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WHO GAINS? WHO LOSES?- BIODIVERSITY IN SAVANNA SYSTEMS

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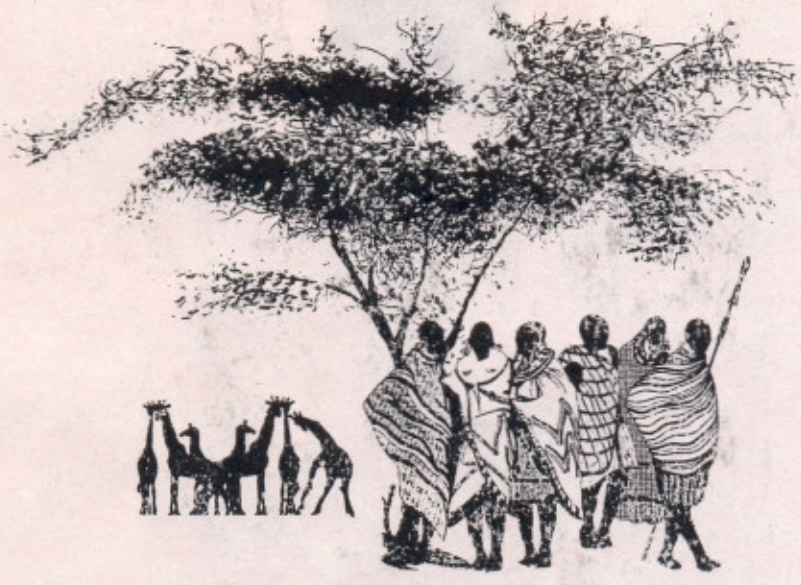

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WHO GAINS? WHO LOSES? - BIODIVERSITY IN SAVANNA SYSTEMS[1]

ABSTRACT

This paper focuses on savanna lands under various forms of communal land management, many of which are occupied by pastoralists. In Africa such lands comprised some of the most important conservation areas outside forests, areas now threatened due to settlement, subdivision and cultivation. Land users in these areas promote sustainable conservation, and species diversity by the ways in which they access and use resources on an extensive basis in a way that is environmentally sustainable. Species diversity is limited by the unforgiving limitation of moisture availability. Dryland natural resource management has been successful, not because of technology, but due to the social controls, knowledge and rights of access over, and control of, a wide variety of resources. These resources provided the bundles of opportunities which enabled resource users to survive and thrive, and provide the safety nets for periods of stress and drought. The alienation of key resources has forced pastoralists to use remaining lands more intensively, with environmental consequences. Traditional systems, rules and regulations in communal land use systems have been disregarded without compensation, resulting in insecurity of tenure generating indifference to land management. Attributes that enable pastoralism to survive do not fit in easily with present day national, and donor influenced, development plans. Many of these attributes are interpreted as constraints, thereby jeopardizing the only management system that has functioned in such lands. Lack of attention to social concerns, values, rules and regulations has been at the root cause for much savanna land degradation, loss of habitat, and expropriation of land, which is decreasing its productive value, rather than sustaining or increasing it. Development of a wide array of land use options, together with building on customary institutions and rules concerning rights of access, can only serve to make such systems economically more attractive, economically more sustainable and socially more viable, therefore contributing to the sustenance of biodiversity.

INTRODUCTION

As savanna lands cover a vast area, this paper will focus on some of the most threatened of those lands, namely those under various forms of communal land management, many of which are occupied by pastorali :s. In Africa such lands comprised some of the most important conservation areas outsid forests, areas now threatened due to settlement, subdivision and cultivation.

Understanding the social sues will help identify many of the opportunities and constraints for conserving biodiversity; f how such users sustainably managed their lands; of how this has changed; and of how l ilding on socially based strengths can establish the climate for improved conservation y creating a bundle of locally based, but nationally important

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economic, and cultural opportunities. Reducing the risks of such systems and increasing their resilience are key concepts in promoting sustainable land use, conservation and biodiversity. Many of the lessons can be adapted for other forms of savanna land use depending on type, use, biodiversity composition and tenure.

WHAT PROMOTES BIODIVERSITY IN SAVANNAH AREAS?

Land Use systems - different economic options

In most savanna lands prevailing agro-ecological conditions only suit specialist drought-tolerant crops. Where rainfall exceeds 500mm per annum cultivation is possible, though risky until it reaches about 750mm per annum. The lands receiving less than about 500mm were traditionally reserved for livestock, since seasonal movements, or transhumance; or irregular movements, or nomadism of livestock take better advantage of the forage (Norconsult, 1990). If people cultivated they reduced risk by planting a variety of crops, with long fallows, which rarely resulted in soil degradation and erosion, because the size of the fields was limited to an area which could be cleared by one person. Cultivation represents one, often minor component of land use.

Pastoral people have, usually, evolved well managed and sound ecological strategies which enable them to live in harmony with their environment, yet utilize the vegetation on a sustainable basis through exploiting different vegetation types. They make best use of the vegetation both in time and space through a transhumant system of wet and dry season grazing combined with setting aside specific dry season grazing reserves (Barrow, 1986). Resource management is made more complex, though necessary, by a variety of social controls concerned with sharing, flexibility and mobility (Norconsult, 1990).

Pastoralists require access to large areas of land and need a considerable capital stock in the form of livestock before they can operate in the pastoral economy. Access to land and resources was made possible and regulated by a variety of mechanisms, for example ownership of pastoral water points, recognition of priority foraging territories which served to spread land use evenly (Swift, 1982), and incorporating wet and dry season grazing. An important issue here is the extent to which social organization is closely related to, determined by, and in turn determines economic and ecological strategies of land use (Swift, 1982).

Pastoral societies are based on a livestock and milk economy through the keeping of diverse livestock types, including cattle, camels, sheep, goats and donkeys. These make better use of the varied fodder in terms of browse and grazing, and of spatial variation in fodder quality through mobility in management. Other economic opportunities which are important in diversifying the pastoral economy, particularly in the dry and drought times, may include the use of a wide variety of wild foods and fruits; opportunistic cultivation; wage earning; and subsistence hunting. For example the pastoral Pokot of Kenya use 61 (20%) plant species for food, and 118 (39%) as sources of medicine out of a sample of 307 (Tanaka, 1981). Similarly the pastoral Turkana of Kenya recorded a use for 222 (43%) species out of a total sample of 512. Between 120-187 species were used in some way by livestock, with 43 species being used by people and 67 species as sources of medicine (Morgan, 1980). Species may be recognized which promote, for example, milk and meat production, dry and wet season forage, species

best suited for different livestock. The wide variety of plant species used for an equally wide array of uses is characteristic, and such diversity is key to risk avoidance.

Planners and development experts underestimate the importance of, and control over water, fodder and trees. For example trees in silvo-pastoral systems are of particular importance to people, and livestock production. Woody vegetation survives better, and often yields more, with a higher nutritional value, at critical dry times of the year (Barrow, 1996). People possess an extensive knowledge about individual tree species and their management, a knowledge gained, and fine tuned over time, and reflected in their life styles and the extent of their dependence on trees - a subject that has been well documented (Chambers, Pacey and Thrupp 1989; Leach and Mearns 1988; Rochleau, Weber and Field Juma 1988; Weber and Hoskins 1983). There is ample evidence across the Sahel that many different tree species, in different systems have been deliberately managed by local people (Weber and Hoskins 1983). This provides a better understanding of the human-ecology of such systems (Rusten, 1990) in terms of environmental perception, understanding, and management, and reflects the life styles and the extent of their dependence on trees including:

- dry timber for woodfuel and charcoal,
- building timber for houses, fencing and thatching,
- food for livestock particularly in the dry season,
- wild fruits and foods for people,
- veterinary medicines for a variety of livestock diseases,
- human medicines for a variety of diseases,
- making of household utensils,
- amenity for shade to act as a meeting place, and
- variety of cultural values, water purification, and ceremonial purposes (Barrow, 1996).

Though dry land users rely predominantly on livestock, the natural vegetation, including use of wild foods, and small scale opportunistic cultivation are important. Many such lands are (or were) important wildlife areas. Wildlife and pastoralism are broadly compatible. Many of the prime wildlife areas, outside of forests, are in such lands. Historically they co-existed, with subsistence hunting providing an additional economic opportunity. Other groups have a variety of cultural attachments to wild animals, and plants, especially trees, which help promote the letter's conservation.

Pastoralists try to make the most efficient use of their environment without over stressing it, so as to conserve their resource base. Their social institutions ensure that the pastoral economy does not operate at the expense of the environment. Other properties of pastoralism may include movement of marginal members in and out of the system to settlements and wage earning, to agriculture; restriction on usage of certain water sources, grazing areas and tree products; high valuation of livestock as bride-wealth; reciprocal claims on livestock (Norconsult, 1990); dividing livestock into smaller herds; moving to areas considered to be insecure; and selling livestock to buy grain (Ellis and Swift, 1988). These opportunities create an array of use choices, essential for sustainable land use, and help promote sustainable conservation, and species diversity. However species diversity is limited by the unforgiving limitation of moisture availability, and is not as diverse as, for example, coral reefs or tropical forests.

Cultural - rules, regulations

Secure tenure over resources or clear rights to their use are crucial as an incentive for rural people to manage sustainably their resources. Such rights are three dimensional in terms of people, eg. the pastoralist, time eg. the pastoralist's ability to maintain the necessary social links, and space, eg. the area of land. They are dynamic due to the social structure, and rights of access can depend on, for example with trees, their origin, eg. self sown or planted, the encompassing production system, eg. private or communal land holdings, and the uses made of the trees.

Importance of access to natural resources is related to their relative abundance, for example water, forage, trees. The holder of the resource has to maintain communal agreement that his rights are established by usage, which form the basis for extending and re-enforcing the web of relations to other people on whose support such agreement depends. Such access rights can lead to individual or household ownership, or more particularly user rights to an area and its resources, for example water and trees.

Pastoral social systems redistribute livestock among people and people among livestock, through, for example, bride wealth, livestock loaning and sharing systems. The extent of a herd-owners social network is directly related to the family's chances of long-term survival. Livestock are also used to absorb or offset other sources of instability, principally the weather. For example in the West African Sahel, households convert capital accumulated in good rainfall years in the form of crop surpluses into cattle (Gilles, 1982). Herd-owners who can, will place some livestock in the herds of friends and relatives as a hedge against losing all animals in one localized disaster. While this system allows more people to subsist than would otherwise have been the case, it means that many dependents and marginal herders may move out of the pastoral economy during periods of stress and do not return until their herds recover.

People in the dry areas may have access and ownership rights to trees, for example the Turkana in Kenya own trees along important rivers. This system of usufruct rights to trees, or *Ekwar*, is part of a broader natural resource management strategy to help spread risks. These resources are owned by the herd owner and his close family relatives. Outsiders will not be allowed to use them without prior permission. This is vital to successful natural resource management in the drylands and therefore to development in terms of utilization and building upon; researching and improving; articulating in policy and extension and improvement in the natural resource management base. Why do pastoralists develop tenure and usufruct rights to key resources? Rights to such critical resources as water, dry season grazing and trees ensures control by those who are allowed to use it, which minimizes overuse, and ensures that it is well managed since those who have the use rights are motivated to manage it properly.

Trees provide a continuous flow of products throughout the year and are an important aspect of risk management. Trees can perform the function of a savings bank where the interest, for instance the produce can be sustainably utilized (Chambers and Leach, 1987). Trees have the advantage over other crops in that harvesting can not only be deferred but can be re-invested which will later yield higher returns. For instance branches of trees can be cut and used leaving the tree to regrow new branches. As a result complex usufruct rights have evolved in many societies. They include such issues as "what rights", for instance to own or inherit, to plant, to dispose of and to exclude, and "whose rights" (Fortmann and Riddel, 1985), for

instance in Niger all valuable trees belong to the state (Weber and Hoskins 1983), or groups may have tenure rights over areas of trees, for instance, the *Ngitiri* conservation system in Shinyanga, Tanzania (Barrow *et. al.*, 1988), or individual rights, for instance *Ekwar*, in Turkana, Kenya (Barrow, 1990). Similar rights occur for water, as well as for dry season grazing reserves, and areas of rich patch vegetation.

Dryland natural resource management has been successful, not because of technology, but due to the social controls, knowledge and rights of access over, and control of a wide variety of resources. These resources, based on the sustainable use of biodiversity, provided the bundles of opportunities which enabled resource users to survive and thrive, and provide the safety nets for periods of stress and drought.

Population

Pastoral population density was, and still is by and large, low. Increases have not been as great compared to agrarian societies. This was determined by the risk prone environment, and unequal distribution of social services. With a low population density, customary management systems functioned efficiently. Resource use stayed within the confines of what was locally controllable and sustainable.

Most pastoral societies had a greater degree of community homogeneity, and cohesion than their agrarian counterparts. Community and social structures are more intact. Customary rules and regulations are better understood and related to. Strong social links, and dependencies together with local knowledge support these community and social structures as the primary mechanism for natural resource management. Such links may be within, and between different groups. They may be between different pastoralist groups, or even with cultivators, for example in West Africa. Together with inter-group social rules and processes, intra-group relations help to further spread risk, by conditionally increasing the areas usable.

CHANGES RESULTING IN DECREASED RESILIENCE, BIODIVERSITY LOSS

Land use

Development in the dry lands of Africa has been fraught with problems. Development needs have usually been externally diagnosed by those who may have little understanding of such systems. Planning was centrally dominated, not based on local micro-level economics. This is a continuing concern, now exacerbated by population increases, and in-migration. Problems have been shifted from the individual family or community level to distant regional levels within and even beyond national borders. The heterogeneity of, for example, Sahelian peoples and vegetation is lost by trying to generalize and standardize. Reasons for dryland development problems and failure include:

- Population pressures, which push the boundaries of cultivation into riskier environments, resulting in loss of critical vegetation resources to cultivation, settlement, irrigation schemes etc.;

- A lack of understanding of the importance of risk and resilience;

- The effects of centrally, usually cultivation oriented, development planning where the people are rarely responsibly involved in project planning and evaluation.

- An emphasis on macro-national economic benefits, not on micro-level household economies;

- Environmental and conservation issues being of secondary importance to technology; and

- The emphasis on discrete projects and their quantification, not on sociological and attitudinal change.

Many think that the drylands are an extension of cultivation based systems. Drylands are significantly different and increasingly so as rainfall decreases. Most rangelands are characterized by low and variable per hectare yields of forage, with mobility being necessary to respond temporal and geographical variation in rainfall and fodder availability (Swift, 1982). Most pastoral development programmes tended to restrict mobility to control access to pastures, thus ignoring the reasons for mobility (Swift, 1982). This restriction was based more on political than technical, ecological or environmental considerations.

Where sustainability is a property both of the resource base and the way it is managed, this is linked to resilience and land use. Some forms of land use are more resilient, for example natural range land, than other, eg. dryland farmland. Land degradation is very simply a loss of resilience, or the capacity of the land to recover. Recovery of land due to natural damage or misuse is much slower in dry compared to wetter areas, because of the relative fragility of the environment and the vagaries of the climate.

Because important resources are being marginalized from customary land users, the system's resilience is reduced significantly, thereby increasing the risks. Resilience involves more than just environmental factors, and must be assessed separately from different forms of land use, for instance not just grazing but grazing by different stock types, grazing land with crops etc. Loss of resilience in dryland systems can be linked to a variety of causes which may be technological or more commonly and more importantly sociological (Warren and Agnew, 1988) and include:

- **Overgrazing**, where most pastoralists trade off mild overgrazing for other reasons (eg. water), while **over cultivation** is more serious, and may result in the loss of top soil;

- **Marginalization**, due to policy, land and population pressures etc. of pastoral dry season grazing, rich vegetation and water sources in favour of cultivation, which is related to **over irrigation** due to poor practise and salinization;

- **Settlements** in the drylands being made possible by advances in technology, eg. wells, fertilizer, machinery;

- **Ignorance** due to lack of knowledge, and inexperience due to lack of understanding;

- **Population growth**, where pastoralists can, **within limits**, adjust the supply side, for instance milk, meat etc., to the demand side, for instance population, and the carrying capacity of the land, by using other economic options, for instance wild foods, opportunistic cultivation.

- **Common property resources** leading to resource degradation? However **communal resources** are well managed, and if there is stress, for instance drought, change of system, marginalization, then communal may become common management;

- **Inequality**, due to inequitable distribution of resources, combined with land users being marginalized from decision making; and

- **Poverty and shortage of capital** is related to inequality and the capacity of restoring resilience; and **greed**.

Where savanna lands have rainfalls that makes cultivation economically viable and relatively risk free, for instance above 750mm per annum, economic returns per hectare make it more difficult for the land to be retained under extensive land use. Pastoralism, livestock and conservation options can no longer compete economically with the returns from cultivation as rainfall increases. An example of this is in Trans Mara to the west of the famous Maasai Mara National Reserve in Kenya. It is accelerated by the Government's desire to change tenure from communal to individual free hold and encourage cultivation.

The alienation of grazing land for cultivation has forced pastoralists to use remaining lands more intensively, with environmental consequences. This results in a changing of the relationship which has developed over generations between the environment, livestock and human population. Pastoralists are confronted with entirely new environmental problems, not of their own making or control.

Cultural - Rules and Regulations

There are two sets of contrasting tenure rules, statutory and customary, which co-exist in most communal lands of Africa. In statutory law land is treated as a single resource, while in customary law it is not. Government policy tends to promote privatization of land for farming since land suitable for cultivation is thought to be under used if left to pastoralism. This allows people, and government bodies to take over such land, thereby further undermining the sustainability of extensive land use systems.

Communal dry land management practise encouraged the use of protected seasonal grazing reserves, rich patches of vegetation, clan rights to water and in some cases specific rights to trees. Where the authority of the elders has been eroded in favour of distant national authority, customary management rules are increasingly difficult to enforce. Customary law developed over time, in general, promoted environmental conservation. However this is now threatened by the pervasive influence of government rules about the land and resources. Some development programmes have usurped, and weakened traditional rights and rules, for instance an irrigation project may ignore rights of access and put an area of relatively rich natural vegetation to cultivation. Failure to recognize the relationship between property and natural

resources, and property in land has led to many bad projects and failed development interventions.

Certain, often well meaning, policies can undervalue the role and management of plants and animals by people, for instance nationalizing certain important trees, introducing rules prohibiting the cutting and use of certain trees, and restricting responsible use of wild animals. Rights related to the land may be linked to rights to the resources on that land, and vice versa. It is important to understand who has what rights to which different resources at the local level, and why.

In general rules and regulations in communal customary land use systems have been disregarded without compensation for irrigation systems, dams, national parks, settlements, and such like. Erosion and environmental degradation especially around settlements has resulted. Insecurity of tenure generates indifference to land management resulting in more of a free for all. Trees are cut for charcoal. Land is cleared for settlement and cultivation. Wild animals are "poached" and got rid of. Environmental sustainability is compromised and biological diversity reduced.

Population

Such complex silvo- and agro-pastoral systems have worked in the past, yet are now under threat from externally driven interventions. Some interventions are essential, for instance health and education, and these systems need to be able to adapt to changing times. This presupposes a thorough understanding, especially by planners, of the potentials and constraints without which problems and conflicts are likely.

In many areas, pastoral land use systems are breaking down due to increasing population pressures. Such population pressures may be as a result of intrinsic increase, but more likely due to in-migration by often non-pastoral populations. This reduces fallow periods, and expropriates the best land for cultivation. The risks of erosion due to over-cultivation, resulting in reduced soil fertility, damage to soil structure, and further degradation results. This is exacerbated by the emphasis on cash cropping and irrigation which displaces rainfed cropping to more marginal and risky lower rainfall areas, and displaces communal livestock land use still further. People in the Sahel have tended to increase crop production by expanding the area under cultivation, not increasing yields per hectare on a sustainable basis. With increasing land and population pressures in higher potential lands, the boundary for cultivation is pushed further into drier zones, often at the expense of pastoral dry season, and rich patch grazing. With respect to this, two unforgiving properties have to be considered. First as rainfall decreases, its variability both in space and time increases, making crop production much riskier. Secondly the ecology and soils are more fragile and degradable. These factors are understood by pastoralists in terms of risk and resilience. But poorly planned research and development in agriculture and agroforestry may actually increase risk and reduce resilience, especially in critical drought times which are inevitable.

Extensive grazing has been sustainable for long periods due to rigid social and cultural controls exerted by pastoralists on themselves concerning animal movement. These controls are breaking down, due to external and national influences, and have not been replaced by an alternative sustainable system. For example a well digging programme in Senegal reduced the

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choice of herding routes and also led to conflict between herders and farmers who were attracted to the new water supplies (Swift, 1982). As pastoralists were driven out of former dry season grazing by, for example expanding cash crop peanut cultivation in West Africa, the remaining trekking routes came overstocked with consequent serious destruction of the vegetation.

Most of the savanna wildlife are found in the pastoral and communal lands of Africa. While population and resource pressure was low, wildlife and livestock co-existed, though there might have been some opportunistic hunting. However with increased populations and resource competition, wildlife became a land use cost no longer affordable. It is no co-incidence that wildlife numbers have decreased dramatically either passively, for example through changing land use, or due to unsustainable hunting or poaching. However where the potential costs were offset by accrued benefits the losses have not been so dramatic and gains have been noted in some areas. For instance in Kenya wildlife losses in Kajiado and Laikipia districts, two districts where benefits have been accruing from wildlife for some time, were between 0% and 25% between 1977-94. While in other savanna areas of Kenya the figure was between 25% and 80% (Norton-Griffiths, 1996, pers comm.).

Such land use changes are further emphasised, to the detriment of sustainable use, by formal education, where education curricula have been developed primarily for urban and high potential areas, with much less emphasis on the needs of the dry lands. Pastoralists are being educated, which is important in itself, but what are they being educated for - to leave pastoralism; to substitute pastoralism with other less viable land use systems, and so increase the risk of hardship and failure; or to help evolve pastoralism as a viable and economic land use system?

It is vital that pastoralist children have the same access to education as other nationals, and should be fully and equally equipped to contribute to their country. It is also important to have pastoralist teachers, doctors, lawyers and so on. But in doing this, are basic assumptions that have allowed pastoralism to be successful and viable being compromised? Is education being used as one means of substituting pastoralism? Educating pastoralists, and not educating for pastoralism serves to re-enforce the prevailing views held by non-pastoralists of substituting pastoralism.

REDUCING RISK, PROMOTING RESILIENCE

Land Use

Our perceptions of the role of natural resources in dryland Africa needs to change. Problems of drylands cannot be looked at from the perspective of externally implemented technological fixes which ignore the users and their knowledge of what is socially acceptable and useful. Development programmes have to incorporate improved natural resource management in its holistic sense, including rangeland and tree management, together with improved conservation and sustainable use of biodiversity.

This demands a conceptual shift from technical solutions to a facilitatory socially based approach. Increasingly pastoralism as a land use system is being shown to be viable from the economic, social and ecological perspectives, and particularly so the drier the land becomes.

Research and development literature supports this. With the possible exception of sensitively planned small scale irrigation, pastoralism is the only really viable land use option in areas where the annual rainfall is less than 500mm.

Given the vastness of many dryland areas, it makes good sense to lay emphasis on sustained conservation and utilization of natural resources as opposed to, for instance tree planting, grass reseeding, dryland cultivation. Pastoralism is based on risk spreading and resilience, and has to depend on mobility to provide the necessary subsistence and cash needs. Risk spreading, mobility and resilience are integrated in different ways by different groups depending on environmental circumstances, but will include some or all of the following attributes:

- availability of large diverse ranges, including wet, and dry season grazing areas;
- access right to, and control over, productive dry season ranges, including trees, dry season forage reserves, and areas of rich patch vegetation;
- keeping of multi species of livestock including grazers, and browsers with the ability to divide herds into smaller units;
- high mobility and low to moderate stocking rates, with high to moderate stock units per person;
- practise of low input, low labour, opportunistic rainfed or flood cultivation;
- making use of and storing wild fruits and foods, especially those of trees, and with the potential for subsistence hunting;
- ability to sell stock and buy grain (and vice versa);
- social structures which enable sharing and lending of livestock through networks of transactions; and
- links with other resource users to optimize that resource for instance, manuring of agricultural land, and the use of crop residues (Ellis and Swift, 1988; Norconsult, 1990; Barrow, 1996).

Customary users of natural resources are powerfully motivated to ensure their survival and conservation measures would be likely to succeed if they sufficiently reinforce formerly adequate customary conservation practices. An environmentally sound natural resource management policy would try to enhance the capability and willingness of local communities to manage existing as well as improved technologies. It would endeavour to:

- encourage land users to develop a bundle of local economic opportunities, including those based on livestock, vegetation, conservation and where appropriate cultivation;
- focus attention and effort on activities that promote conservation and sound environmental practises;

- foster the conservation and management of existing trees, rangelands, and wild species by building on existing viable and valuable natural resource management strategies, by creating awareness, and shifting responsibility to local people;

- conserving and managing important species, and areas of important vegetation, and, in particular emphasizing the importance of dry season grazing and other rich areas;

- improve links between agriculture, forestry, agro-forestry and the pastoral sector, with the objective of off-setting dependence on a system likely to fail under stress and to relate agricultural development to local values;

- the importance of the traditional legal process in enforcing such conservation measures; and

- improving national and donor attitudes to such management systems through a better economic understanding by balancing local and national economic needs with environmentally sustainable local production systems.

Unfortunately attributes that enable pastoralism to survive do not fit in easily with present day national, and donor influenced, development plans. Many of these attributes are interpreted as constraints, thereby jeopardizing the only management system that has functioned in such lands. This need not be the case, if the people and their knowledge of how and why things work are used as the basis for sustainable conservation, and it is acknowledged that pastoral land use is basically sound, implying that improvements have to be integrated with the opportunities that exist so as to resolve real problems which threaten pastoralism's very existence, and thereby the conservation of such lands.

Culture - rules, regulations

The stability of pastoral economies in the face of wide fluctuations in environmental resources contributes to risk avoidance. Social mechanisms of sharing food, productive resources, and rules and regulations governing access to, and control of critical resources are of key importance.

Local controls cannot be replaced by distant national controls, policies and laws. Synergy is need to merge the two systems. This would re-enforce the customary system with its rules and regulations, make national policy and laws more relevant and implementable, and secure a policy and legal base that the future of pastoralism so badly needs. Without this, and a comparable economic model, pastoralism as a viable land use system is unlikely to continue thereby putting at serious risk huge tracts of savanna land and the biodiversity contained therein. Such interventions cannot be just seen from the national development perspective, nor that of customary law and practise, but has to include environmental and sustainability aspects, and the reconciliation of micro and national level economics.

Reinforcement of customary practices with the participation of local resource users is an effective approach for improved and sustainable natural resource management. But this would not be possible in the absence of the customary conservation unit, for example the grazing unit, and implies a degree of social and community cohesion. From the environmental

perspective, elements of a sound policy for utilisation of, for instance, trees and forest products in a natural resource management would be to maximise non-consumptive use of trees and to optimise the productive use of recruitment to the biomass. Differences between the traditional and non-traditional management systems in pastoral areas arise in respect of consumptive strategies.

In terms of communal rights to resources it is important to understand the heterogeneity that exists within a community, the different stakeholders which make up a community whether based on class, religion, gender, origins, socio-economic status etc. This is compounded by the multiple and often mutually exclusive use that can be made of natural resources which complicates equitable distribution of rights of access in terms of who, when, how much, and what? (Fortmann and Riddel, 1985). However community control over natural resources have the advantages of:

- Resource being managed as a whole and the use spread over a wider area,
- Products can be distributed more equitably across the community,
- The community using the natural resource base as an asset to meet community needs, and
- The community may be better able than individuals to protect the resources against incursions from outside (Fortmann and Riddel, 1985).

Strong customary laws relating to the usage of, for instance trees, and dry season grazing reserves, help re-enforce sustainable natural resource management. Rights to natural resources, and the effectiveness of customary legislation govern usage should be used as a basis for sustainable development. Unfortunately most research and development projects prefer to address technical issues, whether with range and wildlife management, tree improvement, or clean water, rather than the sense of advocacy required to build on customary practise to make such rules and regulations locally, nationally and environmentally sustainable. Without secure rights over land, land users will not be motivated to invest in the land. Traditional land use systems and the embodying legal framework which provided for security in the past, is now being eroded in favour of distant state statutes. Unless this is changed risks, degradation and biodiversity loss will increase.

Land tenure rights are secure as long as they are recognized by other community members. Rights over resources have to be maintained through fencing, or other declarations. In many countries pastoralists have lost access to many of their critical resources. Their rights to the remaining ones are often ambiguous and insecure. Land reforms aimed at providing those actually working the land with equitable and secure rights and obligations are essential for improving natural resource management.

Security of tenure, be it individual or communal is of paramount importance over other development needs relating to the rangelands. It helps secure sociologically, and ecologically viable land use systems. Yet few development projects attempt to work at such an advocacy level. Political repercussions are feared. Issues of tenure, access and use must be part of the

development process in such lands, but driven by sociological and ecological sense, not purely for short term political gain.

Population

The influence of population and changes in community structure may be some of the most challenging issues to be addressed if the continued sustainable use of these fragile savanna lands, and the maintenance of their unique biodiversity are to be met.

With sedentarization, human and livestock population growth, monetization of traditional economies and external development influences, many customary management systems are changing in ways that threaten its sustainability because more than the natural recruitment of the resource is often used (Norconsult, 1990). Environmental pressure exerted by such trends is amplified by the continuous off-take from local biomass. Traditional mobile systems allowed time for recovery, no matter how depleted the resource base may have seemed temporarily. These pressures lead to degraded and eroded landscapes so often seen in the vicinity of settlements.

Populations of savanna lands are not increasing, at least internally, as fast as other systems. Such increases are generally accommodated. What is difficult to mitigate for is in-migration, mostly to settlements and richer vegetation areas, of people who do not have the skills and resources to thrive in such dry lands. As a result the best parts of the savanna and pastorals lands are removed for cultivation and settlement. The unforgiving realities of rainfall and biomass recruitment then result in increased rates of degradation, loss of biodiversity and hardship. Until this is actively mitigated for, through the understanding of existing, and the creation of other local level economic benefits, such hardship will increase.

Such land loss is exacerbated by formal education where pastoralists should receive education both for pastoralism and to better equip them to live in their country, but often do not. It does not, nor should not, demand a radical change in education curricula, and schemes of work. It does require fine tuning so that school children obtain an education that equips them to work and live in their country, while at the same time equipping them to better manage their own land. It is a reality that most primary school pupils, on completion of schooling will live and work in their home areas and only a small percentage will gain employment outside this sector. To not equip them thus is an abrogation of a nation's rights to its people.

Conclusion

Lack of attention to social concerns, values, rules and regulations has been at the root cause for much degradation in savanna lands, loss of habitat, and expropriation of land, which is decreasing its productive value, rather than sustaining or increasing it. Development of a wide array of land use options, together with building on customary institutions and rules concerning rights of access, can only serve to make such systems economically more attractive, economically more sustainable and socially more viable, therefore contributing to the sustenance of biodiversity.

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COMMUNITY CONSERVATION DISCUSSION PAPERS

The African Wildlife Foundation is an international non-governmental organisation working for conservation and development in Africa. As part of its Community Conservation programme, AWF is active in the field of involving rural people in conservation.

This discussion paper has been produced as part of AWF's Community Conservation programme. Its aim is to present preliminary findings and on-going work from AWF's activities. We welcome any comments and feedback.

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