



Social Aspects of Community Forestry in the Semi-arid Zone of the Sudan: A Case of Kosti Province

Amani Abdelraihm Kobbail^{1*} and Abdelhi Mohamed Elmadina ¹

Department of Social Forestry, College of Forestry and Range Science, Sudan University of Science and Technology. P.O.Box 6146, Code 11113, Khartoum-Sudan. E-mail abdelhaimohamed@sustech.edu

Corresponding Author: : amanyforest@yahoo.com

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Abstract

This research is an attempt to study the social aspects of community forestry in Kosti Area through household level investigation. The study was undertaken in Kosti province of White Nile area of Central Sudan in 1996. A social survey was carried out in the study area and respondents were selected through simple random selection. The household was the basic unit of data collection, ten villages were selected. Hundred households were sampled out i.e. ten from each village. Community forestry in the study area is one of the sources to meet the community needs; the per capita consumption of fuel wood is equal 0.8m³ /year. Frequency distribution results indicated that the rural people of Kosti area are aware of forestry and different tree species and their uses. They are well aware of the role of community forestry in protecting the area from desertification. Rural people have positive attitudes towards community forestry. The study emphasized the involvement of the rural population in all aspects of tree growing activities, regarding the role as decisions maker and implementer of community forestry activities.

Keywords: communal forests, tree planting and conservation.

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Introduction

The rural populations depends on forests for their existence and to maintain their life system, despite this forests have been destroyed either for fuelwood or to make way for farming or grazing. This wide spread devastation resulted in closely environmental degradation and desertification which in turn lead to drought and famine in many parts of the country in addition to scarcity of energy source for 80% of the population (Bayoumi, 1989).

The main domestic energy source in Sudan is wood and charcoal, Kismul (1988) indicated that, the increasing demand for firewood and charcoal has been an important cause of

deforestation. Likewise such factors as several drought cycles and expansion of agriculture have also increased the pressure upon the forest resources. At present the demand for fuelwood cannot be met from the existing forest reserves and it has therefore become necessary to involve people in planting of trees through appropriate community and agro-forestry techniques (Nasroun, 1989, Kobbail, 2005 Glover, 2005). Community forestry is an ideal approach for dealing with energy crisis and desertification in developing countries, where forests and forest products are most needed and fuel wood account for over 80% of the wood consumed for energy (Cerenea, 1985).

Community forestry programmes are based on the use of public or community lands for growing trees, though generally designed to meet community needs, rather than industrial uses.

In Sudan, there have been very little experiences with such programmes so far. It has been largely identified with traditional gum arabic production systems which combine agriculture and forestry. When the *Acacia senegal* trees are small, crops were grown between them. After a few years of fallow period, gum trees were tapped for several years. At the end of the cycle, firewood and building poles were harvested to clear the land for cropping again. This system occurs on private land, and farmers are the direct beneficiaries of the system (World Bank, 1986). Other than the gum belt area, traditions of tree cultivation is less highly developed but trees are nevertheless widely grown to provide wood, fruits, animal fodder, wind breaks and a wide range of other reasons.

It has been estimated that about 500.000 square kilometer of the semi-arid lands of the Sudan are directly affected by desertification (Ibrahim, 1978). Besides desertification the semi-arid zone of the Sudan is seriously affected by drought. The White Nile Area is one of the most affected areas by deforestation and energy crisis. To combat the threatening environmental degradation in the study area, development programmes (Rural Forestry Programmes) in tree planting were started in the Province towards the end of 1970's.

This paper is an attempt to investigate the social aspects of these tree planting programs. The specific objectives were: to evaluate pattern of energy consumption in the study area, to assess local people forestry indigenous knowledge system, to assess the perception and attitudes of the rural people towards community forestry programmes and finally to evaluate the contribution of community forestry in meeting the needs of community members.

Materials and Methods

The study was undertaken in Kosti Province of White Nile area of Central Sudan. The climate of the area is semi-arid; with an average rain fall of 250-350mm. the main physiognomic vegetation type is woodland savannah which generally reflects the semi-arid climate. The vegetation is dominated by several *Acacia species* of which important multi purposes species. The area is inhabited both by settled and nomadic population, their economy is dominated by traditional rainfed agriculture and seasonal wages.

Data collection and analysis

The data were collected from primary and secondary sources. Primary data were obtained through formal and informal interviews. A questionnaire for basic information at the household level was designed prior the field work to collect both qualitative and quantitative information. The questionnaire was first tested in the field with 20 heads of households. The questionnaire was adequate and very slight modifications were made to suit the conditions of the study area. The questionnaire was administered to hundred heads of households from the selected villages. These formal interviews were accompanied by personal observations which allow the author to judge the reliability of the answers given. In all selected villages the village leader was the first to be approached and talked to about the purpose of the visit and the study to get permission to carry out interviews with the respondents. The questionnaire was designed to obtain information on personal characteristics in addition to social aspects of community forestry activities.

Discussion with the village leaders, extension workers and personal observations from the field visits were also used to collect qualitative information. Observations were found to be useful in collecting information on physical aspects such as vegetation and soil. It was also found useful in directing attention to certain aspects of human behaviour especially where there were

different tribes in the area, which showed different pattern of life.

Secondary data 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. The institutions from which the data was collected are directly involved in the study, such as the Forests National Corporation, Sudan-Finland White Nile Forestry Programme. Information were also gathered from reports and files found at Kosti area and Rural councils.

Selection of villages was done according to the existing community forestry. The author covered all the Programme villages (Sudan-Finland White Nile Rural Forestry Programme) which were ten villages and they represent Kosti North Rural Council.

The household is the basic unit of production and consumption in the rural areas; hence it was used as the unit of analysis in this study.

The Data were processed and analyzed using the Statistical Package for Social Science (SPSS) software. Calculation of the percentage was used as a tool of analysis for interpreting of the qualitative information gathered from respondents.

Results and Discussions

Socioeconomic characteristics of the respondents:

One hundred respondents (86%) men and (14%) women were interviewed. The above percentage does not imply that there are more men than women in the study area. As a rule men are to be interviewed since they are heads of the households and in charge of the major landuse activities. The small proportion of the female respondents is those whose

husbands are absent. The ages of respondents ranged from 30 to 50 years, with a median age of about 35 years, primarily rural workers (70% farmers, 30% other jobs). Of those who revealed no regular education are 55%. Those who have received Khalwa (Quran education), primary, intermediate, and secondary educational levels are very few; their percentages are 2%, 21%, 8%, and 14%, respectively. Most of the respondents (89%) are not members of any type of social committees. They were not government employees and never practiced any form of leadership (Sheik 4%, member of village committee 4%, and member of rural town council 3%).

Fuel wood consumption in the study area:

The main objective of establishing the community forestry in the study area was to protect the villages from sand dunes movements and to provide the population with firewood for household consumption. Consumption of fire wood and charcoal is shown in table (1). The data obtained in terms of donkey loads for firewood, and, in sack for charcoal and converted into cubic meters (m³) of solid wood. According to FAO (1995) the conversion factor for each kilogram of firewood is 0.001109 cubic meters solid wood, while Taha (1993) indicated that the conversion factor for each kilogram of charcoal is 0.0016429 m³ of solid wood. Both were used in this study. Results indicate that the average annual consumption of dry firewood is 5.73 m³ for large size family and 2.40 m³ for charcoal consumption per annum (table, 1).

Table 1: Dry firewood and charcoal consumption by different family groups (m³/year/family).

Family group	Family size	average quantity of converted dry firewood	Average quantity of converted charcoal
Small	<7	3.38	1.51
Medium	7-10	4.96	1.85
Large	>10	5.74	2.40

Based on Table (1) the present consumption rates of charcoal and firewood in the area of Kosti were calculated (Table 2, 3).

Table 2: Annual consumption of firewood per capita (m³).

Family group	Size of the family	Avg. no of members	Frequency	Per capita avg. consumption/ family group	Avg. annual consumption/capita	No. of individuals in the families	Total annual consumption of dry firewood for each family group
Small	<7	4	26	0.5	0.6	104	88.04
Medium	7-10	8	50	0.6		400	247.77
Large	>10	14	24	0.4		336	137.67
Total						840	473.48

Table 3: Annual consumption of charcoal per capita (m³).

Family group	Family size	Avg. no of members	Frequency	Per capita avg. consumption /family group	Avg. annual consumption/capita	No. of individuals in the families	Total annual consumption for charcoal for each family group
Small	<7	4	26	0.2	0.2	104	39.20
Medium	7-10	8	50	0.2		400	92.44
Large	>10	14	24	0.2		336	57.55
Total						840	189.19

Consequently, the average annual consumption of fuelwood (charcoal and firewood) was found to be 0.8 m³ per capita. the fuel wood consumption (firewood and charcoal) estimation in this study is greater than the estimation of FAO (1995) which is equivalent to 0.5 m³ per capita in the White Nile State and also greater than the estimate of an average of 0.6 cubic meters per capita per year at a national level made by FAO (1995) to be widely accepted and applied for the consumption in Sudan. The increase in the fuel wood consumption rate may be attributed to the total dependency of the population in the rural area (study area) on natural forest resources which have been in scarce; and due to lack of any other support such as plant residues or any other substitute. Also the increase of the population number leads to an even greater increase in the households' consumption. Generally, firewood shortage is expected to increase in semi-desert and low rainfall areas as their forests resources base is degraded and further distanced.

Local people indigenous knowledge about forestry:
Local forests knowledge of people is very important issue that needs to be understood, respected and used in efforts to solve existing environmental problems resulting from deforestation, overgrazing and farming (Kilahama, 1994). It is also essential for designing new activities that depends on

local people participation and rational behind traditional tree management (FAO, 1989; Kobbail, 2005; Glover, 2005). Respondents are knowledgeable about different types of tree species and know which of them are appropriate and even know how to propagate them. Table 4 shows the different tree species mentioned by the respondents.

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Table 4: Species recognized by the respondents

Species	Percent
Hashab (<i>Acacia senegal</i>)	83
Siddir (<i>Ziziphus spinachristi</i>)	0
Heglig (<i>Balanites aegyptiaca</i>)	74
Talh (<i>Acacia seyal</i>)	72
Laout(<i>Acacia nubica</i>)	71
Sunt (<i>Acacia nilotica</i>)	67
Mesquite (<i>Prosopis chilensis</i>)	43
Kitter (<i>Acacia mellifera</i>)	37
Seyal (<i>Acacia tortilias</i>)	24
Tundub(<i>Caparis divedua</i>)	18
Neem (<i>Azadirachta indica</i>)	14

As stated by the respondents most of the mentioned trees (Table 4) were dominant in the area and disappeared over the past 20 years due to extensive forest cutting with exception of mesquite which is newly

introduced in the area. Respondents in the study area perceived trees as valuable and useful resources. According to table (5) respondents'

Table 5: Uses of trees in the study area

Tree use	Percent
Firewood	73
Construction wood	54
Shade	35
Charcoal	20
Fodder and fence	11
Fruits	8

identify many uses of trees, all of which were important in their daily life. Most of the respondents (73%) perceived that fuelwood is the most valuable product of trees. From the group discussion the author realized that women are more knowledgeable about the type of trees suitable for firewood. They prefer a variety of tree species among these *Acacia drepanolobium*, *Acacia mellifera* and *Acacia tortilis*. These species are preferred because they burn slowly producing a very hot fire, produce less smoke and the wood can be split easily and dried quickly as stated by women. In the group discussion respondents also stated that they benefit from fodder, wood in making furniture, shade and medical benefits. Local people are aware of the value of the trees for many useful purposes. Forestry extension activities should make use of this high level of awareness about trees to promote tree planting, use of fuel efficient stoves and observance of forest cutting regulations.

Land in the White Nile is highly degraded and all interviewed respondents recognized this problem. Moreover respondents are knowledgeable of the causes of forest damage where 52% of the respondents mentioned that natural drought is the most destructive agent of the forest and they recalled that in the past rainfall was reliable and now days rains is almost in shortage which lead to dryness of the roots and death of trees, and there were some years of drought. These were cyclical, occurring every eight to ten years "Now drought is almost every year" they said. Fifty one percent of the respondents related forest degradation to illegal cuttings and removal of trees. Fourteen percent of the respondents believed that, grazing is one of the causative agents of forest degradation. Generally the misuse of the soil and the natural vegetation by over exploitation for fuel, shifting cultivation and overgrazing leads to serious erosion by wind and water. According to Stebbing ,1953; Ayoub, 1998; Babev and

Gand Zonn ,1999) the misuse of the natural resources leads to irregularity or intermittency and reduction in rainfall and such conditions do not favor any form of productive cultivation and the only possible use is grazing. With increasing numbers of animals and decreasing grazing resources, the land falls progressively into stark desert conditions. People are aware by the causes of forest destruction, contributing significantly to present environmental degradation. Heavy extension efforts are needed to highlight people awareness about the causes of damage to reduce forest degradation and encourage tree planting.

Respondents in the study area are aware about the forestry law. Results show that 98% of the respondents believed that there is a need of getting license or permission from the local authorities, before one can cut a tree

he/she has planted or in a forest. Respondents argue that, they were aware that the forest act of 1932 forbids cutting of trees without license from the forestry authority. Despite this awareness the province forest department in Kosti has put a legal contract, to be observed by local village leaders, which clarifies the relationship between the project and the farmers. This guarantees that plantation will be harvested by owners, under the supervision of the project officials.

Attitudes towards forestry activities:

The present survey results (Table 6) show that most of the respondents are aware of the productive and the protective role of trees and they express their urgent need to plant trees to combat the threatening environmental problems and provide them with fodder and other useful tree products.

Table 6: The urgent need of trees in the study area

Tree need for	Percent
Desert control	48
Fodder	25
Building poles	24
Firewood	22
Wind protection	20
Shade	12

The project (Sudan -Finland tree planting project) covers an area where fodder is in short supply. According to this and towards the end of 1970's the forestry department was interested in the establishment of *Prosopis chilensis* in the sandy upland region with the dual objectives of improving the arboreal pasture and contributing to soil stabilization. The survey results also reveal that all communities have developed positive attitudes towards tree planting as 100% of the respondents believe that trees preserve soil fertility and reduce the land susceptibility to wind and water erosion. The majority of respondents (99%) explained that tree planting secure their future and trees should be planted to meet their personal requirements. Moreover, 98% of the respondents explained that their villages need more trees and 90% of the respondents are interested in growing trees in their farm. It is

obvious from these results that the importance of trees are well understood by all the respondents who consider tree planting is one of the activity of protecting their environment against wind.

Most of the respondents of the surveyed villages possess positive attitudes towards community forestry; 73% of the respondents believed that community forestry represents a source of fodder for grazing particularly in the dry season and they totally depend on them. Forty nine percent of the respondents reported that community forestry supported them with firewood and 48% of the respondents appreciated the vital role of these forests in protecting them from desertification and the movement of sands towards villages. Forty percent of the respondents recognized the protective role of these forests against wind blowing and 16% of the respondents viewed these forests as a source of beauty,

pleasure and landscape and this is an interesting answer from the respondents to feel the aesthetic value of these forests. It is therefore clear that all the respondents benefit from these forests. Their benefits range from provision of domestic needs for human and livestock. It is safe to say that establishment of community forestry in the area is socially acceptable. It is obvious that community forestry play an increasing economic role in communities' life. This role has not been appreciated in the past, due to the abundance of forest resources as perceived by such communities. At present all communities appreciate this role.

Respondents' acceptance of community forestry is very clear from the findings. The best type of management asserted by 99% of the respondents is the community forestry that owned and managed by local people. In the group discussion local people reported the importance of having link with the forest department and this in fact, is a reflection of the positive attitude of local people towards the forest department. They prefer that the role of Forest Department is to be co-ordination, technical roles and implementation of laws. The majority of the respondents stated that this is the best way to guarantee participation, protect forests from damage and illegal use. This shows the change in the rural people attitude towards forestry and Forest Department. Also this result indicates a change in the perception of fear that the Forest Department will take their lands and the difficulty of management if these forest are left to people alone. This is attributed to the fact that respondents' participation in these community forestry programmes with the Forestry Department resolves the barriers of mistrust and antagonism which often exist between the forest services and local people resulting in failure of many programmes.

Although few women were interviewed in this survey, they have positive attitudes towards community forestry and willing to participate in community forestry activities. The survey results revealed that 99% of the respondents favour the involvement of

women in community forestry activities and this is a promising attitude for further development. From the informal discussion carried with the interviewed women it is clear that in the surveyed villages, men play a central role in tree planting and women were not fully involved in tree growing in the study area. As argued by Skutch (1983) women unlike men, do not take up tree planting. The author further stressed that, men whose authority is not easy changeable retain the sole right to grow, manage and fell trees. In the rural areas of the Sudan women are almost a part of the household resource, their chief role being reproduction and caring for the family, fetching water, cooking and procuring fuelwood. Decisions about how fuel is gathered and used are made by women inside the family. Also the seasonal migration phenomenon has placed a heavy burden on women especially in the study area where only children and old men are left behind in the village and the women's role in agricultural production has increased.

Farmers' perception about environmental problems and participation in community forestry activities:

This is an attempt to identify and evaluate the perception of the respondents about some environmental consequences that occurred or may occur as a result of the presence of community forestry in the area. Results showed that all the villagers (100%) recognize the shrinkage of the natural forests around their villages. The causes for the environmental degradation seem to be well understood by the villagers. The most common explanations given by the respondents are illegal cutting of trees (43%), wind (3%), and other factors (2%), where as 49% of the respondents consider drought as a cause to the environmental degradation process.

Local people are aware of the measures to halt desertification. About 89% of the respondents suggested that planting trees is the solution, 16% suggested protection of forest and trees, while 10% of the respondents suggested that people have to

cease cutting trees and only 2% do not see any solution.

The results show that the majority of the respondents (91%) participated in the major activities of community forestry i.e. planting operations which include land preparation (digging of pits), watering, seedling transportation, cleaning...etc. Thirty four percent of the respondents participated in maintenance and protection of forests, while 25% contributed mainly in form of ideas and organization. Generally establishment of plantation under the custody of Forest Department should be done with very significant involvement of local people. This will provide the people with the opportunity of joint responsibility with the forest department in the process of establishment of plantations and hence help them to develop a sense of belonging to the plantations and perceive them as their own assets designed to solve some of their felt needs. Most of the respondents (90%) expressed their readiness and willingness to participate in forest management. The form of contribution ranges from minimum of cash and efforts (6%) to a maximum of 44% of any type of contribution to be asked. The demanding experience of the self-help programmes, adopted by government to tap community resources for provision of basic services is the main reason that makes people not to commit themselves for cash contributions. They opt for easy riding option of any other form of contribution. Provision of efforts accounts for 7% only of the total respondents. Responses to contribution to help in planting the sandy land to be allotted for forest are expressed by 61% of the respondents. Some of the respondents indicated their readiness to

plant trees in their farm land (22%) while 9% of the respondents are willing to give part of their land.

Contribution of communal forests in satisfying the needs of local people:

The results obtained from this survey (table 7) shows the contribution of community forests to people's needs in the study area. All the respondents indicated that part of their needs is obtained from communal forests. The majority (99%) of the respondents stated that they obtain their firewood from the community forestry in addition to other sources. They explained that the amount obtained from the community forestry is mainly in form of dead wood and dry fallen twigs which they are allowed to collect from the forest, in addition to the amount obtained from thinning operations and this is mainly in villages where thinning had been carried out. Similarly for charcoal and construction wood the majority of the respondents obtained them from other sources, and only 4% and 10% of the respondents, obtained them from community forestry, respectively. This occurred in villages where thinning was carried out. Since the total removal or cutting of mesquite is restricted; taking into account the priority of the protective role, 100% of the respondents obtain their thorny zariba (Fences) from other sources. The major and most important contribution of these forests is provision of fodder. The above results indicate the considerable economic role of these forests in satisfying the part of the felt needs and since they are newly established, people will recognize its beneficial aspects in form of wood production as further thinning operations take place.

Table 7. Contribution of community forests in satisfying local people needs.

Product	Source Percent	
	Other than community forestry	Community forestry+ other source
Firewood	-	99
Charcoal	96	4
Fences	100	-
Construction wood	90	10
Fodder	-	-
		100

Conclusions and recommendations:

The study concluded that:

People in the study area are very much aware of the state of their environment and they know the role of trees and forests in improving, preserving and protecting the environment.

Forestry extensionists should be facilitator and help farmers to forage a head with their own development. This means empowering them through information sharing and discussion. Farmers will listen to us if they see we can improve their understanding and assist them to develop or adopt technologies suitable to their own environmental and cultural conditions.

Rural people in the study area possess positive attitude towards tree planting and community forestry. This should be utilized to involve local people more and more in the afforestation programmes. The confidence between local people and the forestry authorities is needed in community forestry programmes and will lead to furthermore successful management programmes dealing with tree depletion, through heavy extension work.

Communities have expressed their readiness to participate in communal forests activities and the success of social forestry programmes irrespective of their models depends largely on effective people's participation at various stages of their implementation (Odi, 1987).

Community forests contribute to some extent in satisfying part of community need and this role is really appreciated by the community.

The study recommended that:

When we plan the socioeconomic dimensions should be estimated for the success of any tree planting programme. In most cases due to time and monetary constraints in rural tree planting activities and the need to meet macro-level policy goals, adequate recognition of the complexity and attention to specific socio economic factors in the programme are sacrificed. Problem definition and proposed strategies are usually generated on this basis of broad assumptions and

general national policy objectives rather than knowledge drawn from investigation in the field with the small farmers, the people the programme is intended to benefit.

For the success of any tree planting programme it is essential that extension workers take into account the highest prioritized needs, through one of the variation of investigation strategies. The target audience may then allow rural tree planting activities to rise in importance in their felt hierarchy of needs (Bojang, 1997). We are also need to encourage local people to share their good ideas with us so that we can support their initiatives and develop village extension plans based on these.

The new conviction of the positive attitudes towards tree planting should received higher attention from the forestry extensionists and should be exploited for further development of new programmes.

For effective rural tree planting programmes it is essential to address the issue of understanding women's need, their role in their communities, their influence in the decision making and their access to land. This will help in motivating women in tree planting. This could be achieved through incorporating female extension workers in tree planting projects. Women participation in the problem identification should be strengthened as well as their participation in implementation.

To gain the maximum possible benefits of communal forests, proper management plan is required to satisfy the community needs and generate marketable fuelwood for them.

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الجوانب الاجتماعية- الاقتصادية للغابات الشعبية بمنطقة كوستي (وسط السودان)

امانى عبد الرحيم كبيل و عبد الحى محمد المدينة

قسم غابات المجتمعات كلية علوم الغابات والمراعي-جامعة السودان للعلوم والتكنولوجيا

المستخلص:

البحث هو محاولة لدراسة الجوانب الاجتماعية- الاقتصادية للغابات الشعبية بمنطقة كوستي (وسط السودان). يستخدم البحث منهج المسح الاجتماعي. تم اختيار المبحوثين عن طريق الإختيار العشوائي البسيط. ثم اختيار عشرة قرى واجري المسح الاجتماعي على عدد 100 شخص. عشرة اشخاص من كل قرية في منطقة الدراسة. أكدت الدراسة أن الغابات الشعبية في المنطقة هي واحدة من المصادر الرئيسية لمقابلة احتياجات السكان المحليين. كما خلصت ايضا الي ان الإستهلاك الشخصي للفرد من حطب الوقود يعادل 0.8 متر مكعب في العام. كذلك أوضحت الدراسة بان السكان المحليين لديهم معرفة جيدة بالأشجار واستخداماتها ودور الغابات الشعبية في حماية المنطقة من التصحر و لهم مواقف ايجابية تجاه الغابات الشعبية بالمنطقة. كما خلصت الدراسة إلي أن مشاركة المواطنين كانت فاعلة في كل الأنشطة الخاصة بالغابات الشعبية بالمنطقة.