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Contribution of Non-wood Forest Products in Support of Livelihoods of Rural People Living in the Area South of Blue Nile State, Sudan

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Abstract

This study was undertaken to identify the role of non-wood forest products to forest-based rural livelihoods. NWFPs considered having very significant contribution in poverty alleviation and resource conservation; therefore, there are many global studies have dug deep in this subject and made it clear, but still the subject needs more consideration. The objective of study is mainly conducted to explore and find out the contribution of non-wood forest products in supporting rural livelihoods in the area south Blue Nile state. Primary data were collected through use of household questionnaire from eight villages located in four localities representing the southern part of Blue Nile state. Secondary data obtained through Focus Group Discussions, records, similar studies, reports and observations. The analysis of the data is mainly to assess the contribution of NWFPs in supporting livelihood of rural people living in the study area. The results of the study show that the majority of respondents (76%) are practicing farming as the main livelihood activity in the area, while (90%) of them are dependents on forest related activities for subsistence and income diversification. The study also revealed that collection of NWFPs is affected by the economic, social, cultural and geographical location of households, and it is performed by all household members, and that women have the highest share in collection process (62%). The study also indicated that NWFPs are traditionally collected to cope with uncertainties in agriculture production, and the average annual income generated by NWFPs per household is (SDG 6,612) which indicates higher income contribution to households (34%) compared to other levels of income combination, that ensures positive role of NWFPs to generate sustainable income for food and livelihood security.

Keywords

Rural People, Livelihoods, Non-Wood Forest Products, Income

1. Introduction

Non-wood forest products have been defined as "All biological material, other than timber, which are extracted from forests for human use." (NTFPs Exchange Programme Website 2007). They include fruits, resins, gums, herbal plants, roots, honey and wood that is not timber (e.g. firewood).

FAO (1999) defined NWFPs as "goods of biological origin other than wood derived from forests, other wooded land, and trees outside the forest." They can be classified in a number of broad categories according to their end use: edible products; fodder for domestic animals; medicines; perfumes and cosmetics; colorants; ornamentals; utensils; handicrafts and construction material; and exudates like gums, resins and latex."

Non-wood forest products (NWFPs) play an essential role in the livelihood of rural people living in and around forests; the term encompasses all biological materials other than timber which are extracted from forests for human use. They comprise leaves, flowers, fruits, seeds, roots, tubers, bark, dyes, tannins, gums, grasses and so on. They are also called “minor forest products” are important sources for food and livelihood security for rural communities living inside and around forests.

Globally more than two billion people dwelling in forest, depending on these products for subsistence, income and livelihood security. They are considered to be vital for

sustaining rural livelihoods, reducing poverty, facilitating rural economic growth (Global NTFP partnership, 2005), and are also important parts of the biodiversity which are important components of livelihoods in terms of their economic, social and ecological value. An estimated 80% of the developing world uses non-wood forest products to meet some of their health and nutritional needs (FAO, 2008). It is considered as an important source of income and sustenance for rural communities living in developing countries.

Nationally people involved in forestry sector development have recognized the potential of NWFPs in contributing to the national economy especially through the use and export of medicinal and aromatic plant parts, and felt the need of conserving the valuable resources, and increasing awareness about NWFPs management among local people in order to participate in conservation, management and utilization of NWFPs. It has become inevitable to manage forests in a sustainable manner and create platform for livelihoods strategies. The utilization and development of non-wood forest products is considered to be one of the most feasible solutions for sustainable management of forests and building of local economy.

Non-wood forest resources have great potential for enhancing sustainable rural development and diversified economic growth, cultural endurance and environmental health (FAO, 2004).

It is well known that rural people living inside and around forests depend on natural forests in collecting dead wood, make charcoal and fetch some income from the sale of these products, but sometimes the income earned from non-wood forest products may have greater impact on the financial status of these communities. According to FAO (1997), it was estimated that the total value of the world trade in NWFPs is approximately US $ 1100 million.

The NWFPs are also of great cultural value to rural people living in communities in Blue Nile state. Conservation of natural forests and preservation of NWFPs is fundamental to the maintenance and continuation of traditional ways of life (Ibid). Traditional herbers, collectors and people who used medicinal plants and herbs they have the indigenous knowledge of their uses, techniques of harvesting and processing over generations. Conservation of natural forests where NWFPs species originated helps in achieving the global development goal of environmental conservation, thus conserving watersheds, biodiversity and genetic sources.

The importance of NWFPs to rural livelihoods cannot be overstated, as a wide variety of natural forest products are used as natural subsidies by rural communities in the area. They entail products that are collected directly for subsistence or for sale to earn an income such as:

- Plant products; food, fodder, raw material for medicine and aromatic plants, raw material for utensils, handicrafts and construction, raw material for colorants and dyes, exudes and other plant products.
- Animal products; living animals, hides, skins, wild honey and bee-wax, animal meat, raw material for medicine, edible and non-edible animal products.

2. Study Area

The present study has been conducted at Kurmok, Bau, Geissan and Roseires localities (Funj Area) in The Blue Nile State, which extends between Latitude 9º 30º and 12º 30º N and Longitude 33º5′ and 35º3′ E. It is located in the southeast part of Sudan. It borders Ethiopia on the east and southeast, Republic of South Sudan to the west and south, and Sinnar state on the northern part where majority of natural forests exist, and some of the rural people living inside and around these forest depend in one way or another for subsistence purposes or income generation on minor forest products. The topography of the state is characterized by mountainous and hilly outcrops interspersed within cracking clay soils, which have been considered as an extension to the cracking clay plains of central Sudan, and are generally alluvial in origin. Have high pH values ranges from 8.0 to 9.5 i.e. alkaline, fine textures of 60% clay fraction and relative thickness (Abdelrahim, 2010). The most outstanding natural feature of the state is the Blue Nile River which rises in Lake Tana in Ethiopia and enters Sudan in the area south of Roseires, at Ed-Daim village. The state is dissected equally by the Blue Nile and White Nile catchments around the central Ingessana hills. The eastern slope carries the intermittent rivers and streams that drain towards the Blue Nile while the western ones flow towards White Nile. The climate of Blue Nile State belongs to the tropical climate zone, characterized by high temperatures. The average daily temperature ranges between 31ºC in summer to 22ºC in winter. The average annual rainfall is around 700 mm, with heavier rainfall in the southern parts of the state. The vegetation cover and woodland forests of the state occupy about 26% of the state's area. Mostly rich savanna trees, shrubs and grasses dominate the vegetation.

Fig. 1. *Location of Blue Nile state.*

3. Methodology

A descriptive household survey was conducted during the

period between May and June 2011. The sampling universe within the study area is composed of four localities, namely Kurmok, Bau, Geissan and Roseires locality. For determining the actual locations within the sampling universe, two locations (villages) were selected randomly from each locality. Systematic Random Sampling was employed as a sampling technique to determine the desired sample size, the actual household numbers in all villages were recorded, and then the average household number was found as (100). To ensure that the data were statistically significant over the whole sampling universe, a desired sample size of 10% was then taken from the overall average household number. Data were collected through household questionnaires administered on 80 randomly selected respondents from 8 villages, each two villages representing a locality. The data collected include information on respondent's demographic features. The secondary data collected by using participatory approaches such as focus group discussions and personal observations to complement the study survey, relevant literature, similar studies and available records were also used.

The collected data then sorted, compiled and processed, then analyzed by using (SPSS) statistical package to generate descriptive statistics. Descriptive statistics quantitatively provide simple summary about the sample and measures, also provide simple graphical analysis, by doing so it gave good summary about the frequency and percentage of values of variables. Thus it is a powerful tool that enables to correlate between variables and compare across population. The generated statistics tables and associated graphs were used in the interpretation of the results. Information obtained from group discussion, individual interviews and observations analyzed at the spot by recording consensus conclusion from interviewees.

4. Results and Discussion

4.1. Household Size and Structure

Household structure is composed of the nuclear head of household, wife, and children and in some cases very close relatives. Of the total the average household size is 6.9. The percentage of adult females (45%) is greater than adult males (25%). It has been noticed that there is a very slight difference between localities with regard to adult females; this can only be attributed to early marriage of girls and polygamy.

Table 1. *The average family size and structure per locality.*

Characteristics		Locality				Total
		Kurmok	Bau	Geissan	Roseires	
Family-size	Adult males	23 (4.2)	17 (3.1)	47 (8.5)	52 (9.4)	139 (25.2)
	Adult female	58 (10.5)	60 (10.9)	61 (11.1)	69 (12.5)	248 (45.0)
	Children	45 (8.3)	32 (5.8)	43 (7.8)	44 (7.9)	164 (29.8)
Average family size		6.3	5.5	7.6	8.3	6.9

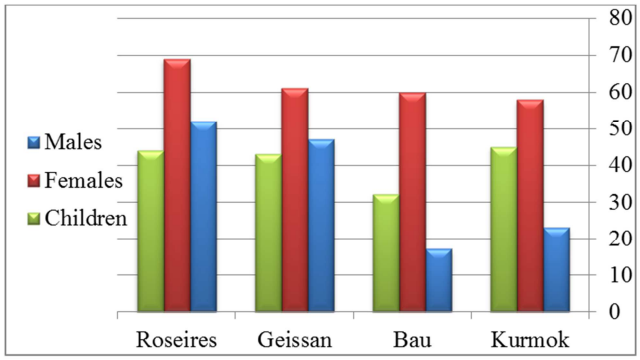

Fig. 2. *Distribution of family members in relation to family size and structure per locality.*

4.2. Age of Respondents

Most of respondents (53.8%) were in the age group of 40 – 54 years, followed by (27.5%) in the age group of 25 – 39 years, those two categories constitute the main workforce who are engaged collection of non-wood forest products, agriculture and while the age group of 55 – 69 years contained the least respondents (18.8%) whom are involved in simple and easy activities such as shop keeping, handicrafts and other allied activities.

Since the X^2 statistics (17.23) exceeds the critical value for 0.05 probability level (12.59), which indicates significant difference between localities with regard to age groups and there is no relationship between localities and different categories of age groups.

Table 2. *Fresquency f respondents age groups per locality.*

Characteristics		Locality				Total
		Kurmok	Bau	Geissan	Roseires	n = 80
Age	25 - 39	8 (10.0)	5 (6.3)	6 (7.5)	3 (3.8)	22 (27.5)
	40 - 54	9 (11.3)	6 (7.5)	13 (16.3)	15 (18.8)	43 (53.8)
	55 -69	3 (3.8)	9 (11.3)	1 (1.3)	2 (2.5)	15 (18.8)
Pearson's Chi square = 17.23 df = 6						

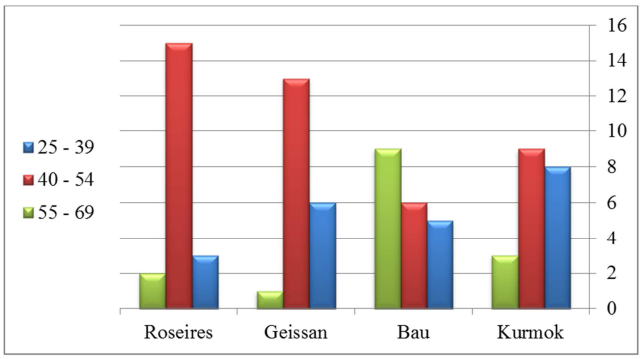

Fig. 3. *Distribution of respondents to different age groups per locality.*

4.3. Respondents Literacy

The majority of respondents (62.5%) have attended either partial or full basic school education, compared to the rate of illiterate respondents (37.5%) which is still considered very

high and the reason for it, is the conflict situation in the state which lasts for more than twenty years, during which the people have lost most of the productive assets and services such as education, health, etc.

Because the computed X^2 statistics for education (1.06) is lower than the conventionally accepted significance level of 0.05 (7.82), then we accept the null hypothesis which means that the educational level of respondents is independent of location i.e. the location had an effect on the education of respondents.

Table 3. *Frequency and percentage of respondents literacy per locality.*

Characteristics		Locality				Total
		Kurmok	Bau	Geissan	Roseires	n = 80
Literacy	Illiterate	6 (7.5)	9 (11.3)	7 (8.8)	8 (10.0)	30 (37.5)
	Basic	14 (17.5)	11 (13.8)	13 (16.3)	12 (15.0)	50 (62.5)
	Secondary	-	-	-	-	-
Pearson's Chi square = 1.06 df = 3						

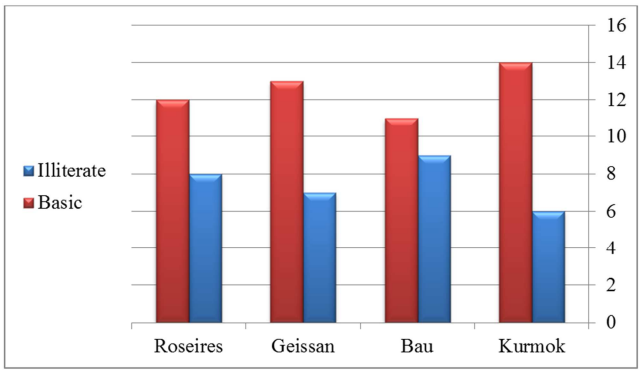

Fig. 4. *Distribution of respondents in relation to literacy per locality.*

4.4. Respondents Occupation

In the present study, it has been concluded that the majority of respondents (76.3%) depending on farming as the main livelihood option, working as small subsistence farmers or as seasonal labor in large mechanized schemes, only (6.3%) are working on livestock raising, and similar number of respondents (6.3%) have small village shops, while (11.3%) of respondents classified under other activities that include traditional mining of gold, chrome and petty trade.

The computed Chi square statistics (7.71) is less than the value in the distribution table (16.92) for p= 0.05, which indicates the non-significant relationship between respondents jobs and their respective locations i.e. there is strong relationship between location and respondents economic activities.

Table 4. *Frequency and percentage of respondents' occupations per locality.*

Characteristics		Locality				Total
		Kurmok	Bau	Geissan	Roseires	n = 80
Job	Farmer	15 (18.8)	14 (17.5)	17 (21.3)	15 (18.8)	61 (76.3)
	Livestock	2 (2.5)	1 (1.3)	-	2 (2.5)	5 (6.3)
	Merchant	2	1	2	-	5
	Others	(2.5) 1 (1.3)	(1.3) 4 (5.0)	(1.3) 1 (1.3)	3 (3.8)	(6.3) 9 (11.3)
Pearson's Chi square = 7.71 df = 9						

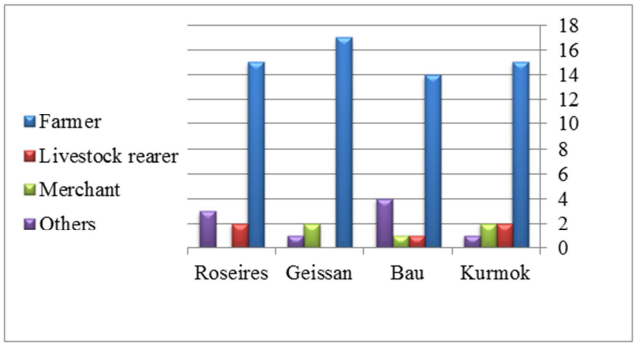

Fig. 5. *Distribution of respondents in relation to occupations per locality.*

4.5. Uses of NWFPs

Non-wood forest products used as food are of the most important benefits produced by trees and contribute significantly to the diet of many rural communities. It is well known that the rural communities in Blue Nile state rely primarily on food they farm, but this study revealed the fact that 90% of respondents depend on non-wood forest products for consumption.

Diversity of fruits collected from trees stated by respondents such as nabag from *Ziziphus spina-christi* (Sidir), laloab from *Balanites aegyptiaca* (Hegleig), gongoleis from *Adansonia digitata* (Tabeldi) and Gudeim from *Grewia tenax* (Gudeim), Dom from *Hyphaene thebaica* (Dom), and Daleib from *Borassus aethiopum* (Daleib).

The study revealed that about 76.3% of respondents are practicing agriculture, where 90% of them are dependent on forest related activities for subsistence and income diversification. The forest related activities derived from non-wood forest products offer a wide range of products from fruits and flowers; some are used as food and other plant parts used as medicine for traditional healing and/or commercial purposes.

It is clear that most respondents are dependent somehow on environmental services and goods provided by forest products, but these services and goods varied between households and within communities. The major factors influencing respondents' livelihoods could be summarized into five capitals; Physical, human, social, financial and natural; this is beside differences in household demographic composition and location.

In rural areas poor households lack other alternatives to diversify income generation; therefore non-wood forest products have vital role in rural livelihoods through the provision of different functions and use to rural people varying from consumption uses by the poor households and to generate income to meet immediate household's needs, sometimes are used as backup during crises.

4.6. NWFPs Collection and Gender Division

Collection of NWFPs at the household level entails a set of gender roles played by both men and women, and the collection process is shaped by the economic, social, cultural and geographical contexts in which they live. Qualitative data obtained during Focus Group Discussions revealed that men usually collect bee-honey, wild meat, bamboo and grass for thatching purposes and or for commercial purposes, while women and children are more experts in collection of firewood, fruits, roots, tubers and palm leaves for the production of baskets, ropes, mats and brooms.

This study revealed that proportion of non-wood forest products collected by different family members in the study area. Of the total, more than (62%) of NWFPs are collected by women, children collect (23%), while men collected only (14%) of NWFPs.

Most respondents indicated that they collect NWFPs for subsistence and income generation, where they sell their products to village merchants or at rotating markets. Marketing of NWFPs also has a gender dimension; men sell honey, bamboo, firewood and grass, while women sell baskets, mats, brooms and fruits.

Table 5. *The amount (kg) and percentage of NWFPs collected by family members per locality.*

Characteristics		Locality				Total
		Kurmok	Bau	Geissan	Roseires	
Family members	Males	13113.93 (3.8)	12423.73 (3.6)	10353.10 (3.0)	14149.24 (4.1)	50040 (14.5)
	Females	28088.09 (19.6)	29234.54 (20.4)	19633.00 (13.7)	12324.37 (8.6)	89280 (62.3)
	Children	16541.38 (6.5)	15777.93 (6.2)	13487.59 (5.3)	13233.10 (5.2)	59040 (23.2)
Pearson's Chi square = 15.09 df = 6						

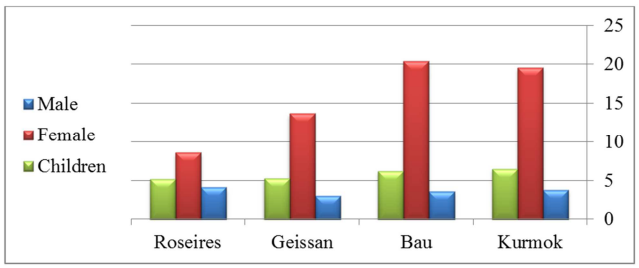

Fig. 6. *Distribution of family members in relation to collection of NWFPs per locality.*

The computed X^2 statistics (15.05) exceeds the critical value for 0.05 probability level (12.59), which indicates significant difference between family members with regard to amount of NWFPs collected.

4.7. Economic Importance of NWFPs in Rural Livelihoods

In the study area the traditional collection and use of now-wood forest products provide social insurance to rural poor, due to the uncertainty of agricultural production in the area. Rural people rely on harvesting of NWFPs to cope with shortage of agriculture products. Thus NWFPs provide subsistence, employment, income and support small household-based enterprises such as production of ropes, baskets, mats and brooms which help to improve the economic condition of rural people. On the other hand marketing of NWFPs help to solve unemployment problems among many poor families and improve their wellbeing.

Discussion with village elders and community elites revealed that earlier NWFPs are traditionally collected by rural people for domestic use, but now these products have acquired additional value in rural and urban markets. For this reason villagers collect NWFPs not only for subsistence but also to generate an income. Therefore, NWFPs become a vital source of income to rural poor forest dwellers and contribute to improving food security by increasing their purchasing power and access to food.

The study also showed that respondents tend to diversify their income through involvement in different sectors e.g. collection of NWFPs, farming, livestock rearing and off-farm employment. Since NWFPs collection is seasonal, poor rural people tend to depend on many sources for generating an income. However, the average annual income for households from NWFPs has been computed as SDG 6612, average annual income from farming as SDG 7200, average annual income from livestock rearing as SDG 2500 and the average income from off-farm employment as SDG 3000. The contribution of income generated by NWFPs is proportionally higher (34%) compared to other activities practiced in the study area, which indicates the greatest role of non-wood forest products in supporting rural livelihoods in the study area.

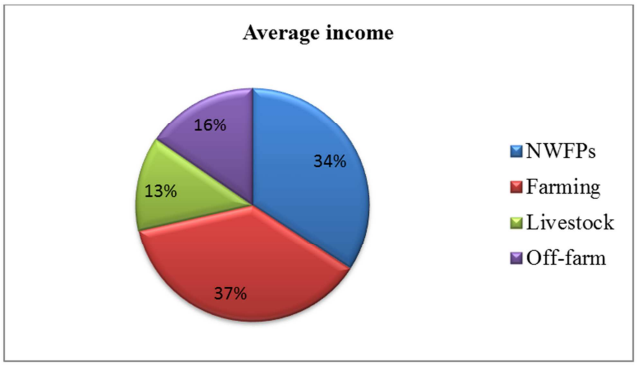

Fig. 7. *Average income share of Household from different activities.*

5. Conclusion

This study is mainly to investigate about the contribution of NWFPs in the household economy in rural areas of Blue Nile state, and to explore the roles played by different household members in collection and trade of NWFPs.

In the study area NWFPs are significant to rural people, mainly for subsistence, and when sold, for rural or urban markets. Data analysis has shown that 76% of respondents are practicing farming as the main livelihood option, but 90% of those are dependent on forest related activities for subsistence and or to generate an income. NWFPs act as

safety net or natural insurance during uncertainties and crises.

Collection of NWFPs in rural communities depends mainly on the economic, social, cultural and location where rural people exist. The study revealed that collection is done by all household members, and the majority of it (62%) is collected by women.

The study showed that NWFPs play a vital role in the household economy, and contributes by 34% on the average household income when compared to other household income sources.

Recommendations

1. It has been observed that the forest area is increasingly shrinking due to agriculture expansion; this is beside disappearance of valuable tree species, which would negatively affect the existence of NWFPs income sources. Therefore, there is a great need for adoption of integrated natural resources management approaches and involvement of local people on sustainable management, development, monitoring and protection of these resources.

2. Review existing forest policies to promote conservation and sustainable management of forest resources.

3. Government has to develop and implement partnership programmes with related institutions and civil society organizations to work together with rural communities in the planning and management of natural resources based on their needs and priorities.

4. Strengthening of the role of forestry extension services to raise awareness among rural people of the importance of issues related to forest destruction, conservation, planting and multiple values of forest resources.

5. Encourage the establishment of community forestry, to reduce pressure on natural forests, increase green cover and conserve biodiversity.

6. Strengthening the role of women in sustainable forest management, through capacity building and greater participation in community-based forest management.

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