



Assessment of Socio-economic and Environmental Impacts of Community forests at Rahad Agricultural Scheme-Sudan

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Abstract

This study was carried out in El Rahad Agricultural scheme in 2017. The main objective of this study is to assess the social, economical and environmental impacts of community forests in the Rahad Agriculture scheme. Secondary data was obtained from reports, records, and previous related studies. In addition to semi- structured interviews were held with some officials and key informants. A questionnaire was used to collect the primary data and 50 respondents were interviewed, which constitute about 20% out the total number of target group in the study area, including foresters, farmers, citizens, and community committees. SPSS soft ware programme was used to analyze the data using frequency and percentages. The study showed that the community forest provided local needs of people such as fuel wood (firewood and charcoal), building poles and fodder for livestock. In addition to social services (health, education, water and recreational services). *Acacia nilotica* trees are considered as main trees at the study area. The study recommended that the extension and forest authorities need to exert great efforts to enhance people participation in community forest management and conservation particularly to activate the legislation that obliges farmers to establish 5%of irrigated scheme with trees.

Keywords: Community forest, Rahad Agriculture scheme, Impacts, Assessment

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Introduction

Sudan has various types of natural forests as well as plantation forests. Forest plays an important role for human well-being in many dimensions and multiple uses include wood and non-wood forest products, recreation , soil and watershed protection, hunting ,biological conservation and other goods and services .(Tia,2012).Traditionally, villages in Sudan used the forest resources in their surroundings. Until the mid -1980s, the majority of forestry programmes in Sudan were primary concerned with reservation

and reforestation , mostly without involving villagers in those areas . FNC alone was not in a position to tackle a large forestry plantation programmes to meet the needs of rural communities. Hence, there is a call for mobilization of other stakeholders to be involved in forestry programmes.

Moreover, there is a need to develop a forestation programmes using new approaches which enhance rural communities' participation. (Kobbail, *et al.*, 2011) found that trees and forests are highly perceived by the local people as a source 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. Also the foresters have to take local people's perception, 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. According to (Elmadina, *etal*, 2012), the character of the benefits and services availed by forests attracted a variety of stakeholder's categories. However, local people groups and FNC were identified as the principal stakeholders. The initiatives of involving local people in forestry programmes motivated stakeholders to develop positive perception and attitudes towards forest resources and forestry authorities. (Abdalla and Mohammed, 2004), found that millions of rural people depended on forests and community forests for income and for fuelwood, because fuelwood is the main energy source in most of Sudan villages and all cookings and most food processing are depending on fuelwood. In (RAS), one of the main reasons for growing forests was to satisfy the local needs like building poles, fuelwood, charcoal, fodder, increase the income, and to compensate the uprooted *Acacia mellifera* forest. Bhattarai, (2016) stated that a community forest is a part of a national forest that has been handed over to a user group for its development, conservation and utilization for the collective interest. Moreover, as common land diminish, and the natural resources on them recede, farmers have thought to shift the production of out puts of value on to their own land by protecting, planting, and managing trees of selected species.

Meanwhile, FAO (1989) defined farm forestry as the practice of growing trees on privately owned agricultural land and waste land including degraded forests. However, in recent time the process of adding trees to farming systems has been accelerated or transformed by the growing commoditization of fuel wood and other tree products. As mention before, the farm forestry is further divided into two categories, one for subsistence and the other for market.

Rahad Agricultural Scheme (RAS) is a national multi-crops irrigated scheme established in early 1974 with a total area of 800000 feddanes, to be executed in two phases namely phase (1) 300000 feddanes and phase (2) 500000 feddanes. According to the Forest National Corporation policy, 5% of irrigated agricultural schemes, as well as 10% of rain-fed mechanized schemes should be planted with trees, Map (1), Abdalla, (2002). Rahad Scheme was established in the arid and semi-arid climatic zones with maximum temperature ranging from 34 to 42 °C and minimum 14 to 23 °C. The relative humidity varies from 21% in April to 70% in August. The rainfall varies between the northern and southern parts of the Rahad Scheme. The northern part has an annual rainfall average just below 300 mm, with a dry period of about eight months, while the southern part has an annual rainfall of 500mm, with a dry period of seven to eight months, so the hard conditions cause shortage in firewood, charcoal, building poles, and other uses of forest. In 1990 RAS introduced tree planting as one of main crops in the scheme and considered it as a cash crop. According to UNEP, (1987), farm trees are very important for agriculture and livestock production, and provide essential tree products. Integration of agricultural crops, livestock and forest plantations was the most reasonable solution. RAS concept is based on the integration of agricultural, animal

production, and forestry. According to Abdalla, (2002), Millions of rural people depend on forests for income and fire wood; because fuel-wood is the main energy source in most of Sudan village's .All cooking and most food processing are dependent on fuel-wood. Indirectly, therefore, fuel-wood affect the stability and quality of food supplies.

Community Forestry Activities in Sudan

- Small-scale community woodlots, including that by user groups, women, school, etc. undertaken in common lands, institutional lands or land leased out to the user groups.
- Farm forestry (including woodlots, wind breaks around farms established and managed by the farmers, including planted in the compounds, etc.)
- Tree planting in compact blocks undertaken by institutions like agricultural corporations in irrigated areas.
- Protective and aesthetic planting (includes shelterbelts, wind breaks and canal, road and rail side plantings, urban forestry etc.) undertaken on government land by government with local level participation.
- Rehabilitation of degraded and abandoned farm lands by individuals,

communities and companies with involvement of government. (Talaat, 2003).

The relationship between Al-Rahad Administration and the community agricultural committee of the citizens is as follows:

Rahad Administration undertakes to prepare the seedlings, prepare the land and supervise the project; either the agricultural committee or the citizens were responsible for agriculture and the cost of land preparation and irrigation.

The income is divided equally between Al-Rahad Administration and community agricultural committee of the village concerned 50% of the revenue per.

The site is chosen by the village community agricultural committee to be an easy irrigation and does not conflict with individual ownership. The contract was done according to the conditions of the irrigated forest between the Al-Rahad agricultural administration and the community agricultural committee of the citizens, where the Al-Rahad agricultural administration undertakes preparation of the land and opening of the channels.



Map No. 1: Study area, Rahad Agricultural Scheme; Source :(RAS, 2017).

Research problem

Rahad Agricultural Scheme (RAS) area was originally occupied by natural thick cover of *Acacia mellifera* trees, and natural pastures in which livestock keeping was the major economic activity of nomads who roam the area. These natural pastures have been removed for agriculture, housing, roads and irrigation system. After the establishment of the scheme, serious problems of fodder for different classes of livestock, domestic fuel and building materials have been created as a result of putting the area, previously used as rangeland, under cultivation. (Abdalla, 2006)

Research objectives

- To evaluate the socio-economic and environmental impacts of community forests and their roles in satisfaction of the local community needs.
- To investigate stakeholders' needs perceptions and attitudes toward forest resources and their management aspects.
- To draw up recommendations to enhance community involvement in forest resources management

Materials and Methods

For data collection, secondary data was obtained from Official records, files, reports and relevant studies for the literature review. Group discussion was used with officials and semi-officials to collect information of

the general nature. The primary data was obtained by a questionnaire and 50 respondents were interviewed out of 1000 farmers which consisted the research population. The selection of the target group was done randomly. The questionnaire was designed to collect information from the farmers. For the data analysis, SPSS software was used .The frequency and percentage of each variable is calculated.

Results and Discussion

Table (1) showed that, the majority of the respondents 70% were farmers, in addition to forest workers, traders and pastoralist's as recognized by 12%, 10% and 8% of the respondents respectively.

Moreover the findings in Table (2) revealed that the majority of the respondents get their income from agriculture, in addition to forest workers, grazing animals and trading as perceived by 12 %, 10% and 8% of the respondents respectively. It is clear that the majority of the respondents were farmers since they were involved in the Rahad Agricultural Scheme and get their income from agriculture. Meanwhile, they were tending to diversify their source of income. Hence, integrated land use systems will have greater chances of acceptance among the population of all segments.

Table 1: Main occupations of Respondent's

Occupations	Frequency	Percentage %
Farmers	35	70
Forest workers	6	12
Traders	5	10
Pastoralists	4	8
Total	50	100

Table (2): Source of income for the respondents

Income sources	Agriculture		Grazing animals		Trading		Others		
	Report	Frequency	%	Frequency	%	Frequency	%	Frequency	%
Yes		35	70	5	10	4	8	6	12
No		15	30	45	90	46	92	44	88
Total		50	100	50	100	50	100	50	100

The results in table (3) showed that, the majority of the respondents 84% mentioned that the community forest provided fuelwood, 42% stated community forest generate income while, 28% mentioned that forest provided fodder for their animals, 12% clarified forests provided recreation in addition to 2% stated, forest reduced temperature and increase rain and relative humidity, and raise the awareness of people about the importance of forest resources and enhance Nafeer system. Community forests were important and useful resource for the people in the study area. They are the main source of fuelwood, building materials, income generation, and fodder for their

animals during drought, recreation and reduce temperature increase rain and relative humidity. These results in line with Abdalla and Tia (2004 and 2012) that mentioned forests are important to ecological, economic and social wellbeing of the communities, they provide wood and non-wood forest products, recreational values, environmental and clean air. The study exposed existence of some negative perception and attitude with respect to community forests such as: attracting birds, pests and rodents. However, the magnitude of this negative perception and attitude was very limited and insignificant.

Table (3): The socio, economic and environmental benefits of community forest in the area

Benefits of community forest	Generate income		Production of fuelwood		Grazing animals		Recreation		Others		
	Report	Frequency	%	Frequency	%	Frequency	%	Frequency	%	Frequency	%
Yes		21	42	42	84	14	28	6	12	1	2
No		29	58	8	16	36	72	44	88	49	98
Total		50	100	50	100	50	100	50	100	50	100

Table (4) showed that ,78% of the respondents reported that *Acacia nilotica* trees were the most important types of trees planted in community forests, which can be used in building poles and firewood and used as livestock feeders and generated income. Moreover, their seeds used for tanning and other uses. Then 18% reported

Acacia seyal trees are planted around the forest and act as windbreaks, while 16% reported *Eucalyptus species*, then the *Azadirachta indica* trees mentioned by 12%. While some other trees such as *Albizia lebbeck*, *Balanites aegyptica* and other were presented by 4%.

Table (4): Types of tree species planted in the community forests

Tree spp	<i>Eucalyptus species</i>		<i>Acacia nilotica</i>		<i>Acacia seyal</i>		<i>Azadirachta indica</i>		Others		
	Report	Frequency	%	Frequency	%	Frequency	%	Frequency	%	Frequency	%
Yes		8	16	39	78	9	18	6	12	2	4
No		42	84	11	22	41	82	44	88	48	96
Total		50	100	50	100	50	100	50	100	50	100

The results in Table (5) showed that, the majority of the respondents (90%) perceived that , the community forests conditioning the air and affected the microclimate , 78% reported the revenue from forests products used in water supply services, 65% stated it should be used in the health services , while

50% mentioned the revenue should be used in educational services in addition to 36% whom perceived community forests provided recreational values .These findings showed different opinions among the respondents about the utilization of the benefits and revenue from these products.

Never the less, the developed a positive perceptions and attitudes toward tree planting in the farms, they perceived community forests as valuable resources and provided many social and economic benefits to the communities adjacent to them and contributed to sustainable economic growth

as well as community development .This positive perception is consistent with Abu Sin and El Samani (1986) conclusions , as they reported a growing awareness as concerns the role of community forest resources in the rural economy as source of domestic needs and income.

Table (5): Perceptions of the respondents towards the values of community forest products in the study area

Forest Value	Health services		Educational services		Water services		Recreational services		Air Conditioning	
	Frequ	%	Frequ	%	Frequ	%	Frequ	%	Frequ	%
Yes	28	56	25	50	39	78	18	36	45	90
No	22	44	25	50	11	22	32	64	5	10
Total	50	100	50	100	50	100	50	100	50	100

See the result in Table (6) above 78% of the respondents mentioned that the tending operation were done in the community forests by sharing of some individuals (Nafeer) system while 18% sated that it was done collectively and collective action remained in the Sudan and did not disappear especially in the villages and rural areas while 4% of the respondents said that by

renting people who are living in the scheme area . So the participation of community people was clearly at the forest activities starting from soil preparation, seedlings, plantations, irrigation, tending operation, protection, harvesting and marketing. The Rahad Scheme authority should make use of the (Nafeer) to enhance community forest endeavors.

Table 6: Ways of tending operations in the community forests at El Rahad scheme

Ways of tending operations	Frequency	%
Share of some individuals(Nafeer)	39	78
Collectively	9	18
By renting labours	2	4
Total	50	100

Table (7) showed that 80% of the respondents reported that the management of the forest is carried out by people with expertise and expertise in forests, mostly from the Forest National Corporation and some concerned citizens in the region, and 12% mentioned that the forest is managed by the community Committees. So people

who live in the scheme traditionally have indigenous experiences in farms and forests management. The sustainable management of the community forests is aimed to ensures enough resources for coming generations, while laying the foundation for future generation.

Table 7: Management of community forest in El Rahad Agricultural Scheme

Ways of Management	Frequency	%
Collaborative forest management	40	80
By community committees	6	12
By a forest management team	4	8
Total	50	100

Conclusion

Forests in general play an important role in the life of humans and animals, where it work to maintain ecological balance , improve the climate , work to increase soil fertility , protection from erosion , protection of waterfalls and agricultural crops from the wind , represent a fodder for their animals and must be preserving and protected. Community forests provide various benefits to diverse areas such as the availability of fodder in the dry season and reduce the pressure on natural forests in cutting operations, providing buildings poles, firewood and increase the income.

Recommendations

- The Forest National Corporation should encourage the villages and initiate the establishment of forests for their popularity and importance.
- Improve and increase the awareness of citizens about the importance of the community forests.
- Great efforts were needed to implement the FNC policy to plant 5% of irrigated scheme with forest.
- Forest extension need to exert more efforts regarding community forests establishment and conservation.
- Effective forestry extension programmes to encourage tree planting such as: villages woodlots, school nursery and woodlots, windbreaks, home nurseries, urban forestry, and public institutions plantations.

References

Abu Sin, M. E., and El samani, M.O. (1989). Socio-economic Aspects of integrated resource management with special reference to the forest resource of kassala province Eastern Region - the case of wad kabu forest.

- Abdalla, Y.Y. (2002). Environmental Values of Forest Plantations at Rahad Agricultural Scheme (RAS). M.Sc Thesis, Sudan University of Science and Technology.
- Abdalla, Y.Y. (2006). Assessment of some Environmental and Socio-economic Factors of Rahad Forest Plantations (Case Study ElFaw Shelterbelts). Ph.D Thesis, Sudan University of Science and Technology.
- Abdalla, Y.Y and Mohammed.A.A (2004). Study of environmental values of forest plantations at Rahad Agricultural Scheme (RAS). Journal of Science and Technology (SUST), Vol.5 (1).
- Bhattarai Binod (2016). Community Forest and Forest Management in Nepal, American Journal of Environmental Protection, 2016, Vol. 4, No. 3, 79-91,
- FAO (1989). Integrated land use plan for Rawashda forest , the Sudan, Rome.
- Kobbail .A.A. Suleman. M.S. and El madina .A. M.(2011). Formal Forest Management System in the Sudan and the Sustainability Issues. Asian Journal of Agricultural Sciences 4(1):53-57.
- Talaat D. A. Magid and ElNour A. ElSiddig (2003). Social forestry in the Sudan - its current status and future potential.
- Tia, M.M.A. (2012). Study of Environmental & Recreational Values of Khartoum Sunt Forest .M.Sc Thesis, Sudan University of Science and Technology
- UNEP, (1987). The disappearing Forests. UNEP. Environmental Brief. No.3. Nairobi, Kenya.

تقييم الآثار الاجتماعية الاقتصادية والبيئية للغابات الشعبية في مشروع الرهد الزراعي - السودان
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المستخلص

أجريت هذه الدراسة بمشروع الرهد الزراعي في العام 2017. هدفت الدراسة إلى تقييم الآثار الاجتماعية والاقتصادية والبيئية للغابات الشعبية في مشروع الرهد الزراعي. تم الحصول على البيانات الثانوية من التقارير والسجلات والدراسات السابقة ذات الصلة. المعلومات الأولية إتمدت بصورة أساسية علي تصميم الاستبيان وتمت مقابلة 50 مزارعاً ، حيث أخذت العينة من مجموع المزارعين بمنطقة الدراسة والمواطنين واللجان الشعبية بالإضافة إلي طرح الأسئلة البحثية ومجموعات النقاش مع ادارات الغابات بالمشروع ولجان القرى . تم استخدام برنامج SPSS soft ware لتحليل البيانات وتم حساب الترددات والنسب المئوية أوضحت الدراسة أن الغابات الشعبية بمشروع الرهد الزراعي توفر الاحتياجات المحلية للمواطنين مثل خشب الوقود (الحطب والفحم) ، وأعمدة البناء والأعلاف للماشية. بالإضافة إلى المساعدة في مقابلة الخدمات الاجتماعية (الصحة والتعليم والمياه) وكذلك توفر فرصة للترفيهية). تعتبر أشجار السنط من الأشجار الرئيسية في منطقة الدراسة. وأوصت الدراسة بأن تقوم إدارة الغابات ببذل الجهود لتعزيز مشاركة المواطنين في إدارة الغابات الشعبية والمحافظة عليها وخاصة تفعيل التشريعات التي تلزم المزارعين بإستزراع نسبة 5% من مساحة المشروع بالأشجار.