NATURAL FOREST RESERVES MANAGEMENT FROM LOCAL PERSPECTIVES: A CHALLENGE FOR DEVELOPING A PARTICIPATORY FOREST MANAGEMENT MODEL

Amani Abdel Rahim Kobbail[1]

Abstract

This research tried to assess and investigate the traditional management system of natural forest reserves pre reservation and its impact on sustainable production. The study also attempted to see how local people as individuals, or groups, perceive forest resources to end with a management model for sustainable development. Two forest reserves sites at Kordofan and Elgedaref states of Sudan were selected. Research methods applied were: a social survey wherein two forms of questionnaires were used for data collection. This method was followed by participants' observations, participatory rapid appraisal and review of the documentary sources. The analysis reveals that most of the land in the study areas is legally state owned. However, villagers have de-facto individual ownership. Ownership of trees on private land was based on the species. The results show that before Government policy of forests reserve and registration in government ownership, the local community has the control over the common property resource and they traditionally used to manage the resource surrounding them. The study show that trees and forests are highly perceived by the local people and that local people see the future management of these forests in the collaboration with government and other actors. The study revealed that the communities' self-generating institutions are the only acceptable channels and linkages with the top planning bodies. The study proposed a management model based on understanding people's perception, aspirations, needs and objectives. The study ends with conclusions and recommendations for policy and practice with regards to natural forest reserves management.

Keywords: forests, participatory management, sustainable development

Introduction

Traditionally, villagers in Sudan used the forest resources in their surroundings (Mukhtar 1990). The decision of the government to intervene and manage the "nation's forests" using professional foresters was based on a

---

[1] Associate Professor, Sudan University of Science & Technology, College of Forestry & Range Science, Department of Social Forestry. E-mail : amanyforest@yahoo.com

belief that forest protection and resource management could better be based on central policy and planning with an authoritative and hierarchical forest service (Wiersum 1991). Until the mid- 1980s, the majority of forestry programmes in Sudan were primarily concerned with reservation and reforestation, mostly without involving villagers in those areas. Indigenous people and their communities have a historical relationship with their lands and are generally descendants of the original inhabitants of such lands. They have developed over many generations a holistic, traditional scientific knowledge of their lands, natural resources and environment (Kobbail 1996). Their ability to participate fully in sustainable development practices on their lands has tended to be limited as a result of factors of an economic, social and historical nature. The isolation of many such (indigenous) people has meant the preservation of a traditional way of life in close harmony with the natural environment (Elsiddig 2003). Their very survival has depended on their ecological awareness and adaptation. These communities are the depositories of vast accumulations of traditional knowledge and experience. Their disappearance is a loss of the large society, which could learn a great deal from their traditional skills in sustainably managing very complex ecological systems.

The natural forests in Sudan need to be managed on a sustainable basis in order to satisfy the needs of the present generation without depleting the resource. Unfortunately, this has not been the case for the forest resources in Sudan, which in recent years have come under increasing pressure due to population increase; agricultural expansion for agricultural products export resulting in deforestation and other problems (Robson1989 & Glover 2005). For this reason, the country adopted a reservation policy since early 1900s so as to conserve and properly manage the remaining natural forests. At present the area of forest reserves approximates 12.5 million hectares.

The reserved forests continued to be under ineffective protection and without management plans. The forest reserves law prohibits access to these forests except within the right of passage and limited benefits. Despite the guarding and patrolling systems, the reserved forests continued to be accessed illegally by the local people for wood gathering and for agriculture (Elsiddig 1996). A vast area of forestland within the Savannah zone has been degraded due to the mismanagement of natural forests and the extensive felling of trees for forest products and agriculture. Almost every forest reserve has been affected and some of them are 100 % cleared. The impact of this destruction resulted in scarcity of fuel wood, in many areas especially in the northern part of the Sudan, and declining agricultural productivity per unit area. The mismanagement of natural forest, reserves and outside reserves, and change in land use systems have declined the growing stock of natural forests.

As explained, forest resources were in the hands of local villagers. During their interaction with 'their' resources, villagers developed certain management strategies. The government intervened and withdrew management control from villagers and followed new management approaches. To-day, the government is asking villagers to share management responsibilities again (Suleiman 1996).

Research Problem

Over the last decades, the vegetation cover in Sudan has very much deteriorated. The natural forest area decreased from 584,362square kilometers in 1968 to 559,015 square kilometers in 1981, i.e. by about 1,940 square kilometers annually and from 71,220,000 hectares in 1990 to 61,630,000 hectares in 2000 (FAO 2001). Adding to that the fact that similar deterioration took place in the range land, Bayoumi (1989) estimates the reduction in the vegetation cover in Sudan as 50,695 square kilometers in thirteen years. People are witnessing the adverse results in the form of lack of food, fodder for animals, fuel and building materials; together with the economic consequences of the fall in the gum production, and the rise in prices of fuel-wood/charcoal and building materials.

Historically, villagers used to utilize and manage forest resources in their surroundings informally through local community leaders. The management system was sustainable, time tested and had survived for a long period while, maintaining the natural resources. The government intervened in different ways in an effort to manage forest resources for the benefit of the whole nation on a scientific basis. The government took (or at least tried to take) control over the management of these resources from the villagers. After more than eighty years, forest authorities have realized that this was neither the most effective nor the most efficient way to manage forest resources. Local people themselves became aware about the critical situation of the reserve forests. The forest policy started to call for sustainable forest management of the forest reserves with local people's involvement. Now, professional foresters are looking for (others) to share the responsibility for forest management. In this paper, the researcher is going to see how local people at the time before reserve dealt with the resources surrounding them and how they were traditionally managing the natural resource supported by their local institutional arrangements and beliefs. Also, he will see how local people see the future management of these forests and how their view is going to be a challenge for developing a participatory forest management model.

Objectives of the Study

The overall objective of this research is to contribute to the ongoing efforts aiming at developing a sustainable management system for the natural forests

reserves in Sudan. The research will try to assess and investigate the management system of natural forests before reservation and their impact on sustainable production and to see how is local people see the future management of these forests to develop a management model for sustainable development.

The main objectives are:

1) To investigate the management system pre-reservation.
2) Identification of stakeholders and assessment of the local needs and possibility for involvement in collaborative management.
3) Development of a management model for forest rehabilitation and sustainable management.

Research Methodology
1. Data Sources

The data were collected from both primary and secondary sources. Data from secondary sources were obtained largely through the analysis of various documents relevant to the study. This includes institutional reports, records and papers which provide baseline information for the study. Primary data were obtained through structured personal face to face interviews and participatory rural appraisal (PRA) with the selected members of the local community and foresters. Two different questionnaires were designed to collect primary data. One questionnaire was administered to old people to collect information for the management system pre-reservation. The second questionnaire was administered to the people who are not involved in the management of these forests to gather information on perceptions, and the willingness and attitude of local people in the management of these natural forest reserves in order to carry out a quantitative study. Check lists for Forest National Corporation (FNC) staff and forestry researchers were developed with the objective of collecting information about sustainable resources management, collaboration, constraints and research needed. This is to explore the views of the officers on the different issues discussed with the local community members with a reasonable depth since the officers and researchers have the insights to verify the different aspects in the study area and link them to scientific facts. Interviews were held with several key informants from Forest National Corporation (FNC) staff and Forest Research Corporation (FRC) staff in the two locations. Interviews were also subsequently held in Khartoum with the general manager of FNC. The interviews were accompanied by personal observations, which allowed the author to judge the reliability of the answers given. In all selected villages the village leader was the first to be approached and spoken to about the purpose of the visit and the study to get permission to carry out interviews with the respondents.

Interviews with local community members were made first followed by interviews with the foresters and forest manager. Finally, the participatory rural appraisal sessions were held to clarify all the points and remove inconsistencies. Semi structured interviews were held with local people using flexible checklists in order to give them more freedom to express their opinion and to pursue topics of interests. The idea was to initiate the social participation, to collect aggregate data at the village level and to understand the community and its survival strategies in all the study area. The *sheik* (community leader) was first consulted to take permission and he was asked to invite all people for a meeting at affixed date. The objective of this method is to verify collected data from a local community and to check the accuracy and validity of the answers. It also offers the chance to check incomplete or uncertain information collected from local people. Moreover, some closed-end questions administered to local people were limited to the choices provided by the investigator; this PRA offered a chance for having depth, richness of description and spontaneity of expression and attempt to establish relationships among variables.

Respondents were divided into two main categories: old people who had familiarity with the pre-reservation era (90 years old and above); and those who were from after reservation era and not involved in forest management. However the old people were difficult to find (above 90 years) and some were reluctant to participate unless there existed strong personal contacts between the researcher and the group. Therefore, an accessible population (Ary *et al*. 2002) was employed and samples were drawn from the accessible population. According to Ary and his colleagues, since a representative sample could be obtained from the accessible population, findings from the sample could be generalized to that population (Ary *et al.* 2002).

Respondents were categorised according to their economic activities and relationship to the forest. A random sample of 10% of each group was selected. The size of each sub sample was proportionate to the size of each sub group. The total sample size is 53 respondents for the old people and 80 respondents for the other category. Two forest reserves sites at Kordofan and Elgedaref states of Sudan were selected (Fig 1). However the selection of villages was based on their accessibility and use of the forest resources. All seven selected villages in the Elgedaref area are located in Elgedaref North Rural Council. In Elain area (Kordofan State) the fieldwork took place in five villages. The villages were selected randomly from thirty villages surrounding the forest. These villages were selected in a stratified way to ensure the representation of (major soil types, both newly established and pre-existing forest). The fifth village was the transhumant pastoralist. The ability of the investigator to include more villages in the sample visit was

limited by the time and budget and this careful selection was done to minimize the cost of travel and time.

Figure 1. The Study Areas

2. Data Analysis

Statistics are numerical characteristics of samples. According to Polit & Hungler (1999), statistical procedures allow the researcher to "reduce, summarize, organize, evaluate, interpret, and communicate numerical data gathered from populations and samples".

In this research data obtained were processed and analyzed on a person computer using the statistical package for social science (SPSS) software. Descriptive statistics is a useful analytical tool that allows the researcher to examine the characteristics, behaviours, and experiences of study participants (Pilot & Hungler 1999). In this research calculation of the percentages was used as a tool of analysis for interpreting the qualitative information collected from the respondents.

Results and Discussions

Throughout history, conservation of nature reserves has implied free natural succession and limited disturbance by humans. Nowadays this policy is often questioned and many argue that human interaction in sensitive nature also can be positive in terms of improved natural resource management, and maintenance of biodiversity.

There is a new global trend in the natural resources management. This trend promotes local control and management of forests and natural areas that surround communities where people live and work. This is partly a reaction against large-scale production, which has not taken local concerns for the land and natural resource management into consideration. In many cases consumers of ethically and environmentally friendly products can see these interests in local control as a reaction to the new demands. This paper discusses how local people were dealing with the resources surrounding them and how they perceived the future management of these resources. The paper ends with a participatory management model based on understanding people needs, aspiration and perceptions for rehabilitation and conservation of the natural resources.

1. Community Identification

A wide range of economic activities characterizes the study areas. Local people were identified in the field survey based on their economic activities. This identification is mainly for the purpose to show how local people depend on natural resources so that we would be able to determine their interest and needs to help in developing a sustainable forest management model based on local requirement. Table 1 shows that the prime activities are agriculture in all its forms: livestock keeping, forest related activities and pastoral nomadism. This is an indicator to the mutual interest of the local people in natural resources, with the majority relying on it. It also provides the basis for the future cooperation in the direction of integrated land use system when a rationale policy is adopted. Those who reported a single economic activity are very few.

Table 1. Major economic activities of the local people in the study area

Economic activities	Frequency	Percentage
Small scale land holders peasants (*bildat* farmers)	70	53
Labourer	12	9
Bildat Farmers + livestock	11	8
Bildat Farmers +labourer	8	6
Bildat Farmers + fuel wood collector	7	5

Transhumant pastoralist	7	5
Merchant	4	3
Large mechanized farmers + livestock	4	3
Government official	3	2
Bildat farmers +merchant	3	2
Herders	2	2
Fuel wood collector	2	2
Total	133	100

Source: Field survey data, 2008

2. Traditional Management of Forest Resources

Prior to the British colonial era, resource management in Sudan was largely carried out informally through local community leaders (*Nazirs, Sheiks, Omdas* and *Sharti*). These informal managements were later supported by the Land Settlement and Registration Act, issued in 1925, which provided for rights and interests over land such as cultivation, pasture, wood cutting occupation, passages, water resources etc. These management systems were sustainable in the sense that they were time tested and had survived for long period while maintaining the natural resource.

In this part of discussion we are going to see how local people at the time before reservation dealt with the resources surrounding them and how they were traditionally managing the natural resources supported by their local institutional arrangements and beliefs.

a. Lands and Tree Tenure System
(1). Land Holding

Generally, in the surveyed villages, land is traditionally deemed as belonging to the individuals and can be inherited. In the study area the following three main levels of land ownership could be identified: Individually or privately owned land; Government land subject to no rights in the community; and Government land subject to rights vested in a community.

The survey results show that most of the lands in the study areas belong to the first and third category. In Sudan, as in other part of the developing world, there are often discrepancies between formal and effective land tenure system in the rural areas. By law, all the unregistered land belongs to the state. In practice, access to most grazing and rainfed agricultural lands (other than mechanized schemes) is regulated by the local principles of tenure and some of the cultivated lands in the study areas are not often formally registered. All lands belong to government and no private ownership of land exists. However, usufruct rights are recognized according to traditional patterns of land tenure and continued residence guarantees rights in

cultivable land as mentioned before. However, as cited by Suleiman (1996) there is *de facto* individual land ownership where land is individually owned and heritable (Saleem and Suleiman 1984).

Before colonial time people were settled in tribal groups and each tribe has its own land marked and known. People were enjoying rights of cultivation and grazing within their own lands. Agreements between tribal elders exist to allow nomadic tribes to move through others tribe lands (Sief El Dien 1979 cited by Suleiman 1996). In colonial times, the colonial government declared itself, by right of conquest, the presumptive owner of all land in Sudan. It was laid down in the 1925 land settlement and registration ordinance that all waste, forest and unoccupied land was deemed to be the property of the government until the contrary was proved. At the same time the land settlement and registration act of 1925 provides for rights and interests over land such as cultivation, pasture, wood-cutting, occupation, passages, water resources etc. In 1970 this position was affected by issuance of the unregistered Land Act that gave the government the ownership over any wasteland. The law did not provide for regulation of existing, long-established usufructuary rights (Saleem and Suleiman 1984 cited by Elsiddig *et al.* 2001). Based on this, the respondents provided their main level of land ownership as one of the three categories given to them and they also specified the area they had.

This latest land tenure system greatly influences the exploitation of the natural resources. The harsh effect of this Land Act on unregistered rights based on the traditional land tenure system has been diluted by the introduction of Islamic principle of *munfaa* (usufruct) by the provision of the Civil Transaction Act (1984) (Magzoub 1999; cited by Elsiddig *et al.* 2001). *Munfaa* has been defined as the right of using and enjoying the land, the bare ownership of which belongs to another person (El Mahadi 1981; cited by Elsiddig *et al.* 2001).

Generally, land is the most valuable natural resource in Sudan. Although government had the formal ownership of unregistered land it was not able to exercise effective control over land allocation and utilization. At the same time the land allocation and judicial powers were taken from the native administration and vested in the local government officers and later in the state government. Government has neither the knowledge of the traditional uses nor the means for planning and control of land use. This created an administrative vacuum (FOSA 2000). This vacuum has negatively affected the natural resources and still a lot of conflicts exist between local people and government.

(2) Tree Tenure

Traditionally, villagers do not see forests as possessions to be protected, and ownership of trees on private land was based on the species. All the respondents (100%) claimed ownership of culturally or economically valued species such as Hashab (*Acacia senegal*), Daleib (*Borassus aethiopium*), Dome (*Hyphaene thebaica*), Haraz (*Acacia albida*), Arak (*Salvadora Pensica*), and Tebeldi (*Adansonia digitata*). At certain locations some species might be treated as private where as others are seen as common property of the tribe or village. For example, in the surveyed villages, some villagers stated that on their own land Hashab trees belong to them, but Talih (*Acacia seyal*) is for everybody. All respondents explained that before reservation no rules were set out to govern tree planting and no-one needed to plant trees at that time; trees grew naturally they concluded. They also clarified that there had been no renting of trees before reservation, but there was a system of sharing the products of certain species on others' lands, such as helping in tapping the gum and take part of the product from *Acacia senegal*.

Generally, the villagers' system of tenure is heavily embedded in the socio-cultural context. Despite the fact that someone might own the tree and/or land, under certain circumstances other people could have usufruct to a quantity of certain type products (Suleiman 1996).

b. Cultures and Beliefs Related to the Forest Resources

Traditionally, villagers in Sudan utilize indigenous and naturally regenerated trees that are of direct benefit to them such as Hashab (*Acacia senegal*), Tebeldi (*Adansonia digitata*) and Dom (*Hyphaene thebaica*) trees. All the respondents stated that before reservation there were no local or official rules set out to restrict tree harvest in the study areas. Tree resources were often subject to some form of local or traditional control by the people themselves. This control was not according to official rules. Rather, it existed in their local cultures and originated from the mere feeling of the physical existence of the trees and through many benefits people derived from trees as recognized by 85% of the respondents. Table 2 shows the different tree species deemed not to be harvested.

Table 2. Tree species deemed not to be harvested by villagers

Tree species	% of the respondents
Laloub (*Balanities aegyptiaca*)	72%
Sidder (*Zizphus spinachristi*)	57%
Aradaib (*Tamarindus indica*)	15%
Gudaim (*Boscia senegalensis*)	15%

Hashab (*Acacia senegal*)	11%
Garad (*Acacia nilotica*)	4%

Source: Field survey data, 2008

However, villagers develop various perceptions, attitudes, objectives and beliefs as to the way of using trees and this to a large extent support sustainable utilizations of trees. Some of these beliefs mentioned by the respondents are related to a specific tree species and others are related to the products. Among these interesting beliefs is that, commonly, villagers do not approve cutting of any trees that provide fruits such as Gudaim, Garad, Aradaib, Nabag and Hashab trees and this is stated by 70% of the respondents. Twenty three percent of the respondents believed that these trees are also homes of *Jins* and Satan and not to be harvested. Only 7% mentioned that removal of these trees killed their children.

As a conclusion, these beliefs are culture-specific and highly influenced the utilization of the trees at that time and supported sustainability of the resource. One of the old men told us that they do not remove these trees where *Jins* are living. He explains to us the following case, which happened to him when he decided to cut an Aradaib tree:

> I had been advised not to fell this tree, but I ignored this advice and cut the tree. Then at night I saw a nightmare that the tree came to me. It was very angry and making a very loud noise. It was about to fall on me, but it did not and this continued for three days; with me from that day I decided not to cut that tree at all.

Some argues that they never cut Sidder trees because it is mentioned in Quran. Others explain that these trees are the major cause of rainfalls. A lot of interesting and common beliefs among villagers were mentioned but the most acknowledged is the provision of fruits, fodder and shade.

c. Resource Management
(1). Lands Organization and Use Control

Before the forestland reservation and registration in government ownership, the local community has the control over the common property resource in most of the rural areas of Sudan. This situation is confirmed by 96% of the respondents in the study areas. They stated that all functions related to natural resource management (land organization and use control) were controlled by the traditional tribal system under *Nazir*, *Omda* and *Sheik* supported by government authorities. Each village has its own *Sheik*, surrounded by village elders known as *Ummar* whom the *Sheik* consults in the case of problems. Respondents stated that the position of *Sheik* is always inherited. They also added that in villages, land allocation is the responsibility

of the *Sheik*. Local governance structure mediated conflicts and reinforced the traditional practices.

Consequently, the traditional native system was very strong. According to Mohamed (1994), the British passed a number of laws and ordinances to give the system a legal order and to make it fit within the framework of the judicial and administrative systems. These laws together with the local customs and traditions made the native administrator a very strong and powerful leader (Mohamed 1994). Mohamed also mentioned that the success of the native administration and traditional ethnic institutions in guiding and managing grass roots affairs was attributed to the fact that they understand the local culture, behaviour and problems of local people. They originated from the local cultures and usually follow the well-understood procedures of native cultures in tackling local problems. And above all they are very respected and obeyed by the people.

The native administration was the organ through which laws regarding land use and conservation of the environment were enforced. In addition to land disposal for agriculture, Gum Arabic collection and irrigated farming the native administration was in charge of protection of the natural forest and pasture against fire, protection of certain "protected" tree species, protection of wild animals and demarcation of transhumance routes and grazing areas (Sief El Dien 1986).

In conclusion, the previous traditional land management system and social control over the use of land, which used to govern the land and resource security within communities, was a highly stable and well organized system accepted and appreciated by almost all the respondents.

(2). Rotational Shifting Cultivation

In both of the study areas people traditionally used to manage the resources surrounding them. Traditional cultivation was practiced and carried out on rotational shifting basis. All the respondents stated that cultivated fields were rotating around their villages where natural vegetation (trees and grasses) regenerated itself and restored soil fertility. All the respondents stated that this system was the land use practice for sorghum, millet and sesame production. It consisted of a cultivation phase lasting for 3-6 years after bush clearance, followed by the fallow phase in which the land was allowed to rest for a number of years under bush re-growth. According to the respondents the fallow period varied from 10-20 years depending on the availability of land in the immediate surroundings of the village.

Respondents explained that once an area had been selected, the under growth is cleared from around the larger trees with a machete. A few days later the farmer returns with an axe to fell the remaining trees in groups. First the smaller trees of a group are partially cut through but left standing. Next,

the larger trees are cut completely, pulling down the smaller members of the group as they fall. The farmer took pride in the number of trees that can be felled simultaneously in this way and in some cases almost the entire field can be brought down at one time. Few very tall and large trees may be retained in the field and protected by a firebreak. Fields are cut during the dry season with most farmers leaving the undergrowth and felled trees to dry for a period of three weeks to a month before burning. By then there is plenty of dry grass and dying bushes to make possible the clearance of vegetation, old and new, by merely setting fire to it; this is locally called *harig* cultivation.

Most of the respondents interviewed indicated that great care was taken to prevent the fire passing on to the surrounding forest. Firebreaks were made by cutting trees along the field margins to fall inward, the row of parallel trunks creating a gap between the combustible crowns and the forest edge. Respondents added that individuals were very aware of the activities of their neighbours and liked to burn their fields at around the same time as other farmers. This required keeping in line with the rest of the community in agricultural practice, as no one liked to stand-alone. Each family was thus able to acquire a number of farm plots that enabled its members to practice their shifting cultivation comfortably. Respondents argued that an average family alternates its cropping on 3-4 plots ranging in size from as small as 5 [2]*feddans* to as large as 50 *feddans.*

Respondents (100%) stated that in addition to cropping they were able to obtain their requirements of woodfuel, building materials, grazing for their animals and other forest resources from the areas they possessed as well as from the nearby natural forest. They emphasized the easy and open access to the forest products and this was stated by (98%).

Respondents (100%) also stated that this system was sustainable. The reasons were that trees and bushes re-grow naturally during the fallow periods and this is mentioned by (64%) of the respondents. They declared that the practice of shifting cultivation was dependent on the fallow periods between successive periods of cultivation (10-20 years) being sufficiently long for the soil to recover its fertility fully and the vegetation, which invaded the fallow areas followed a succession, which culminated in a secondary forest. While (57%) see the reason in the availability of rain fall and only (32%) stated that the reason for the sustainability of this management system was the low population density.

Respondents (100%) argued that there was abundance of forest cover and the land productivity was very high at that time. They estimated crop yields at 5-10 sacks of sorghum per *feddan* (450-900kg/*feddan*) and about

---

[2] A feddan = 4200m^2, 1.038 acre and 0.42 hectare

350kg/*feddan* for sesame, which is higher compared to the current yield. It is clear that people used to manage the resource in a sustainable way.

According to Bebawi *et al*. (1985), Sief El Dien (1986) and Diaw (1997) the rotational shifting cultivation was sustainable system in a way that the re-growth of trees and bushes on the abandoned farm plots during the fallow period enabled restoration of soil fertility and friability without the need for fertilizers or manure. They mentioned that the advantage of the bush fallow system was that the trees protected the soil from erosion as well as providing environmental protection. *Harig* has the advantage of adding potash to the soil and enhancing its fertility. According to Sief El Dien (1986) the whole system can be regarded as a form of agroforestry that allowed environmentally sound land use practice. Even though little or no pest control measures were used there was apparently little crop damage largely because the biological equilibrium was maintained (Sief El Dien 1986). Hence, conservation was credited with the traditional management patterns where the resource does require some form of agreement among the users that determines the use pattern by individual family/groups and regulations controlling over-use of resources.

In conclusion, the system of managing the resource was a collaborative one well organized by local governance in the use and control over the resource.

3. Resource Management: The Future from Local Perspectives

After development of reserves the experience of the forest administration in the management of natural forest reserve was not successful to conserve resources. It seems that the official forest policy and laws meant very little to local people and forestry offences are not socially considered as crimes. On the other hand collaboration seems to be accepted to conserve the forest resources. Here in this paper the author is going to show how local people perceive the forests and looks into how they see the future of these reserves.

Local people have different perceptions and attitudes as far as forestry resources are concerned. It is necessary to look into the perceptions and attitudes of local people in relation to trees and management of forest resources before looking in to how to involve them in managing the resource. Perceptions are partly affected by people's needs and their socio-economic environments. According to Abusin and Elsamani (1986), perception is a function of culture, past experiences, education, needs and understanding people/resource relationship.

a. Perception about Trees

The majority of the respondents perceive trees as valuable resource in the surveyed villages. Results shows that about 41.3% perceived trees as a source of multiple values, compared with about 18.8% who perceived them as a source of supplementary income. About 17.5% of the respondents considered trees as a barrier to agriculture, while 13.8% perceived them as a source of forage and only 2.5% appreciate their beauty in the landscape. People of the study areas by nature, feel the higher value and the importance of trees in their daily life.

b. Perceptions about the forests

Respondents have different perception towards the forests. Results shows that about 76.3 % consider the forests as common property of great value to be used and managed by all with necessary help from the government. This result is an indication of stakeholders respect for each other, and that the forest value is perceived to be managed by all.

About 12.5% of the respondents perceived that the forests are government property to be used according to whatever regulations the government sets. About 10% perceive the forest as their own property, which has been in their own tribal land, normally used according to tribal and customary law. Only 1.2% perceives the forest as self regenerated resource without human intervention. It can be concluded from these responses that the majority of the respondents are aware about the value of the forests that need to be managed properly; hence a proper management system should be adopted to involve local people.

c. Perceptions about the best type of Natural Forest Reserve Management

People's acceptance of joint forest management is very clear. All the respondents (100%) agreed that the best way to manage natural forest reserves is through having a combination of government and villagers' management institutions and all other users at regional level. The resource would remain under the control of the state, but local people should be consulted in every aspect of forest resource management. This in fact, is a reflection of the importance of having an image of a government that has ultimate power compared to their own and they could enforce what it likes (88% of the respondents, Table 3) compared with 35% who think that government could not do it alone and needs the help of the local people. Only 2.5% said that government always has a good intension.

Table 3. Reported Reasons to Collaborate with Government

Reason	F	% of the respondents
Government authorized body provide protection & enforced what it likes	71	88.8
Government could not do it alone	28	35
It has a good intension	2	2.5

Source: Field survey data, 2008

Villagers explained that they would not be able to manage the forest resource without government intervention. They explain that leaving villagers alone to deal with the forest leaves everyone trying to take the maximum, believing that if one does not take his or her share, others will take everything. The result indicates the need for understanding power relations. In this author's opinion, a process like the tragedy of the commons can take place if the change took place abruptly and without giving consideration to the ability of the local people to organize themselves. Through their earlier interventions foresters have led local people to believe that managing forestry resources is a government responsibility. Leaving a forest without handling it over to well-organized villagers means that the forest will become a common-pool (open access) resource, which is open to all. One of the researchers acknowledged that there is a noticeable 'positive' change in villagers' behaviour concerning forest resource management despite the very little piloting attempts. Villagers are becoming more cooperative with foresters and they are willing to participate in management of this resource.

Local people consider their participation as a pre requisite for successful management and forest conservation and they claim that since reservation FNC does neither provide for that nor raise the awareness among local people to take their part in the management. Despite its low capacity to control the area of the two forests, being less cooperative, less willing to involve others and less considerate to the local needs in its management system still more than 60 % of the respondents accepted and trusted FNC to represent the government side in managing these natural reserves.

According to the respondents, FNC has an authorization in addition to the technical knowhow and the required facilities to raise the awareness and manage the forest resource (Table 4).

Table 4. Reasons for trusting FNC

Reasons for trusting FNC	F	% of the respondents
Government body able to provide protection & technical know how	53	94.4
Afraid of	3	5.4
Total	56	100

Source: Field survey data, 2008

Villagers, in general, are of the opinion that the forestry authority should be more concerned with development of forest resources and foresters should increase efforts to enhance forest resource development.

Table (5) shows that 61% of the local people interviewed suggested that the combination could practically be achieved by involving local people in all management practices and protection, while 46.3 % see that government should provide protection, laws and extension campaigns and about 37.5 % see that government should organize system to provide people needs and that people should follow laws and government regulations. Only 2.8% stated that forest should be divided into working circles and one should be for the village under local people control.

Table 5. Practical means to collaborate with government

Means	F	% of the respondents
Involvement of local people in the management and protection	49	61.3
Government provide protection, laws and extension campaigns	37	46.3
Organization of a system to provide local needs	30	37.5
Divide the forest into working circles	3	3.8

Source: Field survey data, 2008

These results indicate that rural people have always a list of prioritized problems. For them the bureaucratic division of departments and organizations with each one providing specific service (s) is meaningless

unless it coincides with their priorities. Villagers expect that any intervener who really wants to help them should go through their priority steps. Wily (1996) added that the more fundamental need is to remove forest management from the conflict in authority to bring local communities into the management sphere in such a way that their vested interests, as forest users, is conjoined to the vested interests of responsible conservator hence sustainability of resource management could be achieved.

Collaboration and participation of local people could be attained first by accommodating peoples' ideas, values and aspiration then by activation of self-generated institution and improvement of government images in the local people mind. Local requirements should be given the priority. Hurditch (1992) reported that one of the main forest resource management objectives is the provision of some "public goods". Hence, pure economic calculations can hardly present enough motivation especially for individuals to manage forest resources on a sustainable basis or to be involved in tree planting activities and this necessitate that local people to be approached with an open mind policy to frame the best form of collaboration for managing these natural reserves.

The majority of the respondents think that the best channels of cooperation with government, to ensure participation, are either the old native administration, council of elites or elders. A few opted to government-structured institutions. Government institutions include political systems inherited from the previous government i.e. village council, tenants and herders associations etc. (Table 6).

Table 6. Acceptable channels of cooperation with government

Channel	F	% of the respondents
Old native administration	28	35
Newly formed councils of elites	17	21.3
Newly formed councils of elders	12	15
Present political channel	6	7.5
Tenant & herds association	3	3.8
Al these channels	11	13.8

Source: Field survey data, 2008

Reasons stated for preferences for each channel are given in table (7).

Table 7. Reasons for preference of channels

Those reported Old native administration		
Reasons	F	% of the respondents
Knows people's problems	18	22.5

Known to government	15	18.8
Experienced	7	8.8
Those reported newly formed councils of elites		
Knows what people's needs, work for public interest	15	18.8
More active	8	10
Those reported newly formed councils of elders		
Know and understand what people need	11	13.8
People trust and obey them	5	6.3
Those reported Present political channel		
Government body, more educated and know what we need	5	6.3
Experienced	2	2.5
Those reported Tenant and herds association		
Know what we need	2	2.5
Understand our problems and represents all people	2	2.5
Those reported all these channels		
Guarantee for representation of all	10	12.5
All known to government	4	5

Source: Field survey data, 2008

From these results, local people see the future of forestry in Sudan as cooperation between forestry authorities and village level native institutions. The official forestry agency does not have enough resources to manage forest resources alone. For a native administration system to play an effective role in sustainable management of forest resources, government should provide enough legal and material support. In addition, more awareness and training are required in preparing both villagers and their leaders for the new responsibilities.

Local people, themselves, suggested extension programmes to initiate the collaborative management. According to Table (8), 70 % of reported extensions should be based on personal contact with officials, visual aids, i.e. cinema, pilot and demonstration and on farm experiments as the best extension approaches, and these may take different channels through traditional opinion leadership, elites of the population or direct public contact and demonstration trials.

Table 8. Extension Approaches

Approach	F	% of the respondents
Personal contact	17	21.3
Visual aids	12	15
Pilot and demonstration on farm experiment	3	3.7
All	56	70

Source: Field survey data, 2008

Respondents in the study area suggested many steps to implement the extension programme. From the respondents' side, about 65% stated that they will notify all people to attend any meeting while 52.5 % will contribute in the extension campaigns. From the community side, 66.3 % of the respondents felt that all people should contribute to necessary activities and 53.8 % wanted that local people to elaborate their ideas. From the government side, about 71.3% of the respondent said government should put emphasis on raising the people's awareness about policies and laws while, 36.3% thought government should intensify the campaigns.

Coordination between local people, other users and government is a prerequisite for sustainable resource management. However, the foresters' view that management still means reserve should be changed. Forest management needs authority, but it is more in need of someone who can deal properly and wisely with local people. Villagers should be involved in forest management from the planning stage, i.e. the preparation and revision of working plans. Management should follow an integrated holistic approach from seeds, seedling through final felling and utilization. It should also establish a production system that meets the various needs for forest products and conserves the forest capacity to regenerate naturally and protect the environment.

d. The Future of Land Use

Peoples' response to integrated land use systems is positive (Table 9). Although some still prefer to stick to one primary activity or related activities and land use, i.e. cultivation, grazing, yet the majority is in favour of combination of land uses. Over 60% of the respondents prefer the logical combination of agriculture, grazing and forests. This attitude is supported by responses to the question testing perception towards development. Although some still perceive development through promotion of their own activity, there is a growing compromising attitude within 75% of the respondents to include all forms of land use in a balanced manner (Table 10).

Table 9. Land use preference in the future

Land use type	F	% of the respondents
Cultivation, forest and grazing	52	65
Cultivation and grazing	11	13.8
Cultivation only	6	7.5
Cultivation and forest	4	5
Grazing only	3	3.8
Forest and grazing	3	3.8

Source: Field survey data, 2008

Table 10. Perception of development

Reported perception	F	% of the respondents
Improve forest,[3] *bildat* and livestock	12	15
Develop all forms of agriculture	3	3.8
Develop livestock only	1	1.3
Develop mechanized farming only	1	1.3
Develop mechanized farming and live stock	1	1.3
Develop all resources in a balance way	60	75

Source: Field survey data, 2008

People from their experiences and laws deeming all land as government land; believe that government officials' perception of development is quite different from their own table (11).

Over 27 % of the respondents believe that the government strategy is to lease all land and develop it to gain quick profit. Some 23% believe that government thinks that all land should go to mechanized farming and only 12.5% believe that the government is keen to develop all resources in a balanced way. Local people, especially in ELgedaref, see that mechanized farming is so powerful, because it represents government strategy and therefore it is given legal and political support. Many complained that it swallowed their traditional *bildat*.

Table 11. Respondents thinking of how government perceives development

Reported perception	F	% of the respondents
Quick profit not care about results on resources	22	27.5
Think all lands go to mechanized farming because of profit	19	23

---

[3] *Bildat* is an agricultural land about 5-6 *feddan*

Ceases all land and develop it the way they see	16	20
Balance development of all resources	13	16.3
Develop resources in balanced way pay attention to local needs	10	12.5

Source: Field survey data, 2008

Resource perception is charged by the submissive traditional culture, even though it is in a process of favorable change. There is strong evidence among the respondents in the study area that forests are thought about as a resource to be conserved, managed and properly utilized. From respondents answer regarding the best system of land use there is indication to a tendency of a compromising attitude of accepting others' interests and developing integration in land use. This result is coinciding with the findings of Abu Sin and Elsamani (1986). Therefore, management for sustainability will first be concerned with securing an improved livelihood for the present generation, while maintaining the potential of forest heritage for future generations. Meanwhile, the forest potential must be seen within the broader context of rural development, in which the allocation of land to different uses is part of a dynamic process but where a balance is maintained between forests and other forms of land-use in which trees have a role. Above all, responsibility of management must be clearly identified and competing interests must be reconciled through dialogue and partnership (Murray 1993). It is now seen as a multipurpose management of the forest, which means that its overall capacity to provide goods and services is not diminished (FAO 1993).

The concept of land use has been consolidated in respondents' mind due to the feeling about drought and expansion of mechanized farming and their respective impacts on the resources and families budget, especially in ELRawashda area. The gap in perception between what people believe and what they think government believes with respect to development is the challenging issue that, need be carefully bridged in order to ensure peoples' participation in the proper management of the forest resource. So local people were asked what they wanted government to do and what they were ready to compromise for the two perceptions to assure sustainable development of the resources. The answers are provided in Table (12).

Table 12. Respondents' answers to what was to be done by people and government

Target	Item	F	% of the respondents
Local people	Grow crops	35	43.8
	Cooperate in protecting the forest	25	31.3

	Increase livestock number	8	10
Government	Provision of basic agricultural requirements	26	32.5
	Provision of funds	19	23.8
	Allocate lands for the poor people in the villages	12	15
	Provide our basic and local needs	10	12.5

Source: Field survey data, 2008

Hence, to narrow the gap in perception, a great effort is needed for a sound extension programme for dissemination of information. The challenge is the selection of the proper channel of linkage with government agencies to gain confidence and effective participation.

e. Participatory Aspects

It is quite evident from the survey results discussed earlier, that local people have developed positive attitudes towards natural resources in general and forest resource in particular. Local people see that sustainability of forest resources could not be attained unless collaboration between them and government took place. Some questions in the field survey were designed to test participatory aspects. The most important result is that the majority of the respondents (96.3%) expressed their readiness to participate in proper management of natural forest reserve. This is a useful result and a step towards sustainable development. The form of contribution that local people are willing to provide ranges from the minimum of giving money (7.5%) to the maximum of all necessary efforts (43.8 %), (Table 13).

Table 13. Respondents' form of contribution in future natural Reserve management

Form of contribution	F	% of the respondents
Effort only	35	43.8
Idea, organization, cash and effort	21	26.3
Abide by any imposed regulation	8	10
Cash and effort	8	10
Cash	6	7.5

Source: Field survey data, 2008

The selection of the form of contribution is justified by the respondents' intension to protect the forest from deterioration, which is reported by 45%

while 43.8% stated shortage of money and 31.3% selected rehabilitant their forest (Table 14). It is quite evident that local people have developed positive attitudes towards resource development.

Table 14. Reported reasons for selection of different form of contribution

Reason	F	% of the respondents
Protection of the forest	36	45
Shortage of money	35	43.8
Forest rehabilitation	25	31.3

Source: Field survey data, 2008

In response to contributions to expand the reserved forests, people are more inclined to help in planting un-used land (57.5%) as noted in Table (15). They are inclined to accept any revision of land use (15%) hoping this will secure more land from mechanized farmers especially in ELRawashda area. Respondents in the study area are less willing to give part of their land for expansion of the forests, because they are not confident others will do the same, mistrust the government's intensions and also because of the small holdings they possess; instead, they believe in revision of land use and ownership. These results are useful in highlighting respondents' readiness to collaborate in resource management.

Table 15. Contribution to expand the area of the reserved forest

Form of contribution	F	% of the respondents
Planting bare land to be allotted for forest	46	57.5
Accept revision of land use system	12	15
No contribution	7	8.8
Plant bare land in the forest	1	1.3
All form of contribution	5	6.3

Source: Field survey data, 2008

According to Abdulla and Holding (1988) and Elsiddig *et al.* (2001) the experiences of the early 1980s of forestry projects that did not involve local people, the drought of 1984/85 and the magnitude of the problem meant that the solution had to be looked for beyond the immediate scope of the forest service. It became clear that the way to have any impact on the development of forest resources in Sudan was through peoples' participation in management of their own forest resources. However, many issues remain to be addressed if local people are to participate actively. For example: making people aware of the changes in the forest laws, providing reasonable facilities

for the extension unit, revising the 1989's Forest Bill and FNC Act and improving the quality of the extension staff training. It is evident on the other hand that FNC expectations of what could be achieved through extension seem to be too high. It is necessary to realize that extension can't 'do it all' but other elements need to be equally taken into consideration for example, availability of other inputs, legislations that encourage local people to participate and the suitability of village level organizations.

In conclusion collaboration is becoming a challenge and a promising way to sustain natural resource but it needs clearly stated policy, rules and attitude in place to enable communities to assume a strengthened role in management decisions. Collaborative management system today offers a simple, cheap and easily replicable tool as a strategy to bring in sustainable development of natural forest resources, by relying on the dynamics of the individual villages and their ability to exercise co-management. However, rural communities are not identical, and working with local people is not always easy and this necessitates provision of technical assistance by experienced facilitators to keep the process of change on track.

Forestry can never be practiced in isolation. Forestry in a country like Sudan should be practiced not only with the sole intension of providing income for the central government, but to meet demands and desires by the population at large. It will be necessary to determine how the forest is to be utilized and who is to benefit, by setting management objectives that must differ from one forest to another.

f. The Proposed Model for Participatory Forest Management

Based on this research finding and understanding people's perceptions in this context helps in forming a participatory forest management model. This based on collaboration between local people and government (Fig1). The model suits the conditions of the two forests and is adaptable to other natural reserves. This will depend on the conditions of the forest and the community status something, which calls for active technical assistance by experienced facilitators to keep the process going.

(1) Strategy Decision from Human Influence on These Forests

From this research finding and to sustainably managing these forest reserves it is imperative to accommodate the needs and aspirations of the local population in an environmentally friendly manner. This is a pre-requisite to obtaining the cooperation of the sedentary and nomadic rural population in the protection and management of these forests. This situation entails considering the following: Development and adoption of an efficient and effective extension /communication system; Maintaining the existing customary systems followed for the protection of these forests. This is largely

based on the native and tribal administrative systems; People in each village should consider the fact that much effort might be needed to protect remote parts of their forests; Existence of management plans; The local population will itself carry out most of the management activities including protection, opening of fire lines, enrichment planting and controlled harvesting. The professionals (Forestry and Range authorities) will provide the necessary technical and legal support.

This strategy can better be achieved by administratively dividing the forests area-wise with a village (*Farig*[4]) working blocks (VWB). The number of *Farigs* existing in the forest will determine the number of these VWBs. This expected to elucidate tenure-ship related emerging problems. Consequently each *Farig* will be responsible for a block (area), the size of which will be determined by the local people themselves based on the needs, historical rights and the group's capabilities to manage the block. The people of each *Farig* will carry out all the management activities themselves. Allocation of blocks and demarcation will be carried out by the local people themselves and under the guidance and supervision of *a Sheik* or (*Sheiks*) and the popular salvation committee. Official (Forestry and Range) technical authorities should provide the necessary technical and legal backstopping.

(2). Administrative Organization

The administrative structure consists of the following two main institutions:

- Management Committee (MC)

This committee includes the field level officials (forestry, range and other relevant authorities) and non-officials (*Omda, Sheiks*, and representatives from local level organizations such as youth, women, development and popular salvation committees).

The extension officer in charge of the project could be the (local coordinator), who is responsible for dealing with the day to-day activities. Moreover, he or she will be the main technical advisor of the committee. The management committee (MC) has the following responsibilities: Supervising the execution of the programme of activities and taking relevant decisions to deal with emerging problems, and Monitoring and evaluation of the project programme and activities.

- Farig (village) Committee (FC)

This is the grass roots level body that contributes in plan execution. This committee will probably   be of an informal nature, where by the residents in

---

[4] *Farig*: is a part of the village contains about 7-10 houses

each *farig* (mostly one extended family) will nominate their representative or contact person to represent the communications and authority line between his people and the other committees and officials. Men and women at this level will undertake all the necessary management activities.

(3) Roles and Responsibilities of Stakeholders

The constitution of the stakeholders may change. Currently the following are the main stakeholders:- 1)Forestry authority 2)Range authority 3)Local people 4)Local authorities 5)Forest research institute 6)NGOs

The following is an account of the roles and responsibilities of these stakeholders

- Forest Authority

Administratively each forest belongs to a state. The roles will be within the forest department at the state level. The forestry department is expected to fulfill the national goal of conserving the forests. Hence, they are expected to provide the technical staff for all the required technical advice pertinent to the sustainable management of the forest. It is also expected to collect some revenue in form of royalties.

- Range Authority

It provides qualified staff to assist in the conservation and development of the range and consequently, to improve the situation of the animal production.

- Local People

This category consists of villagers living in settlements around/nearby these forests, and nomads who visit the forest together with their livestock during a certain period of the year. Livestock raising seems to be central to the live of various groups. Hence, they are interested in having a rich and durable range. Moreover, they are willing to maintain a sound environment. This category of stakeholders is looking forward to benefiting from the wood and non-wood forest products, which could be obtained from these forests; whereas, villagers living in settlements around and nearby the forest; will participate in opening of fire lines and abstaining from causing damage to the forest. Lastly, nomads, will contribute to the protection of the forest through direct patrolling and by keeping themselves and their livestock away from activities that might cause damage to the forest.

- Local Authorities

The locality and the popular salvation committees represent this category of stakeholders. They are interested generally in environmental conservation.

Specifically, they are willing to help provide the necessary range conditions for live stock raising in their areas. They are expecting to benefit from taxes to be collected from forest products and livestock.

In turn they will contribute to the opening of fire lines, range improvement, salaries of their staff (who are involved in the management of the forest); moreover, they will provide the legal support and atmosphere pertinent to the sustainable management of these forests.

- Forest Research Institute

Should have the following responsibilities of coordinating research in a) participatory forest management activities (as priority), b) participatory resource assessment, c) conventional resource assessment, d) providing guidelines and conducting research on how to implement participatory forest management as an alternative management approach, e) provide technical support on tree management aspects.

- Non Governmental Organizations

It is expected that the donors will be impartial but be able to provide financial and technical support, to facilitate building of trust between all stakeholders and to participate in monitoring and evaluation.

- Others

This includes others who are interested in conservation. One might expect other stakeholders' coming- in, in addition to change in roles.

(4). Extension

The whole management philosophy in this context is based on the participation of the local communities with the minimum input from outsides "professionals".

Extension, in this context has to be perceived as a multi directional communication means, whereby the various actors will exchange and share information and experiences. The main objective is to facilitate the negotiations and bargaining process pertinent to design with management plans which would accommodate the needs and aspirations of the stakeholders. Extension foresters will also be the ideal individual to deal with participatory forest management aspects outside the forest, though in collaboration with the foresters' management. His or her role will be: Rural development forestry and other related rural development issues; Formation of community management structures; Coordination of conservation awareness meetings; Training local people in general tree growing; and Updating the participatory management activities on people's land.

The following diagram (Figure 2) shows the linkages between the different stakeholders and local communities with respect to forestry resources development and management.

Figure 2. The Proposed Participatory Forest Management Model
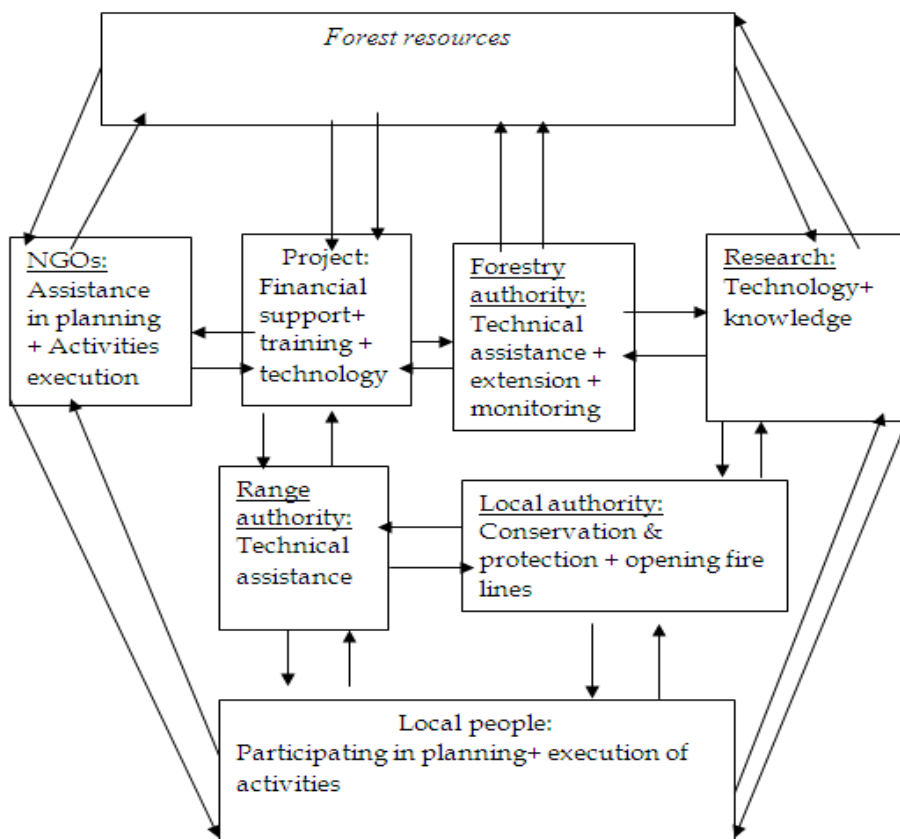
Conclusions and Recommendations

The study concluded that trees and forests are highly perceived by the local people of the study areas as sources and signs of life and that local people see the future management of these forests in the collaboration with government and other actors and expressed their readiness to participate in further development of these forests.

There is a growing compromising attitude to include all forms of land use in a balanced manner and a compromising attitude of accepting others' interests. The study discovered that the communities' self-generating institutions are the only acceptable channels and linkages with the top planning bodies. Understanding people's perceptions, aspirations, needs and

objectives in this context helped in formulating a framework for introducing local communities, government and other stakeholders into operational management of forest resources.

The study recommends that foresters have to take local people's perceptions, objectives, needs and knowledge into consideration when deciding official management objectives and strategies. There is a need to a clearly defined and agreed upon land use policy and legislation, to be developed through the participation and involvement of all relevant stakeholders so as to avoid conflicts and contradiction of interests between various users.

For effective and sustainable management of natural forest resource and with regards to tree and forest land tenure, government should facilitate establishment of property systems by defining groups in delineated areas and with rights of inclusion and exclusion. In this, actors will be effective and sincere in managing forest resources in a sustainable way. What are needed are not only regulations, but also cooperation with regulations. Government can help local indigenous institutions; provide a legal framework and perhaps technical assistance. "The law should make it possible for local collective action organizations to obtain legally enforceable recognition of their identity and rights within the society and to call up on the state as an enforcer of last resort" (Suleiman 1996).

References

Abdulla, E. A. & C. Holding 1988. Forestry and the Development of A national Forestry Extension Services: A Sudan Case Study, Social Forestry Net work, Paper 7c odi.

Abusin, M. E., & Elsamani, M. O. 1986. Socio-Economic Aspects of Integrated Resource Management, with Special Reference to the Forest Resource of Kassala Province–Eastern Region. (The Case of Rawashda and Wad Kabu forests). Fuelwood Development for Energy in Sudan. GCP/SUD/NET.

Ary, D.,Jacobs,L. C. A & Razavie, A. 2002. Introduction to Research in Education. Wadsworth Publisher, Belmont,CA.

Elsiddig , E., A., Goutbi, N. And Elasha, B.2001. Community Based Natural Resource Management in Sudan. Inter governmental Authority on Development. Final Draft., Sudan.

Bayoumi, A. M. 1989. Forest Potential of the Sudan. In: K. H. Badi, A. E. Ahmed & A. M. Bayoumi. The Forests of the Sudan. Khartoum, Sudan, 142-166/

Poilt, D. F., and Hungler. B. P. 1999. Nursing Research: Principles and Methods (6th Ed.). Philadelphia: Lippincott.

Bebawi, F. F.; Elhag, G. A. ; Khogali, M. M. 1985. The Production of Dura (*Sorghum Vulgare)* in Sudan and the Parasite Buda (*Srtiga hermonthica*). In

H. R. J. Davies (Ed). Natural Resource and Rural Development in Arid Lands: Case Studies from Sudan. United Nation University, 1985.

Diaw, M. C. 1997. Shifting Cultivation, Land Use and Property Rights in Southern Cameroon. Rural Development Forestry Network, Network Paper 21e.

Elsiddig, E. A. 1996. Investigation on management syssems in natural forest reserves: Case study : Elrawashda and Wadkabo. Aconsultency report for FAO/FNC, Khartoum.80p.

Elsiddig , E., A., Goutbi, N. And Elasha, B. 2001. Community Based Natural Resource Management in Sudan. Inter governmental Authority on Development. Final Draft. Khartoum, Sudan.

Elsiddig, E. A. 2003. Management of dryland forest reserves in Sudan based on participatory approach. In: Aslsharan,A. A., Wood, W.W., Goudie,A. S., Fowler, A. &Abdelatif,E.A. Desertification in the third millennium. Belkan Publisher,Lisse,The Netherlands.pp.361-364.

FAO 1993. Sustainable Management of Tropical Moist Forest for Wood. In challenge of Sustainable Forest Management: Technical Paper. FAO, Rome.

FAO 2001.Global Forest resources Assessment 2000. Maion report.FAO Forestry Paper No 140, FAO. Rome

FOSA 2000. Forestry Outlook Study for Africa. African Forestry and Wildlife Commission, Item 5 of the Provisional Agenda, Twelfth Session Note, Lusaka, Zambia, 27-30 March 2000.

Glover, E. K. 2005. Tropical dry land rehabilitation: Case study on participatory forest management in Gedref , Sudan. Ph.D Thesis. Viikki Tropical Resource Institute, University of Helsinki.

Hurditch, W. J. 1992. Problems of Public Forestry and Socio-economic Implications of Privatization. O.F.I Occasional Papers No.42, Oxford Forestry institute, University of Oxford, UK

Kobbail, Amani, A. 1996. Managerial and Social Aspects of Community Forestry in Kosti Area (Central Sudan). M.Sc. Thesis. University of Khartoum, Sudan.

Mohamed, H. A. 1994. Traditional Institutions and Resource Management in Darfour: Case Study of Ummkedada Province. In Ahmed (Ed). Indigenous Knowledge for Sustainable Development in the Sudan. 115-128.

Muukhtar, M.E. 1990. Forestry and the Private Sectorin Sudan.Khartoum, Sudan.Sep.the 7th.(unpublished).

Murray. C. H. 1993. The Challenge of Sustainable Forest Management, What Future for the World's Forest? FAO Forestry Publications.

Robson, R. A. H. 1989. The willing of Sudanese to Participate in the Protection and Management of the Forest Reserves: A report to FAO/World Bank. Klockner Stader Hurter. Montreal, Canada.

Sief El Dien, A. G. 1986. Integrated Land Use in Forest Reserves in Eastern Region: Global Diagnosis and the Involvement of the People. Fuelwood Development for Energy in Sudan. GCP/SUD7033/NET. Field Document No.11

Sulieman, M. S. 1996. Changing Forest Management Strategies in Sudan: A challenge for Forestry Educational Systems. Ph.D. Univ. of Wageningen.The Netherlands.

Wily, L. 1996. Community Based Natural Resource Management: The Case of Duru-Haitemba and Mogori forests in Tanzania. A case Study Presented to the World Bank/UNEP Africa. Forest Policy Forum Held in Nairobi, Kenya 29-30August, 1996.

Wiersum, K.F. 1991. Forestry and rural development.Lecture Notes, Forestrydepartment. Wageningn, the Netherlands wageningen Agricultural university.