontaneously germinated seedlings in their fields; for example, the protection of *Faidherbia albida* by many West African groups

(Marchal, 1983; Bernus, 1979, 1980) and protection of *Melia volkensii* by the Mbeere (Brokensha and Riley, 1980). However, such passive regeneration techniques are often the first to disappear once a shortage of natural resources begins.

The protection of trees and shrubs by pastoralists should not be seen as equivalent to the conservation ethic of western environmentalists. Pastoralists usually do not have much use for the climax stage of vegetation succession. The aim of pastoralists and farmers alike is to protect a resource for future use, and to sustain its maximum long-term productivity.

## Traditional reserves

Traditional grazing and forest reserves may be the exception rather than the rule in Africa, but they have been found among more pastoral groups than was previously thought. Some relatively large grazing reserves have been set aside to save forage and browse for dry seasons, such as practiced by the Sukuma (Brandstrom, Hultin and Lindstrom, 1979), the Tuareg of Ahaggar (Swift, 1975), the Il Chamus of northern Kenya (Little, 1984), and the Berbers of Morocco (Artz, Norton and O'Rourke, 1986). Groups such as the Rendille of Kenya (Lusigi, 1984) and the Tilemsi of Mali (Gallais, 1972) reserved certain areas for drought years. Some groups closed off degraded pastures for several years to allow regeneration, such as the Berbers of Morocco (Artz, Norton and O'Rourke, 1986) and the chiefs of northern Burkina Faso, who could order the closure of wells and other water-points (Ware, 1977).

Smaller, special-purpose grazing reserves are more common. The Gabra had ritual holy places, often on top of mountains, that belonged to each *phratry* or subtribe, and were used for age-set initiations every 14-21 years. The woodland around these holy places belonged to the subtribes and was reserved for the periods of ceremony (Schlee, 1987). Many groups, such as the Macina Fulani (Wilson, 1986); Hiernaux and Diarra, 1984), the Songhay of Fantio village (Marie, 1977) and the Masai (Little and Brokensha, 1987; Western and Dunne, 1979) reserve the area around their camps or settlements for special animals (such as calves and nursing livestock), thus ensuring adequate forage for vulnerable animals as well as guarding against overgrazing. Other groups prohibit all grazing in sensitive areas. For example, in the dry season the Tuareg of Gourma do not allow grazing in the area between the domestic camp and natural ponds (Bourgeot, 1981).

Timber or forest reserves are less common among pastoralists than grazing reserves. The Kikuyu of Kenya customarily reserved certain heavily wooded lands as a timber reserve for the community. In these areas, permission was needed from clan elders to cut large trees and the cutting of valued trees was prohibited as was crop cultivation (Brokensha and Castro, 1988). The Sultan of the Somali could declare forests closed to wood-cutting for a certain period of time (Cerulli, 1959 in Swift, 1977). The Gabra allowed no hunting or gathering, including wood cutting, in the range reserves around their holy mountains (Schlee, 1987).

Very few grazing and forest reserves are still being respected. Most groups have been forced to abandon the system because of increasing populations, resulting in resource shortages and expansion of cropland. This is recorded among the Berbers of Morocco (Artz, Norton and O'Rourke, 1986) and the Luo of Kenya (Coldham, 1978). Other contributing factors are the construction of borewells in the reserves (Western, 1982) and the breakdown of the socio-political system which concentrated the power of enforcement among local leaders, for example, the Pokot (Ostberg, 1988) and the Il Chamus (Little, 1984).

Some forest reserves are still viable. For example, the forest reserves in Babati District

(north-central area of the United Republic of Tanzania) are still protected and used for ceremonial purposes. Although the traditional chiefs have lost much of their political power, their authority over the creation and protection of these reserves is still intact, and communal supervision, sanctions and punishments for infringement of the reserves are still in use. These reserves range in size from just a few trees to areas of more than 40 ha and serve a variety of functions, including rain-making and other ceremonies; there are separate reserves for male and female initiation rites. In a few cases, traditional healers own private reserves and use their resources (both natural and supernatural) for the treatment of patients (Gerden and Mtallo, 1987).

## Sacred groves

Sacred groves or areas are often associated with cultural rituals, such as rain-making, sacrifices to totems, earth spirits, and burial grounds. Within their boundaries, members of the community are prohibited from performing certain specified activities which may include hunting, gathering, wood-cutting, cultivating, grazing, etc. Examples of groups that maintain sacred groves include the people of northern Burkina Faso (Marchal, 1983), the Mbeere (Brokensha and Riley, 1980), the Kamba of Kenya (Silberfein, 1984), the Kikuyu (Middleton and Kershaw, 1953), the Jie of Kenya (Gulliver, 1970), the Tonga of Zambia (Allan *et al.*, 1948) and the Gabra and Boran of Kenya (Legesse, 1984).

In some cases, trees are deliberately planted on sacred groves. For example, the Nyakyusa of the southwestern part of the United Republic of Tanzania (Wilson, 1951), the Boran (Legesse, 1984) and the Kikuyu of southern Mount Kenya allow cuttings to be taken from trees in sacred groves to propagate other sacred trees (Brokensha and Castro, 1988).

In most cases, these areas remain sacred forever, but in some instances, because of the mobility of the people, they last only a few generations. The few studies that have measured the size of sacred groves show varying numbers and dimensions. There are at least 200 sacred groves in two locations in the Kirinyaga District protected by the Kikuyu, their size varying from less than one-tenth of a hectare to 1.3 ha (Brokensha and Castro, 1988). In Mbeere (Kenya) the colonial administration listed more than 100 sacred groves ranging in size from one-quarter of a hectare to 3 ha (Little and Brokensha, 1987). Among the Tallensi of northeastern Ghana "a half a mile's walk... takes one past two or three earth shrines" (Fortes, 1945). One earth shrine of the Lowili of Burkina Faso covered approximately 12 km<sup>2</sup> (Goody, 1956).

Because of the decline of animism and religious significance of the groves, coupled with increasing resource shortages, many sacred areas are no longer being respected; However, the concept has been used by governments, such as in Madagascar (Andriamampianina, 1985), to establish modern forest reserves.

## Traditional social controls

Traditional coordination among herding units is ensured by a higher level authority and a set of formal rules. For example, according to Somali rules, large ceremonies are held only when and where there is enough pasture and water to support all attendants for the days required (Behnke and Kerven, 1984). The same phenomenon has been reported among the Wodaabe Fulani of Nigeria (Stenning, 1959) and the Masai (Jacobs, 1980). The council of elders of the Il Chamus enforces grazing controls through informal "police" chosen from members of the 18-30-year old age set (Little and Brokensha, 1987). The Berbers of Morocco had a chief of grass who made final decisions concerning common grazing, such as the timing and location of movements, deferring grazing, and granting access to outsiders (Artz, Norton and O'Rourke, 1986). The Dina Land Use Code of the Macina Fulani regulated the movements of the Fulani and Tuareg tribes into and out of

the delta zone of the Niger River, by assigning an order in which the herds and flocks could re-enter the delta in the early dry season (Gallais, 1967). Similarly, the Lozi king would decide the date when cattle and people would have to leave the flooded area for higher ground (Gluckman, 1951). Among the Tallensi, only the chief had the right to set fire to bushland (Fortes, 1940).

These social controls obviate the need for fences and act as checks to a "tragedy of the commons". Some of these controls, especially those relying on communal cooperation, are gradually being abandoned because of increasing resource scarcity and certain socio-political upheavals, such as the imposition of centralized government structures, destruction of local political authorities, and increasing income disparities. Reviving them will depend on the degree of social cohesion in the group, and whether the traditional authority of local political leaders is still alive or can be restored.

**[VALUABLE TREES such as this baobab \(Adansonia digitata\) are protected by herders throughout Africa](#)**

## Conclusions and implications for development

The current literature clearly shows that pastoral groups use a wide range of techniques in managing their natural resources, and that these systems are neither random nor irrational, but quite deliberate and adapted to the vagaries of their environment. The "level of technology" in traditional resource management varies considerably among different ethnic groups. Some groups have fairly simple systems, while others have evolved complex organizations and techniques.

Many more techniques will undoubtedly be identified as the interest in describing and using traditional systems for development grows. Most of the work so far has been done by social scientists who, because of their training, tend to concentrate on such issues as social controls, land tenure and political organizations. More involvement of foresters and ecologists is needed to help identify the technical details of woodland management.

Because of mostly external but also internal factors, many of these traditional techniques and systems have been partially or totally abandoned. Some techniques are no longer appropriate, for example, those that perpetuate socio-economic inequalities, or restrict the participation of women and minorities in the development process. In this regard, it is clear that we cannot afford to be romantic about traditional systems. On the other hand, the basic principles behind many traditional resource management techniques are still viable and valid, and could be used as a starting-point for the development of appropriate strategies for incorporation into development projects.

**[TREE FODDER can traditional techniques ensure conservation of the resources base?](#)**

In most cases, there will be room for improvements upon the traditional systems, with the aim of developing techniques that are locally appropriate and can substantially improve the traditional design. This implies that there is a need for a synthetic approach that combines traditional and modern techniques (Richards, 1975; Brokensha, Warren and Werner, 1980).

In some cases, development workers may be able to modify techniques from one group to meet the current needs of another. However, such "technology transfer" must be approached with the same caution we have reamed is needed with Western technologies.

In general, traditional techniques cannot be used, revived, or improved without certain

prerequisites, some of which may be politically sensitive issues. These include clarification of national land tenure laws; careful planning of crop expansion; official recognition of traditional socio-political organizations; "greater incentives to young herders to stay on the range greater sensitivity by government officials and extension workers to the value of traditional knowledge; and a common, coherent national policy on the decentralization of natural resource management. Development workers, especially those in the field, need a participatory evaluation framework, through which both the local people and outside experts can agree on which technologies are worth keeping, modifying and/or reviving.

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