



Contribution of Forest Plantations in Satisfaction of Some Local Needs, Case Study, Rahad Agricultural Scheme – Sudan

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Abstract

This study was conducted at the Rahad Agricultural Scheme (RAS) in Sudan, during the period 2003-2006. The main objective of this study was to investigate the role of forest plantations in satisfaction of some local needs from the benefits created by these forests. For data collection, secondary data was obtained from reports, records, related studies, meetings and discussions with officials, semi-officials, and villagers. Group discussions with farmers to clarify some points were held. In order to investigate the impact of Rahad forest plantations on the inhabitants of the scheme area a questionnaire was prepared to collect the primary data and 50 respondents were interviewed. The target groups were foresters, researchers, farmers, forest guards and project employees. The target group was randomly selected based on variation of age, gender, jobs and education level. For data analysis, SPSS software was used. The percentage of each variable is calculated and the mean of some variables was also calculated. The results obtained from this study can be summarized as: Forest plantations at (RAS) satisfy the local needs, they produce sufficient fuel-wood, charcoal, building poles, and fencing materials, fodder, sawn timber and increase the income of people. So the study recommended that, there is a need to increase the awareness of people towards forest plantations and to improve the management system.

Keywords: Rahad agric scheme, foresters, forest guard, building poles

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Introduction

Rahad Agricultural Scheme (RAS) was planned in the early 1970s; it is one of the main four agricultural schemes of irrigated sub-sector of the central plains of the Sudan. The (RAS) lies east of the Blue Nile on the eastern bank of the seasonal river, the Rahad. It extends between latitudes 13°-7' and 14°-6' North, and longitudes 22°-6' and 35°-9' East. The settled area of the scheme within the administration boundaries of

Gezira and Gadarif states, 55% in Gezira and 45% in Gadarif States. The scheme is located 160 Km, south of the capital, Khartoum. (Abd El Hafeez, 2001). During feasibility study (H.T.S, 1965-1969), all natural tree species have been uprooted, the following broad vegetation zones prevailed:

- a- *Acacia tortilis* (Samor).
- b- *Acacia nubica* (Laot).
- c- *Calotropics procera* (Ushar).
- d- *Acacia melliferra* (Kiter).

- e- *Acacia seyal* (Talh).
 - f- *Ziziphus spina-christi* (Sidir).
 - g- *Balanites aegyptiaca* (Heglig).
- At present, only tall grasses and different types of weeds dominate mostly during the rainy seasons, including:
- a- *Sorghum sudanense* (Addar).
 - b- *Deinebia retotlexa* (Um mamliha).
 - c- *Aristalochia bracteolate* (Um galagil).
 - d- *Cymbopogon nervatus* (Nal).
 - e- *Cyperus rotundus* (Seida).
 - f- *Cynodon dactylon* (Nagila).
- (El Samani, 1990)

Ten years later, original inhabitants as well as migrated people increased in number to about five folds (Abdalla, 2002). 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. In 1990s RAS introduced tree planting as one of the main crops in the scheme, from that time, forest plantations were considered as a cash crop (Abdalla, 2006). The main objective of this study was to investigate the role of forest plantations in satisfaction of some local needs and benefits created by these forests. The total areas available for forest activities in RAS are about 16,200 Feddans. This constitutes 5.4% of the total area of phase one (300,000 feddans) of RAS. This forestry area includes reserved area

for different forestry planting programmes i.e. firewood plantations (wood lots), shelterbelts and windbreaks, canal side plantations, roadside plantations and small wood lots. These areas are distributed all over the scheme area. The main species used for irrigated forest plantations in Sudan are *Eucalyptus spp.* Table (1). They have been introduced first in Gezira Scheme, (El Nour, 1993). According to (Abdalla, 2015), the forests cover in Sudan was reduced from 21.83 million hectares in 2000 to 18.83 million hectares in 2014 that means 10% from the total area of the country. After separation of South Sudan the country lost 2/3 from the total area of Sudan forest cover.

Tree plantations: Natural tropical forests can be replaced by two types of tree plantations: Forest plantations and tree crop plantations, which provide food, oils, and other non timber products. Monocultures are often, but not always grown in both types of plantations. The forest plantations area in the tropics was only about 1% of the total closed- forest area.

Forest plantations are typically established to restore cover to areas where forests are not as abundant as they once were and when both timber and fuel wood are in short supply. Plantations can contain as much carbon as the original vegetation, but they typically contain 30- 50% of the carbon in the original vegetation, because of short rotations. Irrigated forest plantations have been established within existing agricultural scheme, where agriculture, forestry, and livestock can be combined in different ways. The main species used for irrigated forest plantations in Sudan are *Eucalyptus spp.* They have been introduced first in

Gezira Scheme. The purpose of block plantation that is the main type of irrigated plantations is to supply the inhabitants with wood for building and as fuel. Both of these products are rare and costly in the large treeless areas like RAS or other large irrigated schemes (El Nour, 1993).

Plantations are forest stands established by planting and/or seedling in the process of afforestation or reforestation that are either (1) of introduced species

(all planted stands), or (2) intensively managed stands of indigenous species which meet all the following criteria: One or two species at plantation, even age class, regular spacing stands that were established as plantation, but have been without intensive management for a significant period of time, are considered as semi-natural according to this definition (Margarida, 2001).

Table 1: The area available for forest plantations in RAS

| Forestry activities | Area/hectares | Tree spp | Spacing |
|----------------------------|---------------|----------------------------|---------|
| Fire wood plantations. | 2,520 | <i>Eucalyptus spp</i> | 2x 3 m. |
| Shelterbelts & windbreaks. | 1,647.3 | <i>Acacia seyal</i> | 2x 3 m. |
| Canal-side plantations. | 2,300 | <i>Acacia nilotica</i> | 10 m. |
| Roadside plantations. | 252 | <i>Parkinsonia aculeta</i> | 2x 3 m. |
| Small wood lots. | 84 | <i>Eucalyptus spp</i> | 2x 3 m. |

Source: El Nour, (1993)

Materials and Methods

In order to investigate the impact of Rahad Forest Plantations on the inhabitants of the scheme area, secondary data was obtained from reports, records, related studies, meetings and discussions with officials, semi-officials, and villagers.

Group discussions with farmers to clarify some points were held, a questionnaire was prepared for data collection and 50 respondents were interviewed. The main target groups were farmers, researchers, foresters, project employees, forest guards and labourers.

The target group was randomly selected based on variation in age, gender, jobs and education levels. The questionnaire consists of different questions, and it was designed on multiple choice

questions. The questionnaire aims to collect information about the plantation of forests, direct and indirect benefits of forests,

Results and Discussion

Benefits provided by Rahad Forest plantations

Fuel- wood: Fuel-wood is the main source of energy in most area of Sudan. The majority of cooking and most of food processing depends on fuel-wood. The demand for fuel-wood in Rahad area was increasing every day because the population has increased to about five folds. 86% of people who have been interviewed during the data collection stated that forest plantations satisfy their local needs from fuel-wood, while 14% depends on energy from gas and electricity.

Table 2: Respondents opinion about the contribution of forest plantation in the provision of their direct needs

| Respondents opinion | Fuel- wood | | Building polls | | Fodder | | Charcoal | | Sawn timber | |
|---------------------|------------|-----|----------------|-----|--------|-----|----------|-----|-------------|-----|
| | Frequ. | % | Frequ. | % | Frequ. | % | Frequ. | % | Frequ. | % |
| Provided | 43 | 86 | 40 | 80 | 26 | 52 | 21 | 42 | 19 | 38 |
| Not provided | 7 | 14 | 10 | 20 | 24 | 48 | 29 | 58 | 31 | 62 |
| Total | 50 | 100 | 50 | 100 | 50 | 100 | 50 | 100 | 50 | 100 |

Source: field data, 2006

Building poles: Forest plantations in Rahad area are regarded as the source responsible for a large share of the majority of poles for the inhabitants. Wood forest products and mud bricks were the important and the major building material used for construction and building of houses in RAS. About 80% of the respondents stated that forest plantations are the main source for construction poles. People in the southern part of the Scheme prefer to use plants and forest products (straw and wood) as a material for building houses, because this part lies within low rainfall

savanna region which is rich in natural forest and vegetation. The northern and central parts lies within the semi-arid savanna which is poor in terms of availability of natural forest and vegetation as building material, so people in these parts prefer to use mud bricks as material for building houses , wood and plants vegetations were used only in roofing plate (1) .The type of soil is an important factor in choosing the building materials i.e. in the southern part of RAS area , the soil is clay and black but in the northern part the soil is sandy clay .



Plate 1: Building poles

Source: field data 2006

Fodder: A significant role of forest plantations in RAS areas is their contributions to a pastoral economy by providing fodder. The protein from leguminous vegetation during the dry season constitutes an essential element in animal diet .As stated before the majority of the inhabitants of RAS villages were of nomadic background.

According to their answers, 52% of the respondents reported that forest plantations provided fodder to their animals Table (2). Among the various source s of feed, woody vegetation is generally the cheapest on which the majority of the livestock rely on. The FNC administration in RAS prohibited grazing in forest to allow for tree

regeneration, so livestock concentrated on the Jebal and Butana plains seeking

for natural vegetation and water sources plate (2).



Plate 2: Fodder from trees during the dry seasons

Source: field data, 2006

Charcoal: The overall energy supply in Sudan characterized by the dominance of traditional biomass fuel i.e. firewood and charcoal which constitute more than 90% of energy consumption in the country. According to the survey conducted by the researcher in 2005, 42% of the respondents stated that forests were the main energy source in Rahad area, while 58% of them think that the gas is the main source of energy.

Until 1994, people in Rahad area have suffered from shortage and scarcities of fuelwood, because of trees clearance to establish Rahad Scheme. After 1994(the establishment of Rahad forest plantations), the planned villages depended on forest plantations while people who live on each side of the river Rahad (the old villages) depend on natural forest , so they are not suffering the scarcities of fuelwood.



Plate 3: Charcoal from Acacia trees

Source: field data, 2006

Sawn timber: According to the survey 62% of the respondents stated that they do not use timber and wood for sawn timber, while 38% of them mentioned

that they made hand crafts and handles of some agricultural tools.

The majority of the respondents stated that their main income is from outside work in other farms, selling agricultural

crops and animals. Most of them generate supplementary income and farmers engage in off-farm jobs. According to the survey conducted, 51.4% of the respondents stated that forest plantations increase their income, while 48.6 % disagreed because more than 60% of Rahad forests were owned by the Rahad Corporation (Corporation forest) the participations of people and their awareness in management, adoption of planting trees was not great. Traditionally, Sudanese people do not prefer growing trees on farm, this is related to many mistaken beliefs e.g. Forests harbour birds, insects, and pests that can destroy field crops. Besides that, people have in mind that growing trees for cash is a long term investment. But, in fact forest plantation is a considerable investment and accumulating asset of raw materials.

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's villages .All cooking and most food processing are dependent on fuel-wood. Indirectly, therefore, fuel-wood supplies affect the stability and quality of food supplies.

Today in Sudan, although the use of gas became popular, people prefer to use charcoal and fuel-wood. Fuel-wood scarcity may affect the quality of food consumed, if the result in reduction of cooking time and greater reliance on uncooked or reheated foods. Based on the survey for forest products consumption in Sudan conducted by the FNC, 1995 as following:

-The survey of household fuel wood consumption revealed that, the per capita annual consumption equals 0.64m³.

-It was found that 32% of households used charcoal and 85% firewood and 94% both of them used for cooking and ironing (rural areas).

-Two Sacks per month, weight 30.4 kg, the per capita consumption of charcoal is 0.88m³ annually (Tawfig, 1996).

Even more forests and plantation forests provide a source of income and employment. Many people in rural areas depend on money earned from gathering, processing and selling forest products to meet their requirements. Both men and women in RAS are involved in forest activities; women tend to dominate in the production of items related to the home and to agriculture. The processing of forest products provides a significant percentage of the income of many millions of rural household, and contributes to rural economy in many countries (FAO, 1992).

In RAS the FNC administration provided the labourers and forest guards with small cut areas located near the shelterbelts so as to look after the forest. These areas are cultivated with agricultural crops like Maize and Groundnuts.

Non- wood forest products: These products called: minor forest products, other forest products other economic products or non- timber forest products. Table (3) explained that rural households they generate their income from a variety of sources including agricultural production, wood and non- wood forest products.

Table 3: Categories of Non- wood forest products

| Category | Materials | End uses |
|-----------------------------|---|--------------------------------------|
| Food stuffs , plant- based | Fruits from <i>Ziziphus spina-christi</i> , <i>Balanites aegyptiaca</i> , | Food – oil , drinks |
| Food stuffs,- animal -based | Birds , honey | Food , medicine form honey |
| Medicinal value | Medicinal plants like <i>Eucalyptus spp</i> , <i>Acacia nilotica</i> seeds. | Medicine oil, seeds , leaves |
| Animal fodder | Leaves , Twigs , Fruits, Flowers | Fodder from Acacias |
| Gums and saps | Latex , gum trees | Chemical raw materials , drinks |
| Market | Leaves, branches , | Small scale forest based enterprises |

Source: field data 2006

Conclusion

The following conclusions were drawn from the study:

- 1- Forest plantations at Rahad Scheme satisfy the local needs, they produce sufficient fuel-wood, charcoal, sawn timber, fodder, other non-wood forest products and building poles.
- 2- Sudanese people do not prefer growing trees on farm, this is related to many mistaken beliefs e.g. Forests harbour birds, insects, and pests that can destroy field crops.

Recommendations

The study recommends that:

- 1-Increase the awareness of people of Rahad areas about the important role and values that brought by forest plantations and share them in forest management.
- 2- There should be clear working plan and management system for these plantations forest.

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مساهمة الغابات المستزعة في توفير بعض الاحتياجات المحلية ، دراسة حالة مشروع الرهد الزراعي - السودان

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المستخلص

أجريت هذه الدراسة في مشروع الرهد الزراعي بالسودان خلال الفترة من 2003-2006 . الهدف الاساسي من هذه الدراسة هو التحقق من دور الغابات المستزعة في توفير بعض الاحتياجات المحلية و القيم من تلك الغابات . المعلومات الثانوية تم الحصول عليها عن طريق التقارير ، السجلات ، الدراسات السابقة ذات الصلة ، الاجتماعات و النقاش مع المسؤولين و غير المسؤولين و كذلك المواطنين بالمنطقة . كذلك تم عقد حلقات نقاش مع المزارعين لتوضيح بعض النقاط المتعلقة بالدراسة . و من أجل التحقق من اثر الغابات المستزعة علي سكان المنطقة تم اعداد استبيان لجمع المعلومات الاولية ، حيث تم استبيان عدد 50 شخصاً من شريحة موظفي الغابات ، الباحثين ، المزارعين ، حراس الغابات و بعض منسوبي المشروع . تم اختيار تلك المجموعات عشوائياً اعتماداً علي اختلاف العمر ، النوع ، المهنة و مستوي التعليم . لتحليل البيانات تم استخدام برنامج التحليل الاحصائي (SPSS) و تم حساب النسب و المجموع لكل البيانات . و خلصت الدراسة الي النتائج التالية: أن الغابات المستزعة بمشروع الرهد الزراعي توفر بعض الاحتياجات المحلية مثل حطب الحريق ، الفحم ، أعمدة المباني ، التزريب ، العلف ، الاخشاب المنشورة و كذلك زيادة دخل المواطنين . أوصت الدراسة بضرورة رفع الوعي للمواطنين وكذلك تطوير نظم الادارة للغابات بالمنطقة .

