
SURVEY ON NON-TIMBER FOREST PRODUCTS IN BAUCHI SOUTH SENATORIAL DISTRICTS, BAUCHI STATE, NIGERIA

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ABSTRACT

A survey on Non-Timber Forest Products (NTFPs) in Bauchi South Senatorial Districts (Alkali, Bauchi, Tafawa Balewa and Toro Areas) of Bauchi State, Nigeria was reviewed in 2013. The aim was to identify the common tree species in the areas, the plant parts used (roots, barks, stems, leaves, fruits, etc) and to identify their uses, methods of used and end produce. Data were collected through the use of structured questionnaires, supplemented with verbal interview and observation. A total of 300 Questionnaires were randomly administered in the study local government areas. All data collected from the survey areas were subjected to simple descriptive statistics. A total of 58 useful species of plant origins was recorded as having various applications in the lives of the rural dwellers in the area. The result showed that NTFPs in Bauchi South Senatorial Districts of Bauchi State has varying use categories such as Medicine (33.0%), Food/fruits (16.0%), Oil & Spice/condiments (8.0%), Carving, crafting & implement (12.8%), Environmental protection/amelioration(10.8), Proteins/bush meats (7.6%) while Other uses[Fodder, tannin, rope, gum, utensil, dye, etc. (11.8%)]. The study also revealed that, the people in the area collect these resources frequently and sell them as a means of earning a living. There is need for forest policy to include the production of NTFPs and local agro-forestry schemes should be developed within national forests to allow for the production of bush meats, rattan, bamboo, traditional medicines, honey and other forest food.

Key Words: NTFPs Non-timber forest products, Bauchi South Senatorial Districts, Bauchi, Tafawa Balewa, Toro, Alkali, Areas

INTRODUCTION

Non-timber forest products (NTFPs) are wild plant products other than timber harvested from forests, savannahs and other natural vegetation types. This definition includes the use of wood for canoes, woodcarvings, local house constructions, fencing materials and firewood/coal, but

excludes industrial timber (Andel, 2006). Other Non-Timber Forest Products (NTFPs) harvested from forests, include: wild fruits, vegetables, nuts, edible roots, honey, palm, medicinal plants, and bush meat (Andel, 2006). The NTFPs are also described as the Non-wood forest products (NWFPs) by the FAO (2001; www.fao.org) which include all

goods or items of biological origin as well as services derived from forest or any land under similar use, and exclude wood in all its forms.

NTFPs have enormous uses among rural Communities in Nigeria such as sources of Foods like fruits, nuts, honey, insects and animals and etc. They (NTFPs) are also used as fodders, fibres, fertilizers, medicinal extracts, construction materials, cosmetics and culture products, natural dyes, tannins, gums and other exudates. Other benefits include essentials oils, spices, edible oils, decorative articles, horns, tusks, bones, pelts, plumes, hides and skins, on-wood lingo-cellulose products, photochemical and aroma chemicals. These products are derived from a variety of sources, such as plants(palms, grasses, herbs, shrubs and trees) and animals (insects, birds, reptiles and large animals) and other non-living components of the ecosystem (Akanni, 2013).

Millions of people, especially those living in rural areas in developing countries including Nigeria, collect these products daily and sell as a means of livelihood (Andel, 2006; Sale, 2006; Shomkegh *et al.*, 2008). They also refer to all the resources produced other than industrial round wood and derived savanna sawn wood/timbers (wood chips, wood based panels and pulps) that may be

extracted from the forest ecosystem and are utilized within the household or are marketed or have socio-cultural, religious significance (FAO, 1990; Tee and Amonum, 2008).

A large proportion of rural populations living near forestlands earn their livelihood from the extraction, collection, and sale of NTFPs thereby improving their quality of lives and standard of living (Agbogidi and Okonta, 2003). Agbogidi (2010) listed NTFPs to include: food or food additives (nuts), plant materials (fibre, creepers and flowers), plant derivation (raffia bamboo rattan, cork, and essential oils. Others are animals (such as snails) and animal products (honey, silk).

Non-Timber Forest Products contributes highly to the income and welfare of household. These among others include gathering, collection and sale of leaves and medicinal herbs, food vending, and sale of fuel wood and honey. Others include goat, sheep, and rabbit and poultry rearing, food processing, crafts and basket weaving, trapping, catching and processing of meat also generate income to those engaged in it, (Odebode, 2003).

World Health Organization estimate revealed that 80% of the people living in developing countries use wild plants to meet some of their health and nutritional needs

(Agbogidi, 2010). Thus, billions of people, especially those living in rural areas in developing countries, make use of NTFPs on a daily basis. This involves thousands of plant and tree species, most of which are consumed within the household of the gatherers (www.fao.org/documents). Life would be virtually impossible for most people living in rural areas in developing countries without the availability of palm leaves for roofing, medicinal leaves and natural fibres to construct baskets and fish traps. Although the majority of the products never reach a marketplace, a small percentage is sold in local and regional markets offering an important source of cash income, as their commercial value is high. The extraction, processing, and trading of NTFPs is often the only employment available for the population in these remote rural areas, (Andel, 2006).

METHODOLOGY

STUDY AREA

Alkaleri Local Government Area

Alkaleri is one of the 20 local government areas of Bauchi State in Nigeria, with its headquarter at Alkaleri (alkalere) located at 10°15'58'' N 10°20'07'E. It has land area of 5,918km² and a population of 329,424, (Census, 2006). The predominant tribes in the area are 'Kannuri, Fulani, Dugurawa and

Jukun'. Human activities include: farming, hunting, civil service, business, etc.

Toro Local Government Area

Toro is one of the local government areas of Bauchi South Senatorial Districts of Bauchi State in Nigeria, with its headquarter at the Toro which is located at Latitude 5°40' and 7°40'N and longitude 5°00' and 6°30'E. It has an area of 6,932km² with total population of 350,404, (N.P.C, 2006). The predominant tribes are 'Jarawa, Fulani and Ribina'. Human activities include: farming, hunting, civil service, business, etc.

Bauchi Local Government Area

Bauchi Local Government Area is located between latitude 10°22' North of the equator and longitude 9°42' East of the Greenwich Meridian at an elevation of 607.4m above sea level. It has land area of 3,687km² with a population of 493,840 (Census, 2006). The predominant tribes are 'Gerawa, Fulani and Hausa'. Human cultivation include: farming, hunting, business, civil service, etc., (Nigerian National Bureau of Statistics, 2010).

Tafawa Balewa Local Government Area

Tafawa Balewa local Government Area is located to the south of bauchi town, about 80km along bauchi-kwabir road. It lies between latitude 9°41'E and longitude 10°5'N. It has land area of 2,515km² with a

population of 219,988(NPC, 2006). The predominant tribes in the area are ‘Jarawa, Sayawa and Fulani. Human activities include farming, hurting, business, civil service, crafting, etc., (Nigerian National Bureau of Statistics, 2010).

Sampling Techniques, Data Collection and Data Analysis

A combination of random and purposive Sampling technique was employed in selecting the respondents. The population sample used for the study covers the entire southern senatorial district. In order to ensure adequate and broad based data collection, four Local Government Areas (LGAs) were randomly selected (Alkaleri, Bauchi, Tafawa-Balewa and Toro). In each LGA selected, three villages/towns were in turn purposively selected. The villages/town include:- Zaranda, Gumau and Polchi in Toro LGA; Duguri, Gar and Alkaleri in Alkaleri LGA; Bununu, Zwal and Lere in Tafawa-Balewa LGA and Liman-Katagun, Kangere and Buzaye in Bauchi LGA. In each village/townselected, twenty five (25) respondents were randomly picked for the data collection

Data for the study was obtained through the use of structured questionnaire, supplemented with verbal interview and observation. A total of 75 copies of the

questionnaire were allocated to each local government areas, given the grand total of 300 questionnaires, but 288 questionnaires were returned due to lack of cooperation and cultural belief among the respondents (i.e afraid of spiritual attack by the researchers).

Descriptive statistics (descriptive analysis) was used to analyze the data. These include frequency counts and percentages.

RESULTS AND DISCUSSION

Socio Economic Characteristics of Respondents in the Study Area

The result of socio economic characteristics of respondents in the study area is shown in Table 1. Majority (61.1%) of the respondents involved in gathering/using the NTFPs were below the age of 46 years and 24.3% were above this age while 14.6% of the respondents were less than 26 years of age that are involved in gathering NTFPs. This means that a high proportion of the collectors of NTFPS in the area fall within the middle age bracket, which could be linked to vigor and low level of industrialization in the study area. Results on educational level showed that 51.7% of the respondents attained primary/ secondary education; 34.1% attained tertiary education, while 14.2% did not attained western education but only attained quranic education and vocational education. This

means NTFPs collection constituted a source of livelihood for both the literates and illiterates in the study area. A breakdown of the NTFPS collectors by sex showed that 79.9% were Men while 20.1% were Women. The low number of female respondents was connected with the culture/religion of the Muslim people, which limits the exposure of females; they exhibit shyness, and thus access to answering the questionnaire.

Results on marital status indicated that 70.1% of the respondents were married while 25.7% were single, and 4.2% as divorcee. The result is indicative of a possible fast population growth in the study area, which means more pressure on the NTFPs in few years to come, when compared between population growth and forest resource conservation. Their level of education could have influence on how they harvest, gather and utilize NTFPS.

Furthermore, the results showed that more Christians (42.7%) were involved in NTFPs collection and utilization. This was followed by Muslims (47.2%), and traditionalist (10.1%), the least.

Figure 1 showed the end products for which the NTFPs were being collected and used by people of the communities in the study Areas. All the forest products identified in the figure were derived by the number of questionnaire answered and returned by the respondents in the areas. The result (Fig 1) showed that 33.0% of the respondents used NTFPS for medicinal purposes, 16.0% for Foods/fruits, Protein/bush meat were 7.6%, Environmental protection/amelioration/shelter belt 10.8%, crafting/carving/implements 12.8%, oil and spice/condiments 8.0%, while Other uses (Fodder, tannin, rope, gum, utensil, dye, etc.) 11.8%.

Table 1: Socio Economic Characteristics of Respondents in the Study Area

Variables	Frequency	Percentage
Age (years)		
<25	42	14.6
26-45	176	61.1
>45	70	24.3
	288	100
Educational level		
Primary/secondary	149	51.7
Tertiary	98	34.1
Others (Quranic & vocational)	41	14.2
	288	100
Gender		
Male	230	79.9
Female	58	20.1
	288	100
Marital status		
Single	74	25.7
Married	202	70.1
Divorced	12	4.2
	288	100
Religion		
Christians	123	42.7
Muslim	136	47.2
Traditionalists	29	10.1
	288	100

Contributions of NTFPS to the Socio-Economic Development of the Study Area

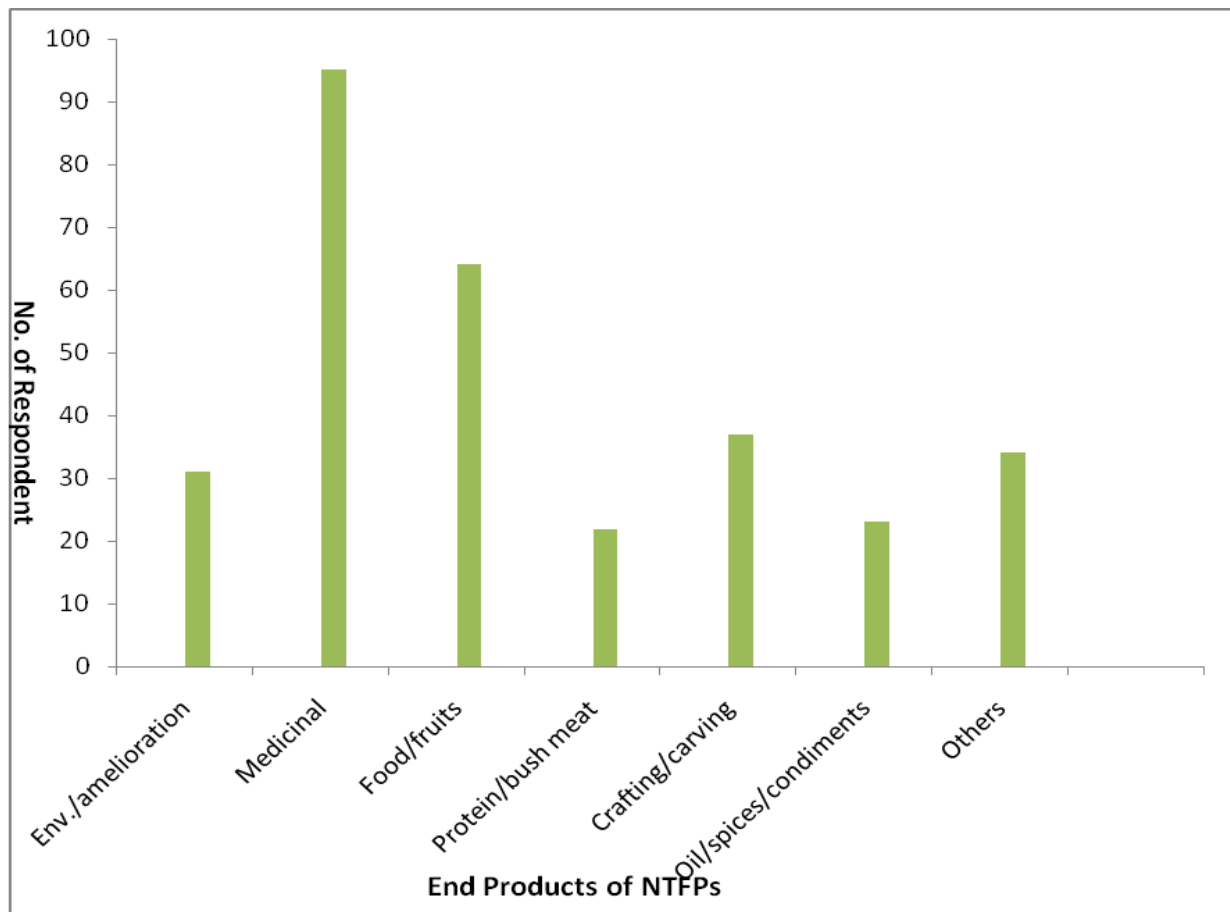


Figure 1: End Products/Major uses of NTFPs in the Study Area

Tables 2-8 present the uses/purposes of NTFPs collected, the parts collected and the various forms they were utilized. 17 plant species were collected and used for traditional medicine, 12 for foods, 11 for raw materials in carving, crafting and implements, 7 for oil, spices/condiments and all the tree species played a vital role in the study environment, which include shelter belt, Environmental control and amelioration. This finding corroborates that of Agbogidi (2010) that NTFPs range from

being used as food or food additives, medicines, and crafts among others. Also, Shiva and Verma, (2002) reported that NTFPs can be classified in many different ways; according to ends use (medicine, food, drink, etc) by the part used (roots, leaves, barks, etc). One could deduce from these results that NTFPs provide the inhabitants daily needs. This agrees with the findings of Arnold (1995), who reported that rural dwellers in developing countries depend on NTFPS for various levels of use.

Results on the availability of NTFPs revealed that, 51.2% of the respondents reported that some NTFPs are not always available throughout the year due to restriction by government in order to enhance sustainability and sometimes too much pressure/demand on some of the products have negative effects to the forests and environs unless by permission, while 48.8% responded that it is always available to them because they are forest guards/agents in the areas, particularly from restricted forests in the study area while some of the respondents have forest permits into the forests. Furthermore, the result on seasonal availability of forest products as showed on table 2 below, where NTFPs availability is based on seasonality, as 11.8% of the respondents reported that

NTFPs are available to them mostly in the wet (rainy) season, 72.9% reported that NTFPs are mostly available to the community during the dry season while 15.3 of the respondents reported that the products are always (both seasons) available. The unavailability of the NTFPs, through the year, especially in wet season was attributed to inaccessibility of road into the forest to obtain NTFPs; also according to the study, it is difficult to identify some products species from other Plants (weeds). This finding agrees with the report by Timko *et al.*, (2010) that the reliance on NTFPs for livelihood in general and forest based incomes in particular, varies depending on the season and the accompanying household need.

Table 2: Seasonal availability of Forest Products

Seasonal availability	Frequency	Percentage
Rainy season	34	11.8
Dry season	210	72.9
Always (both seasons)	44	15.3
	288	100

Table 3: List of Common Tree Species for Medicinal uses, Part & How Used and End product in the Study Area

	Scientific name	Plant part used	How used	End produce
1.	<i>Tamarindus indica</i>	Fruit, seed, leaf	Fresh/cooked	Medicinal
2.	<i>Cassia siamea</i>	Leaf	Cooked,fresh	Medicinal
3.	<i>Lawsonia inermis</i>	Bark, leaf	Fresh/processed	Medicinal
4.	<i>Detarium microcarpum</i>	Stem, fruit/seed	Fresh,dried	Medicinal
5.	<i>Adansonia digitata</i>	Bark, leaf	Cooked, dry, processed	Medicinal
6.	<i>Khaya senegalensis</i>	Bark, leaf	Cooked ,fresh, dry	Medicinal
7.	<i>Azadirachta indica</i>	Bark, leaf, seed	Dry, cooked, fresh, processed	Medicinal
8.	<i>Anacardium occidentale</i>	Leaf	Cooked, fresh fruit,	Medicinal
9.	<i>Moringa oleifera</i>	Bark, leaf, seed, root	Fresh, dry, cooked and processed	Medicinal
10.	<i>Eucalyptus spp</i>	Bark, leaf	Cooked	Medicinal
11.	<i>Sclerocarya birrea</i>	Bark	Cooked, fresh	Medicinal
12.	<i>Sterculia setigera</i>	Bark, root	Cooked, fresh	Medicinal
13.	<i>Piliostigma thonningii</i>	Leaf, stem	Fresh, cooked	Medicinal
14.	<i>Terminalia catappa</i>	Leaf	Cooked	Medicinal
15.	<i>Vitellaria paradoxa</i>	Bark, seed, leaf	Cooked, fresh	Medicinal
16.	<i>Nauclea popeguinea</i>	Bark, leaf	Cooked, dried, processed	Medicinal
17.	<i>Zyzipus spinachristi</i>	Fruit, leaf	Fresh, cooked	Medicinal

Table 4: List of Tree Species for Food/Fruit, Part and How used and End product in the Study Area

S/N	Scientific Name	Plant Part Used	How Used	End Produce
1.	<i>Terminalia catappa</i>	Fruit	Fresh	Fruit
2.	<i>Lawsonia inermis</i>	Leaf	Fresh	Fruit
3.	<i>Deterium microcarpum</i>	Leaf	Fresh	Fruit
4.	<i>Ziziphus mauritiana</i>	Fruit	Fresh	Fruit
5.	<i>Ziziphus spinachristi</i>	Fruit	Fresh	Fruit
6.	<i>Prosopis africana</i>	Fruit	Process, cooked	Food
7.	<i>Adansonia digitata</i>	Leaf, fruit	Cooked, dried, processed	Food/fruit
8.	<i>Vitlleria paradoxa</i>	Seed, fruit	Cooked, processed	Food/fruit
9.	<i>Annona senegalensis</i>	Fruit	Fresh	Fruit
10.	<i>Vitex doniana</i>	Fruit	Fresh	Fruit
11.	<i>Borassus aethiopum</i>	Fruit	Fresh, cooked	Food/fruit
12.	<i>Hyphaene thebaica</i>	Fruit	Dried, fresh	Fruit

Table 5: list of Common Tree Species for Oil and Spice/Condiment, Part & How used and End product in the Study Area

S/N	Scientific name	Plant part used	How used	End produce
1.	<i>Parkia biglobosa</i>	Seed	Cooked	Spice/Condiment
2.	<i>Vitelaria paradoxa</i>	Seed, fruit	Cooked, processed	Oil, Spice, Condiment
3.	<i>Prosopis africana</i>	Seed	Cooked/ Processed	Oil, Spice, Condiment
4.	<i>Afzelia africana</i>	Fruit	Cooked, Processed	Oil,
5.	<i>Dacroydes edulis</i>	Fruit	Cooked, processed	Oil
6.	<i>Hypaene thebaica</i>	Fruit	Processed	Oil
7.	<i>Ficus sycomorus</i>	Fruit	Processed	Oil

Table 6: List of Common Tree Species for Carving, Crafting & Implement Part Used, How Used and End product in the Study Area

S/N	Scientific name	Part used	How used	End produce
1.	<i>Balanite aegyptiaca</i>	Stem	Processed	Carving and Crafting
2.	<i>Anogeissus leiocarpus</i>	Stem	Processed	Carving, Crafting, implement
3.	<i>Acacia albida.</i>	Stem	Processed	Crafting, implement
4.	<i>Prosopis Africana</i>	Stem	Processed	Carving, Crafting, implement
5.	<i>Dacroydes edulis</i>	Stem	Fresh, processed	Carving and Crafting
6.	<i>Irvingia gabonensis</i>	Stem	Processed	Carving and Crafting
7.	<i>Dialium guineense</i>	Stem	Processed	Carving and Crafting
8.	<i>Acacia albida</i>	Stem	Processed	Crafting, implement
9.	<i>Terminalia glaucescens</i>	Stem	Processed	Craft, implement
10.	<i>Piliformis microcarpum</i>	Stem	Processed	Craft, carving, implement
11.	<i>Tamarindus indica</i>	Stem	Processed	Implement, carving, crafting

Table 7: List of Common Tree Species for other Purposes, Part & How used and End product in the Study Area

S/N	Scientific name	Plant used	How used	End produce
1.	<i>Piliostigma thonningii</i>	Stem	Fresh	Rope, weapon, implement
2.	<i>Acacia albida</i>	Sap, stem	Processed	Tannin, gum
3.	<i>Ceiba pentandra</i>	Stem, leaf, silk	Processed	Rope, mattress/form
4.	<i>Adansonia digitata</i>	Leaf, fruit, stem	Cooked, dried	Tannin, resin, soap
5.	<i>Diospyros mespiliformis</i>	Leaf, fruit,	Fresh/dried	Utensil
6.	<i>Prosopis africana</i>	Stem, leaf	Processed	Coal, weapon
7.	<i>Acacia nilotica</i>	Leaf, stem	Fresh, dried	Fodder, weapon, utensil
8.	<i>Anogeissu leiocarpus</i>	Leaf	Fresh	Fodder, utensil
9.	<i>Ficus sycomorus</i>	Leaf	Fresh	Fodder, implement
10.	<i>Terminalia catappa</i>	Fruit, leaf	Fresh	Fodder
11.	<i>Lawsonia inermis</i>	Leaf	Fresh, dried, processed	Dye, skin design

Table 8: Income Generation of the Respondents in the Study Area (Annually)

Income Generation	Frequency	Percentage
<₦15,000.00	12	4.17
₦15,000-35,000	47	16.32
₦36,000-45,000	127	44.1
₦46,000-65,000	68	23.61
₦66,000 and above	34	11.80
	288	100

The results on income generation from NTFPs in the study area revealed that 73.8% of the respondents generated income from NTFPs, while 26.2% do not. However, they used the products for other daily needs which can be quantify in monetary value i.e they generate income indirectly. The income generated by the people indicated that 4.17% generate/earn <₦15,000 annually, 16.32% generate between ₦15,000 and ₦35,000 annually, 44.1% between ₦36,000- ₦45,000, and 23.61% earned between ₦46,000-65,000 annually while 11.80% generate about ₦66,000 and above. Some of the most pressing needs that can be met by collecting and selling forest products include:

- The payment of school fees (Adebisi 2004, Campbell *et al.* 2002, Sunderlin *et al.* 2005);

- Funding investments in consumptive activities (such as new clothes, school uniforms, gifts, pots, and pans) (Campbell *et al.* 2002, Schreckenber 2004);
- Dealing with medical emergencies as they arise (Sunderland *et al.* 2004, Sunderlin *et al.* 2005) or meeting medicinal needs (Arnold and Perez 2001);
- The provision of low-cost energy as wood remains the main source of energy for the vast majority of rural Africans (Oksanen *et al.* 2003);
- Supplementing diets during particular seasons in the year or during shortfalls (Angelsen and Wunder 2003, Arnold and Perez 2001);
- Using profits for participating in family ceremonies (Adebisi 2004); and

- Using incomes in productive activities (such as building a storage hut, purchasing a new goat or agricultural stocks for later resale (Schreckenber 2004) or purchasing agricultural inputs (Sunderlin *et al.*, 2005).

CONCLUSION AND RECOMMENDATION

Conclusion

Results from the study in Bauchi South Senatorial District, Bauchi State, Nigeria on NTFPs revealed that NTFPs play an important role in the livelihood of rural and forest-dwelling communities. Respondents from the study areas depend on those NTFPs for their nutrition and medical care. It also provided feed for domestic animals and equipment for local construction which are traded to generate cash income.

Data for many products on harvested quantities, provenance, trade and export volumes are unreliable or nonexistent. This is because most people do not keep a record of what they use, buy or sell. NTFPs, from which much money can be made, in particular, are often overharvested or harvested in a way that is destructive to the plants. As a result, after a certain period the product is no longer available, sometimes with devastating consequences for the harvesters and their families. Abundantly present and fast growing

species withstand a certain degree of exploitation far better. There are sustainable management systems for only a limited number of species. For the greater majority of the species, however, the lack of information on growth rates and regeneration hampers the design of adequate harvesting models.

Moreover, if people can earn a living by selling these products, they will not need to engage in other, often environmentally more destructive activities. But if the harvesting of wild plants is no longer economically viable, they may shift to less sustainable land use practices. NTFP extraction does not, however, always contribute to biodiversity conservation.

Recommendation

NTFPs occupy a significant place in the economy of rural dwellers of the study areas, to ensure speedy growth and yielding (development) of NTFPs in Bauchi South Senatorial District, there is need for government to increase their funding for trees planting campaign in marginal land. The people of the communities should also be encourage to embark on planting of economic trees to support some cottage industries located in the area which can help to reduce rural-urban population drift and the prevailing unemployment by providing raw materials for crafting and carving.

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