

Perception of the Local Community Towards Utilization and Role of Non-wood Forest Products in *Bahr Alarab* Locality, East Darfur State, Sudan

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Abstract: Non-wood forest products (NWFPs) can be defined as all goods and services for commercial, industrial and subsistence uses other than wood derived from forests and their biomass that are sustainably extracted without changing their reproductive functions. These products are obtained either from fruits, seeds, leaves, barks, roots or as exudates. The importance of the non-wood forest products in terms of food and nutritional requirements are medicine, fodder for livestock, fiber, fertilizers, construction materials, cosmetic and cultural uses. The objectives of the study were to identify the main types and uses of non-wood forest products (NWFPs) and to assess their contribution in the income of the rural communities. About 100 households were chosen randomly and interviewed at Komya, Abuassal, Omkheirban and Boro villages in Bahr Alarab Locality in East Darfur State of Sudan. The questionnaire dealt with types of NWFPs, methods of collection, uses, processing, marketing, extension and developing. The descriptive statistical analysis of the data was carried out using SPSS software program and Chi- square Test. The result showed that the main types of non-wood forest products in the study area were the fruits of Nabag (*Ziziphusspina-christi*), Laloab (*Balanites aegytiaca*), Aradaib (*Tamarindus indica*), as well as exudates of *Acacia senegal* (Gum Arabic) and *Acacia seyal* (Gum Talha). Those products have multipurpose nutritional (82%), medicinal (88%) and commercial (90%) uses. Most of the people, particularly women, worked in the collecting (91%) and marketing (65%) processes besides agriculture. It was also found that the non-timber forest products had significant contribution to their income (71%). The result also showed that the shortage of water (70%) and lack of funding (91%) hindered the collection and marketing. Also the study showed that there was weakness in forest extension services. Urgent intervention to guide and help the locals to sustainable production, efficient uses and profitable marketing and value added were recommended. In that respect, also encouraging community and funding institutions such as Micro financing Fund and the Family Banks to establish cooperative societies regarding production and marketing of non-wood forest products is of vital importance.

Keywords: Non-wood forest products, types, collection, processing, marketing and perception

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I. Introduction

Non-wood forest products (NWFPs) can be defined as all goods and services for commercial, industrial and subsistence uses, other than wood, derived from forests and their biomass which can be sustainably extracted, i.e. extracted from a forest ecosystem in quantities and ways that do not alter its basic reproductive functions (Suleiman, 2012). As defined by Obeid (2015), non-wood forest products are goods of biological origin other than wood derived from forests, other wood lands and trees outside forests. These products are obtained either from fruits, seeds, leaves, barks, roots or as exudates. Man's dependence on forests products is for many years exclusively centered on non-wood forest products. However, most of the forest management systems emphasize the principle of sustainable yield of timber production and consider non-wood forest products as secondary or even "minor" products (Augustino et al., 2011). Therefore, it is important to understand the broad range of products and services from the forests, trees and woodlands. The importance of the non-wood forest products is in terms of food and nutritional requirements such as medicine, fodder, fiber, fertilizers, construction materials, cosmetic and cultural uses. Also edible mushrooms, fruits, herbs, aromatic plants, game, fibers, resins, and gums (FAO, 2006). The demand for non-wood forest products, especially those for food and medicine, is increasing ever in urban areas (Younis, 2018). In spite of their current real and potential value, most of the non-wood forest products are grouped as minor products of the forests.

They are rarely feature in national statistics and seriously studied or researched by national institutions. There are several constraints to their development into a strong and prosperous industry because most of the non-wood forest products are often associated with traditional uses that are not widely known and/or they are linked to traditional measures employed by the poor for their subsistence or to address poverty (Tieguhong et al., 2009). Although these products are gathered mainly from the wild and from national forests, some planted forests established for the purpose of supplying wood also provide grass and leaves. Both of which are important to livelihoods. The non-wood forest products play a crucial role in meeting the subsistence needs of a large part of the world's population who live in or near forests; they provide shelter, food and medicines on a daily basis as well as in time of crisis. For poor households, non-wood forest products can supplement income or lessen unexpected hardship such as the loss of crops. Non-wood forest products are also important in term of their potential to improve livelihoods through the sale of surplus products. In this instance, processing raw materials to add value could significantly enhance returns lotions (Khalifa, 2014). As long as rural people rely on these products for their basic survival and nutrition, care must be taken to prevent the resource from shrinking or being degraded (Belcher, et al., 2004).

There are around 150 trees and shrub in Sudan used as sources for non-wood forest products (Badi, 1993). Their management is usually left out from management prescriptions in preference to timber management. The lack of data on the non-wood forest products to support sustainable and remunerative enterprises also represents a serious drawback; baseline data to underpin their importance is scanty or lacking. In despite of the great role being played by non-wood forest products in East Darfur, there is limited statistical information on the types and benefits, consumption, collection and marketing of those products. They are pillars of food security but few studies were done. This was the motivation to do this study hence. The overall objective of this research was to study the types and utility of the non-wood forest products in East Darfur State of Sudan as well as their contribution in the income generation of the rural communities and food security.

II. Material and Methods

The study was carried out in *Bahr Alarab* Locality which is located in East Darfur State, between Lat.10° -13° N and Long.25° -27° E. The climate is tropical. Rainfall ranges between 200 and 500 ml. Sandy soil is dominant in the northern and eastern parts of the locality; it is about 70% of the total area. The soil in middle and south of the locality is heavy clay soil as well as in the south part and covered 30% of the area (MPPED, 2016). A questionnaire was design to interview 6% from the total population of four selected villages in the *Bahr Alarab* locality; *Komya*, *Abuassal*, *Omkehrban* and *Boro* of total population of 10000 persons. The questionnaire included information on personal data, types of non-wood products, means of collection, sex of collectors, seasons of collection, processing, marketing and the perception of the interviewed person on the development of the non-wood forest products. Group discussion was held to supplement the information given by the respondents. Statistics analysis using statistical package of social science (SPSS) was performed. Chi-square test was exercised to test significance of differences between respondents' views and the accuracy of the data.

III. Results and Discussion

The results in figure (1) indicated that the study area was rich of young labor force of both sex. This could be exploited in collection of non-wood forest products and development of projects in the future. As shown in figure (1c), 61% of the respondents had no regular education; however, this high rate of illiteracy may be attributed to unavailability of schools and lack of interest of many families to educate their members. Figure (1d) showed that most of the respondents (88%) were married. Polygamy and early marriage is a common phenomenon in the rural areas. In despite of the population surge implications, this creates a chance for more labors in households. More than 83% of respondent practiced farming as main activity (Figure 1e). Besides agriculture, as seen in figure (2), collection of non-wood forest products was practiced by more than 91% of the population ($P < 0.001$, Chi square = 67.24). That is because of the nature of the natural resources available in the region and the fact that majority of respondents get live hood benefits such food, forages and medicines in addition to the improving their income and fill the gaps of insufficient feeds, particularly in critical periods in the region. Therefore forestry and agricultural institutions should enhance farming activities by encouraging farmers and support them with production inputs.

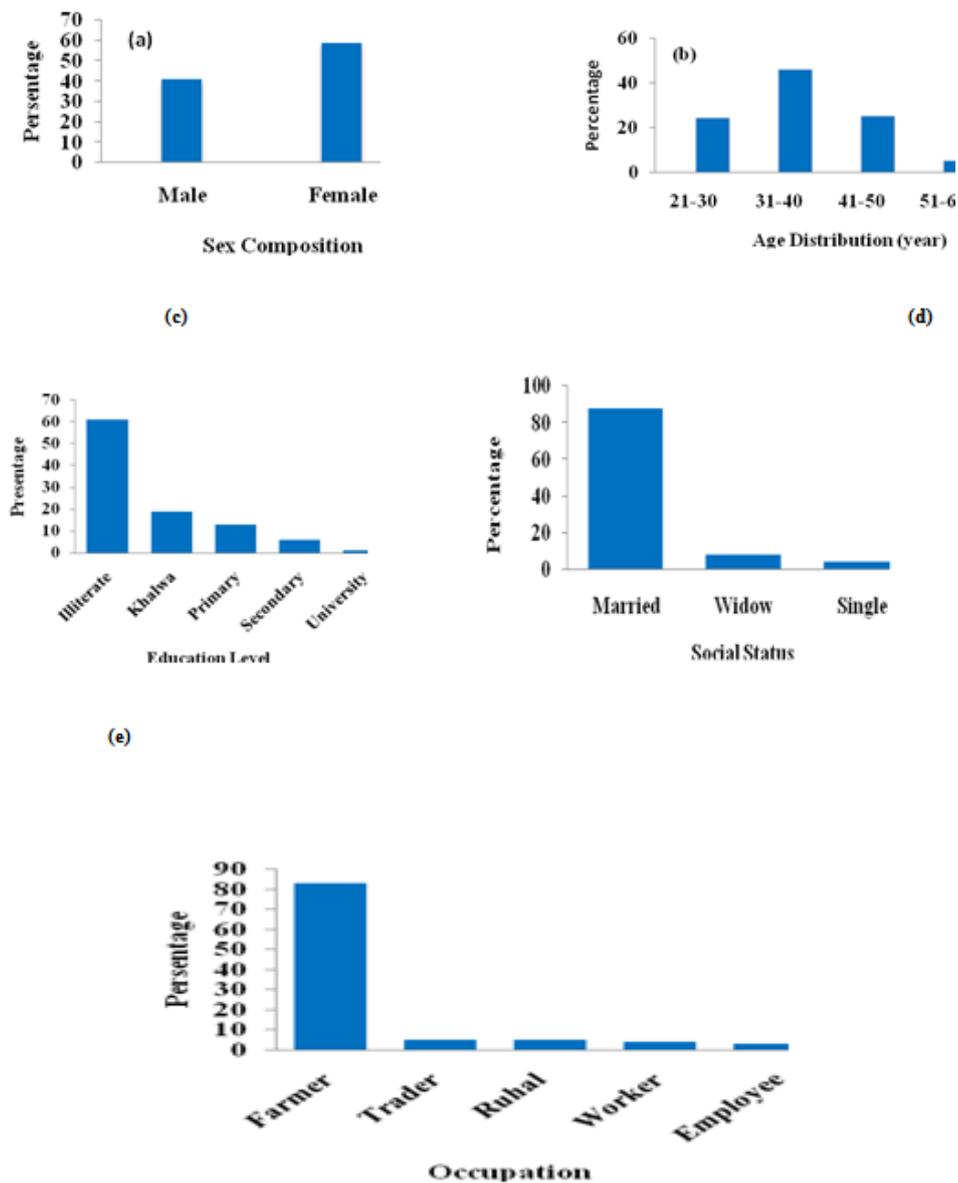


Figure (1): Sex type (a), age (b), education (c), social status (d) and occupation (e) of the population of *Bahr Alarab* Locality in the East Darfur State of Sudan [Khalawa is pre-primary Quran education]

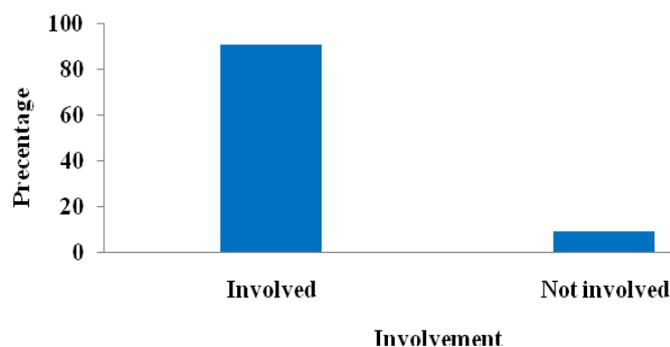


Figure (2): Involvement of the community in non-wood forest products collection in *Bahr Alarab* Locality in the East Darfur State of Sudan.

The survey and interview showed that the main types of non-wood forest products in the area were *Nabag* (*Ziziphusspina-christi*), *Aradeib* (*Tamarindus indica*), *Laloub* (*Balanites egyptica*), *Gum hashab* (*Acacia senegal*), *Gum talih* (*Acacia seyal*), *Gohgan* (*Azanzagarkeana*), *Gudeim* (*Grewiatenax*) (Figure 3). This may be due to the dominated of this species in the study area and there is also a great awareness of the importance of their non-wood products because it is the second source of income after agriculture.

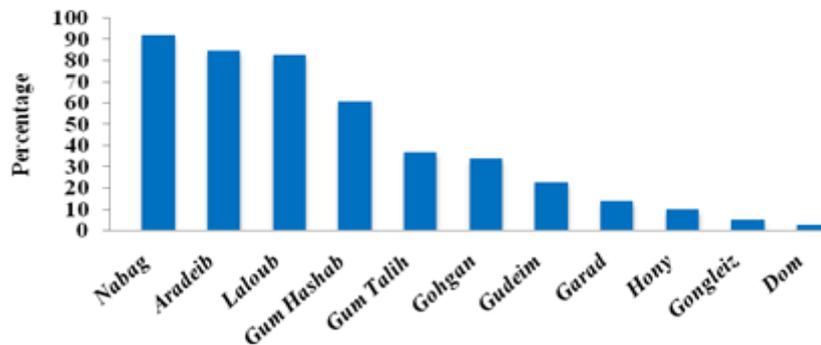


Figure (3): Types of non-wood forest products in *Bahr Alarab* Locality in the East Darfur State of Sudan [*Nabag* (*Ziziphusspina-christi*), *Aradeib* (*Tamarindusindica*), *Laloub* (*Balanitesegyptica*), *Gum hashab* (*Acacia senegal*), *Gum talih*(*Acaciaseyal*), *Gohgan*(*Azanzagarkeana*), *Gudeim* (*Grewiatenax*), *Garad* (*Acacia nilotica*), *Gongleiz*(*Adansonia digitata*) and *Dom* (*Hyphaeneathebaica*)]

The result in figure (4a) showed that about 83% of the non-wood forest products collectors were female. This result indicates that women have more access to forest products than men. It seems that in the rural areas in Sudan men are responsible for agricultural production and animal herding. Most of respondents interviewed said that the time for collection of non-wood forest products was winter and summer (Figure 4b). This means that collection of the non-wood forest products is more or less being practiced most of the year as in Sudan there are three seasons; summer, autumn and winter. As far as the difficulties of collection were considered, about 70% of respondents mentioned that source of water was one of the major difficulties, because water points (*Donky*) are not available and the majority depends on the rainfall (Figure 4c). In addition to that, about 46% of the respondents said that accessibility was also one of the difficulties. These difficulties have a negative impact on the collection of non-wood forest products though, solving them will increases the production and improve the living conditions of families. That is so important for the rural development as this study showed that non-wood forest products are used in all kinds of needs and activities of the population; (90 %) used them commercially, 88% in medicine, 82% as food, 42% as fodder and 22% in traditional industry. However, this result noted strongly to the contribution of the non-wood forest products in the livelihood of the rural community who is so far away from the urban to enjoy the privileges of modern services.

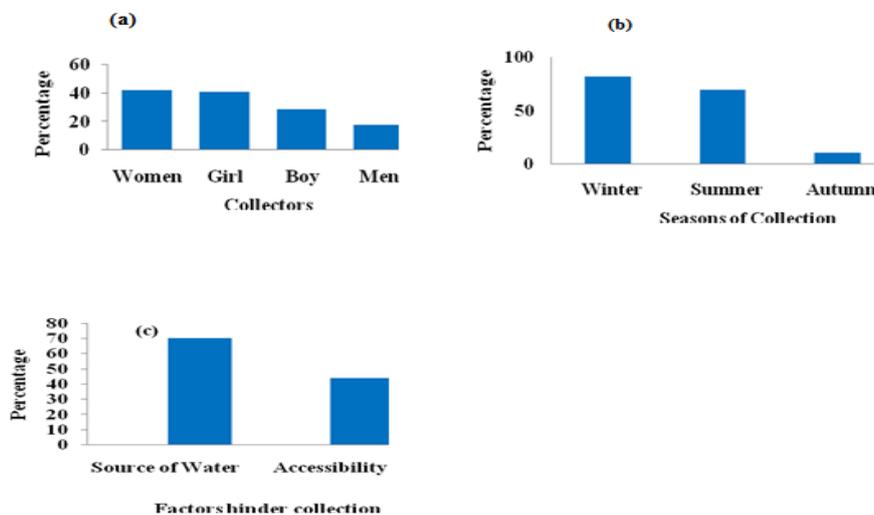


Figure (4): Collectors (a), seasons of collection (b) and factors hinder non-wood forest products collection (c) in *Bahr Alarab* Locality in the East Darfur State of Sudan.

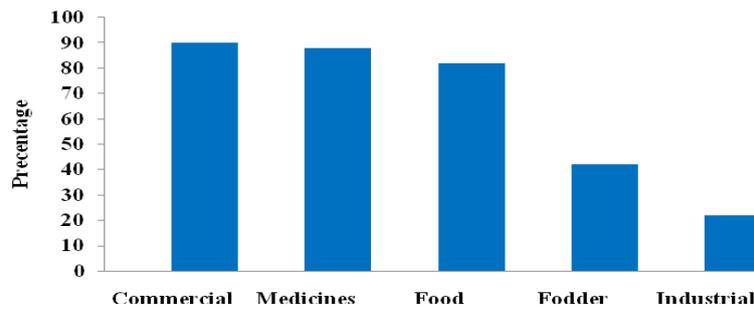


Figure (5): Uses of non-wood forest products in *Bahr Alarab* Locality in the East Darfur State of Sudan

About 77% of the respondents said that they sold the non-wood forest products to middle men (Figure 6). The honesty of this answer was found to be at Chi square equals to 29.16 ($P < 0.001$). The faraway of the markets from the collecting areas and absence of sale points seem to compel the collectors to sale to the mediators who always decrease bargain to gain more. Therefore, markets should be established to contribute in selling and companies and other meant institutions should be available in the area to encourage the people for more collection. Moreover, and based on the results given in figure (7) where 65% of the respondents said there was no processing of non-wood forest products in the locality, nevertheless the respondents mentioned that there were some traditional processing of some products such as *Nabag* lubes, oil from *Heglig* fruit, Tannin from *Garad*, and juice from *Aradeib* and *Gongleiz* fruits ($P < 0.001$; Chi square = 9.0), programs and projects necessary to add value to the non-wood forest products dealing are urgently needed. More than that, training and guidance of non-wood forest products processing to increase the income and improve the living conditions of rural people are necessary.

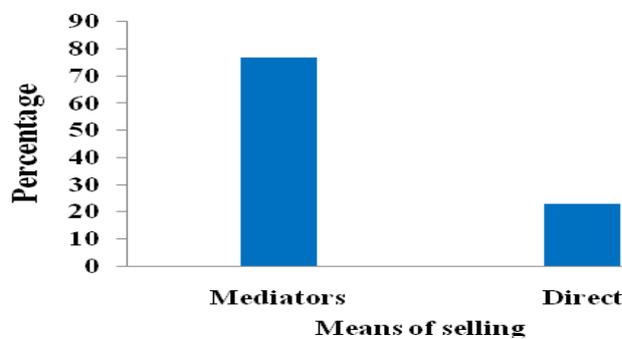


Figure (6): Means of selling the non-wood forest products in *Bahr Alarab* Locality in the East Darfur State of Sudan



Figure (7): Perception of the respondents towards the processing of non-wood forest products in *Bahr Alarab* Locality in the East Darfur State of Sudan

About 65 % of the households sold the non-wood forest products they collected in the village market (Figure 8a). This is due to the fact that there are difficulties in transporting them in or outside the state. Then, the family's sale their products in the village market at very low price. In light of the low and lack of attention to the prices of non-wood forest products, collection of the non-wood forest products by households would be diminished and then vanished in the coming few decades. This assumption is supported by the result in figure (8b) as about 56% of respondents said that non-wood forest products were not profitable compared to 44% said profitable ($P < 0.001$; Chi square = 1.44). Moreover, 98% of respondents said that there were no companies to help in financing and marketing of the non-wood forest products (Figure 8c & 8d). The reliability of this views was very highly significant ($P < 0.001$, Chi square > 67.24). So governments and funding institutions should give these products priority and support to enhance production and marketing because they had very significant contribution ($P < 0.001$; Chi square = 17.640) to household economy (Figure 8e). More to financing, about 75% of respondents also believed in processing to develop the collection and marketing of non-wood forest products (Figure 9). Nevertheless of their ideas or believes, reward able prices, financing of producer, extension and awareness programs would encourage families to collect the largest quantity and protect the trees (Figure 9).

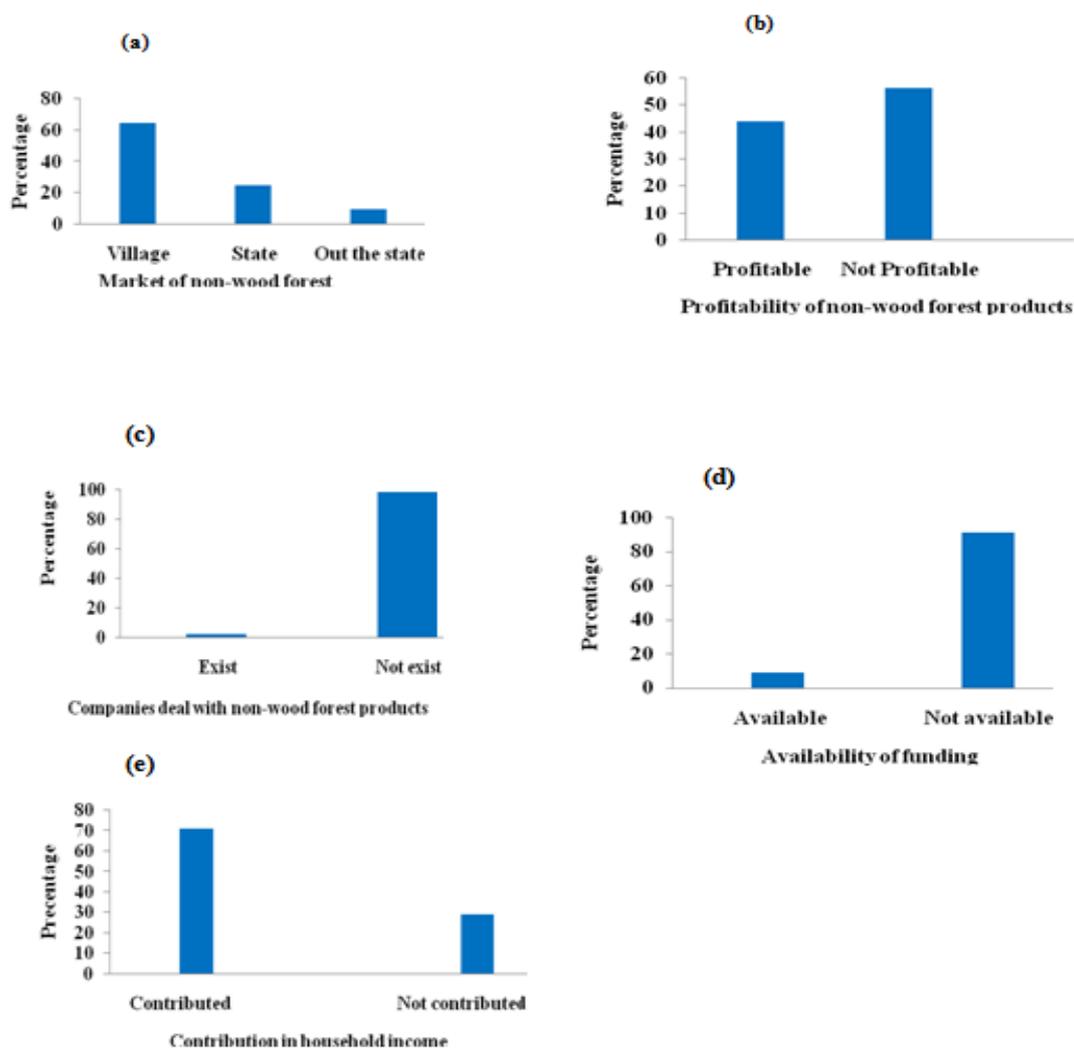


Figure (8): Commercialization of non-wood forest products; marketing (a), profitability (b), existence of companies (c), funding of collectors (d) and contribution in the households income (e) in *Bahr Alarab* Locality in the East Darfur State of Sudan.

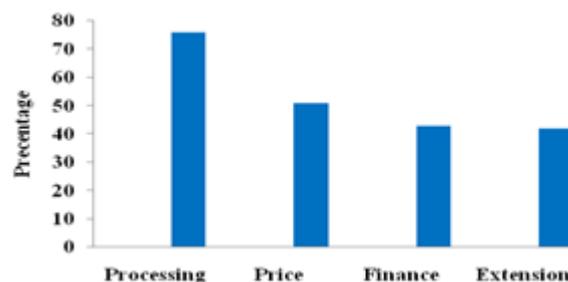


Figure (9): Respondents perception towards developing non-wood forest products in *Bahr Alarab* Locality in the East Darfur State of Sudan.

Figure (10) showed that about 95% of the respondents mentioned that they were not contributed in any activities on forest and natural resources and their conservation. This seems to be because of the lack of extension and training programs on forests activities being provided by the National Forests Corporation. More than that is the lack of management programs and the security circumstances. Provision of guidance, capacity building and awareness programs may develop the conservation of the non-timber forest products resources.

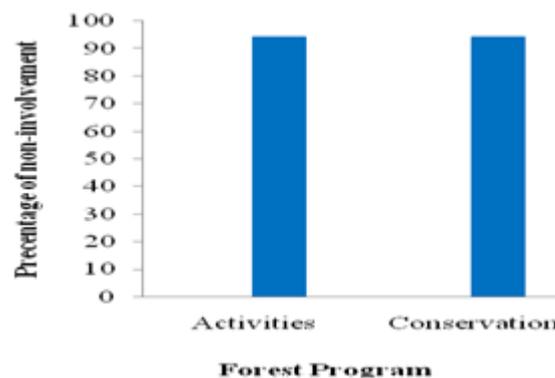


Figure (10): Involvement of the community in forest activities and conservation in *Bahr Alarab* Locality in the East Darfur State of Sudan.

IV. Conclusions And Recommendations

The study found that Majority of the collectors were females. The main types of non-wood forest products were *Nabag (Ziziphusspina-christi)*, *Aradeib (Tamarindus indica)*, *laloub (Balanites egyptica)*, *Gum Arabic(Acacia senegal)* and *Gum talha (Acacia seyal)*.The products were used in medicines, food and commercially. The seasons of collection were winter and summer. The major problems facing collection were shortage of water and accessibility. Selling of non-wood forest products was done through mediators at the villages markets in absence of companies. The non-wood forest products had direct contribution to household income. There was no processing of non-wood forest products. People perceived that processing, pricing, and financing might developed the non-wood forest products. The community was not involved in the activities and conservation of the forests.

The study recommends that developing strategy on collection and marketing of non-wood forest products to secure fair prices through investment of companies, extension services and micro-finance. Establishing of storage facilities for the producers to help them in better marketing and fair income during the off season period. Introduction and application of appropriate methods and techniques to increase production conserve the trees and secure high quality of non-wood forest products is of high importance. Improving the infrastructure in the study area especially roads to improve accessibility Encourage pharmaceutical industries to invest in non-wood forest products as raw material and raise awareness of the people towards non-wood forest products. Encourage people to plant non-wood forest product trees on their lands and as wind breaks around agricultural schemes empower extension and training programs to sustain the non-wood forest products resources.

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