Socio-Economic Contributions of Forest Products to Rural Livelihood: A Case Study of Aramoko Forest Reserve Ekiti-State

Olujobi O. J. (Corresponding Author)
Department of Forest Resources and Wildlife Management, Ekiti State University, P.M.B. 5363, Ado-Ekiti, Nigeria
Email: olujobi@yahoo.com

Olajuyigbe B. J.
Department of Forest Resources and Wildlife Management, Ekiti State University, P.M.B. 5363, Ado-Ekiti, Nigeria

Abstract

In the past, conservation effort has primarily focused on establishment of forest reserves for timber production, with minimal or no consideration to how these natural resources will help sustain or improve livelihoods of adjoining communities. This study examined the contribution of Aramoko forest reserve to the livelihoods of the adjoining communities in Ekiti State. One hundred and twenty pre-tested questionnaires were administered among the products collectors in the study area. Data collected were analysed and the result showed that 78.3 % of the respondents are married with 52.3 % of them male, while 50.8 % of the respondents aged between 51-70 years with 64.1 % having at least secondary education. Twenty-five (25) different products were collected by the respondents in the study area. These products include among others; timber with highest frequency of (120) followed by herbal plant (115), *Archantina marginata* (105), *Thaumatococcus danielli* (89), *Bridelia ferruginea* (70) and *Irvingia gabonensis* (65). The use of motor cycle accounted for 41.4 % of the respondents means of transportation, while 31.3 % of the respondents sell their product in bit at the village market. Picking, digging, plucking, cutting and uprooting were methods used for harvesting by the respondents while illegal felling (24 %) and indiscriminate bush burning (22.4 %) were the major conservation problem in the study area. Specifically, some of the products harvested are used for food, medicine, fuelwood, herbs and cultural purposes. The study recommends that research should be conducted into how these products can be artificially raised in the nursery for plantation establishment.

Keywords: Socio-economic; Conservation; Aramoko forest reserve; Adjoining communities; Ekiti state.

1. Introduction

Forests are major source of livelihood for many people particularly in developing countries, providing numerous benefits directly or indirectly to human beings. Forestry sector is one of the main pivots on which the nation’s welfare is built. Thus, it serves as resource base for many forest industries providing one of the highest revenues and employment generating sectors. Forestry also has an important role in poverty alleviation in the broader definition, pertaining to capabilities, empowerment and rights. The importance of forest to mankind cannot be over emphasized. 

Forests currently comprise approximately 4 billion hectares or 30 per cent of the global land base and it provides food, shelter, fuel, and other goods and services to a large portion of the world’s population [1]. Approximately 1 billion extremely poor people depend on forests for part of their livelihood [2]. In rural areas of sub-Saharan Africa, forest resources are amongst the most vital components of livelihoods and development opportunity [3]. Forest resource utilization therefore is a precondition for livelihood of forested communities who do not have alternative sources of income [4].

Africa is said to have the highest percentage of people in the world that live on less than a dollar a day [5]. Over two-third of the continent’s 600 million people are estimated to rely on forest products, either in the form of subsistence uses or as cash income derived from a wide range of timber and non-timber forest products (NTFPs) [6]. During the colonial period, population densities and pressure on forests at the time was low, and this gave greater latitude for tolerance and compromise. However, as human population increases over time this scenario has changed with regards to forest livelihood-systems.

The livelihoods of the people in local communities are linked to production at subsistence level. There is growing recognition that the wise and sustainable management of forest reserve requires the close involvement of all stakeholders. Community involvement in forest management can be defined by the way in which a forest is used, which groups and individuals have access to it, the timing, means and degree of access, what is removed from the forest and the manner of its removal. Forests are important in the livelihoods of local people in most developing countries. Local people depend on forest resources for various products such as fuel wood, construction materials,
medicine, and food. Globally, it is estimated that between 1.095 billion and 1.745 billion people depend to varying degrees on forests for their livelihoods [7].

The potential for sustainable livelihood development of rural dwellers is assessed by analysing assets, perceptions as well as their conservation initiatives [6]. There is limited awareness on the real contribution that forests towards achieving sustainable livelihoods and poverty alleviation as well as the impact of forest conservation on environment. This is primarily due to poor forest statistics and valuation and lack of effective advocacy. Increased attention to both There is therefore an urgent need to recognize the contribution and potential of the forest resources sector with regards to sustainable livelihoods of its adjoining communities. Conservation and livelihoods issues at international and national levels has translated into substantial changes in governance worldwide, with increased participation by relevant stakeholders in natural resources management [8].

There has been a correlation between dependence on forests for local livelihoods and successful organization, this dependence on forests includes both direct uses and income generation through the sale of forest products and services [9]. With the growing population, expansion of agriculture becomes inevitable and this was at the expense of the natural resource base [10]. With the increasing pressure on the forest reserve and the consequent near depletion, better management system must be put in place to reduce further degradation and guarantee the future of the existing forest. There is dearth of quantitative information on the role of forest resources to livelihoods and dependence to guide sustainable use. People in rural areas depend on the resources available in their environment for their livelihood.

2. Methodology
2.1. The Study Area

Aramoko forest reserve is in the western part of Ekiti State, Southwest Nigeria. The forest lies between Longitude 7° 48′ and 54° 5′ East and Latitude 5° 4′ and 1° 78′ north of the Equator. The forest lies south of Aramoko–Ekiti, and north of Ijero-Ekiti. It covers an area of about 13.47 km². The climate of the study area is of West Africa monsoonal type with dry and wet season. The dry season normally start from November through March and is characterised by dry cold wind of harmattan. The rainy season normally start from March through October with occasional strong wind and thunder storm, usually at the onset and the end of the raining season. The annual rainfall ranges from 750mm in the northern zone to 1,500mm in the southern zone, diurnal temperature ranges from 21 °C to 31°C with little variation throughout the year. Annual average relative humidity is about 90% at 7.00am and 65% at 4.00pm. The vegetation type is rain forest.

2.2. Data Collection and Analysis

Pre-tested structured questionnaire which seeks information on the socio-economics characteristic of the respondents, products collected from the forest, period of harvesting, method of harvesting, uses of the products among others was administered to thirty (30) randomly selected respondents in each of the towns (Table 1). The sample size was purposively determined. Administration of the questionnaire was by personal interview. The selected respondents were interviewed at the gate of the reserve since each of the town has entrance to the forest reserve. In some cases, especially where respondents were interviewed right inside the forest reserve, researcher’s observation was used to deduce the applicable answer to some questions such as distance of the village to the forest. Data collected were analysed using simple statistical analytical techniques to produce frequency table and percentage.

Table 1. Distribution of respondents in the study area

| Towns             | No of respondents |
|-------------------|-------------------|
| Aramoko-Ekiti     | 30                |
| Ijero-Ekiti       | 30                |
| Ido-Ile–Ekiti     | 30                |
| Erio-Ekiti        | 30                |
| Total             | 120               |

3. Results
3.1. Demographic Information of the Respondents

Result in table 2 show that 52.5 % and 47.5 % of the respondents are male and female respectively. Age distribution revealed that 50.8 % of the respondents are between 51-70 years. Marital status shows that 78.3% are married while 15.8 % are single. Respondents’ family size reveals that 42.5 % of the respondents have 4-6 members and 48.3 % have 1-3 members while result on educational background shows that 20.8 % are graduates of higher institution while 5 % have no formal education.
Table-2. Distribution of respondents by socio economic characteristics

| Variables         | Frequency | Percentage (%) |
|-------------------|-----------|----------------|
| Sex               |           |                |
| Male              | 63        | 52.5           |
| Female            | 57        | 47.5           |
| Age               |           |                |
| ≤30               | 25        | 20.8           |
| 31-50             | 30        | 25.0           |
| 51-70             | 61        | 50.8           |
| ≥70               | 4         | 3.3            |
| Marital status    |           |                |
| Married           | 94        | 78.3           |
| Single            | 19        | 15.8           |
| Divorced          | 5         | 4.2            |
| Widow             | 2         | 1.7            |
| Family size       |           |                |
| 1-3               | 58        | 48.3           |
| 4-6               | 51        | 42.5           |
| >7                | 11        | 9.2            |
| Education         |           |                |
| No formal education| 6        | 5              |
| Primary education | 37        | 30.8           |
| Secondary education| 52       | 43.8           |
| Post-secondary    | 25        | 20.8           |
| Total             | 120       | 100            |

3.2. Harvesting /Collection Practises of Respondents in the Study Area

Result on respondents’ collection status (Table 3) shows that 16.7 % are full time while 83.3 % are part time collectors while 38.3 % of the respondents visit the reserve every day with 40 % of them have been in the business for 11-20 years. The result shows that majority (48.9 %) of the respondents are farmers. Products mostly harvested by the respondents are timber, wild animal, *Agaricus spp.* and firewood with 7.2 % each.

Table-3. Distribution of respondents by harvesting practices

| Variables                | Frequency | Percentage % |
|--------------------------|-----------|--------------|
| Collection status        |           |              |
| Full-time                | 20        | 16.7         |
| Part-time                | 100       | 83.3         |
| Visit to the forest      |           |              |
| Everyday                 | 46        | 38.3         |
| Weekend                  | 41        | 34.2         |
| Once in two weeks        | 16        | 13.3         |
| Monthly                  | 6         | 5            |
| Others                   | 11        | 9.2          |
| Collection Experience    |           |              |
| 1-5 years                | 10        | 8.3          |
| 6-10 years               | 27        | 22.5         |
| 11-20 years              | 48        | 40           |
| 16-20 years              | 25        | 20.8         |
| >20 years                | 10        | 8.3          |
| Total                    | 120       | 100          |
| Occupation               |           |              |
| Artisan                  | 39        | 20.7         |
| Civil servant            | 21        | 11.2         |
| Trading                  | 36        | 19.1         |
| Farming                  | 92        | 48.9         |
| Total                    | 188*      | 100          |

*Multiple responses
Table 4. Distribution of respondents by product harvested from the forest

| Scientific name          | Frequency | Percentage % |
|--------------------------|-----------|--------------|
| Irvingia wombulu        | 68        | 4.1          |
| Plukenetia conophorum    | 42        | 2.5          |
| Brakelia ferruginea      | 70        | 4.2          |
| Parkia biglobosa         | 57        | 3.4          |
| Firewood                 | 120       | 7.2          |
| Raffia hookeri           | 82        | 4.9          |
| Timber                   | 120       | 7.2          |
| Wild animals             | 120       | 7.2          |
| Chrysoptilum albidum     | 62        | 3.7          |
| Garcinia kola            | 54        | 3.2          |
| Arachantina marginata    | 105       | 6.3          |
| Agaricus spp.            | 120       | 7.2          |
| Apis mellifera           | 45        | 2.7          |
| Pher guineense           | 32        | 1.9          |
| Vernonia amygdalina      | 56        | 3.3          |
| Xylopia aethiopica       | 28        | 1.7          |
| Zingiber officinale      | 25        | 1.5          |
| Senecio biafra           | 32        | 4.9          |
| Thaumatococcus danielli  | 89        | 5.3          |
| Tetrapleura tetraperta   | 31        | 1.8          |
| Aframomum melegueta      | 22        | 1.3          |
| Monodora myristica       | 38        | 2.3          |
| Pterocarpus osun         | 29        | 1.7          |
| Irvingia garbonensis     | 65        | 3.9          |
| Herbal plants            | 115       | 6.9          |
| Total                    | 1,677*    | 100          |

*Multiple responses

3.3. Respondents Marketing Operations

The result on respondents marketing operation (Table 5) shows that 31.3 % of the respondents sell their products in bit, 25.3 % use scale while 23.2 sell in bundle. Majority of the respondents (51.7 %) spent between ₦500 - ₦1000 on transportation to the reserve. The result shows that 41.4 % of the respondents transport their products by motor cycle while 48 % of the respondents sell their products at the village market. Poor pricing accounted for 22.4 % of the problems encountered by the respondents, this was followed by spoilage and cost of transportation with 19.7 % each. The result that 46.6 % of the respondents make ₦151,000-250,000 annually.

Table 5. Distribution of respondent by marketing operations

| Variables            | Frequency | Percentage % |
|----------------------|-----------|--------------|
| Mode of Selling      |           |              |
| Bundle               | 89        | 23.2         |
| Bit                  | 120       | 31.3         |
| Using scale          | 97        | 25.3         |
| All of the above     | 77        | 20.1         |
| Total                | 383*      | 100          |
| Transportation Cost  |           |              |
| <500                 | 26        | 21.7         |
| 500-1000             | 62        | 51.7         |
| 1100-2000            | 29        | 24.2         |
| >2000                | 3         | 2.5          |
| Total                | 120       | 100          |
| Means of transportation |         |              |
| Motor cycle          | 115       | 41.4         |
| Bicycle              | 21        | 7.5          |
| Motor vehicle        | 40        | 14.4         |
| Carry on head        | 102       | 36.7         |
| Total                | 278*      | 100          |
| Selling point        |           |              |
| Reserve gate         | 65        | 26.0         |
| Village market       | 120       | 48.0         |
| City market          | 53        | 10.2         |
Table 6 shows that different methods which includes digging, uprooting, plucking, cutting and picking were employed by respondents for harvesting of their products. These products were usually harvested at different period of the year from January to December (Table 7). Result on conservation problem (Table 8) shows that animal grazing accounted of 24 % of damage done to crops and samplings in the forest this was followed by indiscriminate bush burning (22.4 %) and illegal felling (20.7 %) respectively.

3.4. Respondents Methods and Period of Harvesting and Conservation Problems

Table-6. Distribution of respondents by method of harvesting/collection

| S/N | PRODUCTS                  | Harvesting/Collection Method                |
|-----|--------------------------|---------------------------------------------|
| 1   | Irvingia wombulu         | Plucking and picking                        |
| 2   | Plukenetia conophorum    | Plucking and picking                        |
| 3   | Bridelia ferruginea      | Cutting and peeling                         |
| 4   | Parkia biglobosa         | Plucking and picking                        |
| 5   | Firewood                 | Cutting and picking                         |
| 6   | Raffia hookeri           | Tapping                                     |
| 7   | Timber                   | Cutting                                     |
| 8   | Wild animals             | Hunting                                     |
| 9   | Chrysophillum albidum    | Plucking and picking                        |
| 10  | Garcinia kola            | Plucking and picking                        |
| 11  | Archantina marginata     | Hunting and picking                         |
| 12  | Agaricus spp.            | Uprooting                                   |
| 13  | Apis mellifera           | Hunting                                     |
| 14  | Piper guineense          | Plucking                                    |
| 15  | Vernonia amygdalina      | Cutting and plucking                        |
| 16  | Xylopia aethiopica       | Picking and plucking                        |
| 17  | Zingiber officinale      | Uprooting and digging                       |
| 18  | Senecio biafrae          | Cutting, uprooting and plucking             |
| 19  | Thaumatococcus danielli  | Cutting                                     |
| 20  | Tetrapleura tetrapetra   | Picking and plucking                        |
| 21  | Aframomum melegueta      | Digging and uprooting                       |
| 22  | Monodora myristica       | Picking and plucking                        |
| 23  | Pterocarpus osun         | Cutting and peeling                         |
| 24  | Irvingia gabonensis      | Plucking and picking                        |
| 25  | Herbal plants            | Cutting, digging, peeling, uprooting, plucking and picking |
Table 7. Products collection/harvesting period of the year

| S/N | Products              | J   | F   | M   | A   | M   | J   | A   | S   | O   | N   | D   |
|-----|-----------------------|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|
| 1   | Irvingia wombulu     |     |     |     |     |     |     |     |     |     |     |     |
| 2   | Plukenetia conophorum|     |     |     |     |     |     |     |     |     |     |     |
| 3   | Bridelia ferruginea  |     |     |     |     |     |     |     |     |     |     |     |
| 4   | Parkia biglobosa     |     |     |     |     |     |     |     |     |     |     |     |
| 5   | Firewood              |     |     |     |     |     |     |     |     |     |     |     |
| 6   | Raffia hookeri       |     |     |     |     |     |     |     |     |     |     |     |
| 7   | Timber                |     |     |     |     |     |     |     |     |     |     |     |
| 8   | Wild animals          |     |     |     |     |     |     |     |     |     |     |     |
| 9   | Chrysophyllum albidum|     |     |     |     |     |     |     |     |     |     |     |
| 10  | Garcinia kola         |     |     |     |     |     |     |     |     |     |     |     |
| 11  | Archantina marginata |     |     |     |     |     |     |     |     |     |     |     |
| 12  | Agaricus spp.        |     |     |     |     |     |     |     |     |     |     |     |
| 13  | Apis mellifera       |     |     |     |     |     |     |     |     |     |     |     |
| 14  | Piper guineense      |     |     |     |     |     |     |     |     |     |     |     |
| 15  | Vernonia amygdalina  |     |     |     |     |     |     |     |     |     |     |     |
| 16  | Xylopia aethiopica   |     |     |     |     |     |     |     |     |     |     |     |
| 17  | Zingiber officinale  |     |     |     |     |     |     |     |     |     |     |     |
| 18  | Sennecia bisulvae    |     |     |     |     |     |     |     |     |     |     |     |
| 19  | Thaumacoccus danielli|     |     |     |     |     |     |     |     |     |     |     |
| 20  | Tetrapleura tetrapiera|   |     |     |     |     |     |     |     |     |     |     |
| 21  | Aframomum melegueta  |     |     |     |     |     |     |     |     |     |     |     |
| 22  | Monodora myristica   |     |     |     |     |     |     |     |     |     |     |     |
| 23  | Pterocarpus osun     |     |     |     |     |     |     |     |     |     |     |     |
| 24  | Irvingia carbonensis |     |     |     |     |     |     |     |     |     |     |     |
| 25  | Herbal plants        |     |     |     |     |     |     |     |     |     |     |     |

Table 8. Distribution of respondents by conservation problem

| Conservation problem         | Frequency | Percentage % |
|------------------------------|-----------|--------------|
| Indiscriminate bush burning | 93        | 22.4         |
| Illegal felling of trees    | 86        | 20.7         |
| Poaching                     | 52        | 12.5         |
| Illegal farming              | 85        | 20.4         |
| Grazing                      | 100       | 24.0         |
| Total                        | 416*      | 100          |

*Multiple responses

3.5. Uses of the Products by the Respondents

Table 9 shows that different parts of the products which include leaf, fruits, bark, timber, root among other are harvested for different purposes. Some of the specific uses of the products include food, medicine, snacks, soup, fuelwood, herbs and cultural uses.

Table 9. Products and their uses

| S/N | Products              | Part Used | Specific Uses                                      |
|-----|-----------------------|-----------|---------------------------------------------------|
| 1   | Irvingia wombulu     | Fruit, leaf, bark, wood and root | Soup, herb, fuelwood, sawn wood |
| 2   | Plukenetia conophorum| Seed, leaf and root               | Food, herb                                |
| 3   | Bridelia ferruginea  | Bark, leaf and wood                | Soup, herb fuelwood                       |
| 4   | Parkia biglobosa     | Fruit, wood, seed, bark            | Seasoning, fuelwood, food, herb           |
| 5   | Firewood              | Wood                               | Cooking                                  |
| 6   | Raffia hookeri       | Palm wine, palm fronds             | Beverage, broom, shelter                  |
| 7   | Timber                | Wood                               | Construction, furniture fuelwood          |
| 8   | Wild animals          | Meats, skin                        | Food, leather, medicine                   |
| 9   | Chrysophyllum albidum| Fruit, wood                        | Food, fuelwood                            |
| 10  | Garcinia kola         | Fruit and leaf                     | Snacks, anti-venom                        |
| 11  | Archantina marginata | Meat, shell                        | Food, calcium supplement, cultural use    |
| 12  | Agaricus spp.        |                                     | Soup                                     |
| 13  | Apis mellifera       | Honey, honey comb                  | Food, wax, medicine                       |
| 14  | Piper guineense      | Seed, leaf                         | Pot herb                                 |


4. Discussion

The involvement of high number of middle aged and fairly aged people in harvesting and collection of forest products in the study area attest to the fact these sets of age brackets are very agile and they constitute the labour force. This assertion had similarly been reported by Olujobi [11] and Ogunsola, et al. [12]. The full-time collector status of most of the respondents coupled with year of experience and frequency of visitation to the forest reserve is an indication that people in the adjoining communities appreciate the importance of the forest reserve in their lives. The large number of products collected from this forest reserve is a proof that the reserve has positively impacted on the livelihood of the people in the adjoining communities by way of meeting their economic and household needs. This assertion is in agreement with that of Ayieloja and Ajewole [13] who reported that forest reserves provide wide range of product simultaneously and at different time for rural population for their immediate household needs.

Observation from the study showed that majority of the respondents sell their products in bits at the village market. The poor pricing experienced as the major problem faced by the collectors could be attributed to the poor financial status of the buyers in the village coupled with the fact that they equally have access to these products at no cost from their farms. This assertion had similarily reported by Olujobi [14]. On the other hand, some collectors do take their collection to the city market on motorcycle or in a chartered motor vehicle for lack of storage facility and perishable nature of most of the products. This afford the collectors the opportunity to sell their products fast even at higher price since these products are widely accepted by the urban dwellers that do not have the opportunity of going into the forest.

The study revealed that availability of some products is seasonal. For instance, products like *senecio biafrae*, *irvingia gabonensis*, and mushroom, are harvested or collected during the rainy season, while products like fuelwood, timber, snail, and *Thaumatococcus danielli* are harvested through the year. This seasonal availability of product helps the villagers to be productive and financially secure throughout the year. Similar assertion has been reported by Edusah [15]. The study also revealed that the forest reserve experiences its negative human impact through the activities of some poachers that usually carry out illegal felling of timber and indiscriminate bush burning in the dry season while hunting for wild animals. Also, some Fulani herdsmen do graze their cattle in the forest thereby causing damage to crops and samplings in the forest. In the natural portion of the forest, illegal farming activities such as planting of Indian hemp are noticed. These are common conservation problems in most natural forest reserve in southern Nigeria. Plucking and picking method of harvesting commonly employed by the respondents in the reserve is a prove that people in the study area are conscious of conservation measure which allows for continuous production of the products.

The diversity of product collected/harvested from the forest are used for different purposes. Greater percentage of the products are consumed as food while some are used for medicinal purposes, craft (weaving), wrapping and cultural purposes. Still some are used for sawn wood and fuel wood production. Parts of the plant used as food are fruit bark and leaf either cooked or eating raw. The medicinal uses of the forest products collected are majorly used for continuous production of the products.

5. Conclusion and Recommendation

This study has shown that different products which consist of wood and non-wood products used for different purposes were harvested/collected at different times of the year in Aramoko forest reserve. These products have contributed to the livelihood of the people of the adjoining communities of the forest estate in terms of economic, social, cultural and traditional values. The study also revealed that respondents faced some challenges in the marketing of their products; these challenges include spoilage due to perishable nature of the products and high cost of transportation. It is recommended that collectors and the consumers of the products should be educated on the ways by which these products can be conserved through sustainable harvesting practices so that their supply can be in perpetuity.

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