

Full Length Research Paper

Assessment and sustainable management of non-timber forest products used as food and medicine among urban dwellers in Oyo State, Nigeria

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Accepted 9 October, 2013

This study assessed the Non Timber Forest Products (NTFPs) used as food and medicine by the urban dwellers of Oyo State, Nigeria. It identified the NTFPs, sources and perception about the effectiveness of utilization as medicine. Data were sourced on the basis of senatorial districts. The three senatorial districts are Oyo South, Oyo Central and Oyo North with a population size of 1,764,217, 1,906,814 and 1,909,863 respectively. Both random and proportionate sampling techniques were adopted with 217 questionnaires processed. Descriptive analysis such as frequency, percentage and histograms with Chi square were used to describe the socioeconomic variations and to assess the various utilizations of NTFPs. The Chi-square analysis showed that occupation ($p = 0.001$), educational status ($p=0.002$), income ($p=0.013$) and age ($p=0.011$) were statistically significant in determining how the respondents feel about the effectiveness of the use of NTFPs as medicine, but variables like gender ($p=0.071$) and religion ($p=0.121$) were not significant. Efforts should therefore be made by government and relevant research institutes to train the people on the domestication of these NTFPs to achieve sustainability, pharmaceutical involvement to make more refine and more awareness about NTFPs. Some of the reasons given by the respondents for using the NTFPs include cheapness, availability and accessibility and some of the sources where they obtain the NTFPs were given as market, hawkers, forest and friends.

Key words: Non-timber forest products, utilization, availability, accessibility, domestication.

INTRODUCTION

Over the years, forestry and its products have contributed immensely to the economic development of Nigeria; the importance of the products cannot be over-emphasized (Fonta et al., 2010). Forests products can be classified into two: Timber, which constitutes the bulk of forests based materials used for economic purposes, and the Non-Timber Forest Products (NTFPs). During the 1960s and 1970s, forest products earned large amounts of foreign exchange and the sector was ranked highest in

employment generation. The forest sector earned annual foreign exchange of between 308 million to 412 million naira or about 4.2% of GDP (World Bank, 1988). The situation, however, turned around between 1970 and 1985, due to the discovery of oil. NTFPs have been studied by researchers from many different academic fields and each field used a slightly different definition of NTFPs. They are any product or service other than timber that is produced in a forest (CIFOR, 2004). They

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include fruits, nuts, vegetables, fish medicinal plants, resins, essences, a range of barks and fibers, bamboo, rattans, honey, insects, animals, fodder, fertilizers, medicinal extracts, construction materials, cosmetic and cultural products, natural dyes, tannin, gums, latex and other exudates, essential oils, spices, edible oils, decorative articles, horns, tusks, bones, pelts, plumes, hides and skins, non-wood ligno-cellulosic products, phytochemicals and aroma chemicals. NTFPs are indispensable part of the livelihood strategy of communities living in and near forests and constitute an important source of livelihood for millions of people across the globe.

The role and contribution of NTFPs have been crucial in subsistence as livelihood support, in rural economics and biodiversity conservation since times immemorial due to their richness of variety. About 80% of the population of the developing world depends on NTFP for their primary health and nutritional needs (FAO, 1995). Osemeobo (1991) noted that rural women were found to be making between N115 and N500 in fruit gathering and sale. It is therefore paradoxical that in spite of their real and potential value, most NTFPs remain grouped as minor products of forests. However, in the recent time, there has been increasing recognition of the fact that this approach to forest management is neither conducive to sustainable management of the forests, particularly of the tropical moist forest nor is it in the best economic interest of the predominantly rural societies in the tropics. Due to the relative scarcity of most of the NTFPs now as a result of deforestation, as noted by Nwoboshi (1986) and the present awareness of their importance, more value is being added which has made them highly marketable. Research at a global scale has identified that rural households draw from a diversity of income sources, adopt a range of livelihood strategies in order to achieve and maintain a sustainable livelihood. These include the use of NTFPs both for household consumption and for sale. The contribution of forest to poor people's livelihoods goes largely unrecorded in national statistics. This is due mainly to the role of forest products in subsistence economies and the informal sector, from which reliable and quantifiable data are inherently difficult to obtain.

Various uses of NTFPs have been revealed and described in literature; prominent among them are the uses as food and medicine. However, the utilization varies from region to region. In other words, some used as medicine in a particular region may serve as food in other region and the species used for a particular purpose may differ with regions. It is the realization of these that this study assessed the utilization of NTFPs used as food and medicine in Oyo State. The empirical study was on the assessment of NTFPs among the urban dwellers, who are the so called elites. There is, however, great variation in the extent to which forest products are used from area to area and even between households

within a community. Indeed, this variation reflects the extent to which NTFPs are an integral part of rural livelihoods.

Forest foods

NTFPs species are used as food in the form of wild fruits, vegetables, and nuts, edible roots, as bush meat, snails, edible insects and honey. Others are used as food additives in form of spices, flavorings, and food colorants and as fermentation agents, various animal foods such as fodder for livestock, straw, baits to catch animals and bee plants. Similar reports on the use of NTFPs as food and food condiments have been made by Andel (2006), Jimoh and Haruna (2007); Tee and Amonum (2008). Other edible food materials found in the forest include insects, rodents, wild game and fish. These have been found to have superior nutritional quality, when compared with domesticated varieties. Besides, processed and stored forest food products help to insure a year round food supply (Jimoh and Adebisi, 2005). Furthermore Jimoh and Adebisi (2005) maintained that NTFPs include a vast number of edible and now edible products gathered from the forest. Some of the products are eaten raw while others are processed in various forms through boiling, drying and other methods.

Medicinal plants

Various NTFPs species have medicinal value for the treatment of various ailments including the treatment of stomach aches, cut/wounds, diarrhea, ulcer, infertility, Malaria, fever, blood purification and others. The roots, seeds, bark, resin, leaves are used for these purposes. Others are used for fishing and to control insects. Abere and Lameed (2008) reported that the African giant land snails (*Achatina achatina* and *Archachatina marginata*) are used to cure whooping cough, anaemia, ulcer, asthma, aphrodisiac and hypertension. Abere and Lameed (2008) further maintained that the fluid of the snails is used to treat headache, treatment of dysentery, eye problems, and small pox. The meat cures bone fracture, infertility in women while the shell is used to prepare talismans for protection and used culturally to appease the gods as well as to ward off evil spirits. Snails have also been successfully used to curtail aggression, malformation of bone structure and promotion of easy child birth, nourishment of lactating women, suppression of convulsion, healing of amputated fingers and circumcision of male children (Abere and Lameed, 2008). Medicinal and Aromatic Plants (MAPs) include plants used to produce pharmaceuticals, dietary supplement products and natural health products, beauty aids, cosmetics, and personal care products, as well as some products marketed in the culinary/food sector. MAPs

have been an important resource for human healthcare from prehistoric times to the present day. According to the World Health Organization, the majority of the world's human population, especially in developing countries, depends on traditional medicine based on MAPs (WHO, 2002). About 50,000 and 70,000 plant species are known to be used in traditional and modern medicinal systems throughout the world (Schippmann et al., 2006). The importance of NTFPs was raised for the past few decades as a result of many factors such as the dependence of rural communities of NTFPs, new market preferences for natural products, increasing concerns about forests and biodiversity conservation, and occurrence of many NTFPs among the biological richness and ecological complexities of natural forests (Grimes et al., 1994).

Sustainable management of NTFPs

Sustainability issues

The increasing demand for natural products in the sectors of food and medicinal ingredients poses major ecological and social challenges. High pressures on wild resources are threatening the survival of populations and species, while also endangering local ecosystems. Overharvesting of selected plants for commercialization, premature collection along with habitat destruction, open grazing, forest fire and soil erosion are major threats to the sustainability of NTFP conservation. Sustainable management of NTFPs is important because of their value as a perennial source of subsistence income and to conserve biodiversity. For the past few decades, these resources have been highly exploited for trade. Harvesting usually takes place before the plants mature. Moreover, bark is harvested by cutting plants of all size classes within the available area. These practices not only hamper the regeneration of the concerned species, but also pose threats to their long-term survival (Edwards, 1996; Olsen and Larsen, 2003). Most high-valued NTFPs are collected from the wild without paying attention to the quantity and quality of harvested material. Being the least benefitting groups, collectors often tend to harvest more than the harvestable quantity to get more money. Similarly, competition among collectors compels them to collect NTFPs prematurely, resulting in their gradual disappearance from the wild. Soil erosion and forest fires are issues that occur mostly by anthropogenic causes.

Specific objectives

1. To identify non timber forest products (NTFPs) in the study area,
2. To identify the sources of NTFPs to urban dwellers,
3. To determine the relationship between the

socioeconomic variables of the respondents and their perception about the effectiveness of the utilization of NTFPs as medicine,

4. To identify the constraints faced by the respondents (urban dwellers) in getting the NTFPs.

METHODOLOGY

The research was carried out in Oyo State, which is an inland state in south-western Nigeria, with a population of about 5,580,894 (NPC, 2006) and its capital at Ibadan. It is bounded in the south by Ogun State and in the north by Kwara State, Nigeria. In the west it is bounded partly by Ogun State and partly by the Republic of Benin while in the east it is bounded by Osun State. The State is located on Latitude 8° and Longitude 4° east and covers a total of 27,249 km² of landmass. The vegetation pattern of the state is that of rainforest in the South and guinea savannah to the North. Thick forest in the South gives way to grassland interspersed with trees in the North.

Oyo state is divided into three senatorial districts: Oyo South, Oyo North and Oyo Central, Oyo North has 13 Local Governments viz: Saki West, Saki East, Atisbo, Irepo, Olorunsogo, Kajola, Iwajowa, Itesiwaju, Ogbomoso North, Ogbomoso South, Orire, Oorelope and Iseyin. Oyo Central comprises 11 Local Governments of Afijio, Akinyele, Egbeda, Ogo-Oluwa, Surulere, Lagelu, Oluyole, Ona-Ara, Oyo East, Oyo west and Atiba. While Oyo South consists of 9 Local Governments. They are Ibadan North, Ibadan North East, Ibadan North-west, Ibadan South-East, Ibadan South-West, Ibarapa Central, Ibarapa North, Ibarapa East and Ido.

Method of data collection

Data were collected on the basis of Senatorial District and the three senatorial districts are Oyo South, Oyo Central and Oyo North. Both random and proportionate sampling techniques were adopted. Random sampling technique was adopted in selecting the Local Government Areas from each Senatorial District. The proportionate sampling technique was used to determine the exact number of questionnaire that was administered to respective communities in the chosen Local Governments in relation to the population of the Senatorial District they belong. A total of two hundred and thirty (230) copies of questionnaire were administered at household level out of which two hundred and seventeen (217) copies were found analyzable.

Method of data analysis

Descriptive statistics such as frequency, histogram and percentage were used to describe the socioeconomic characteristics of the respondents. Chi-square was used to test the relationship between socioeconomic variables of respondents and their utilization of non timber forest products as medicine.

$$\text{Chi Square } (X^2) = \sum (O-E/E)^2$$

Where O = Observed Frequency of users of NTFPs who feel they are more effective than orthodox medicine.

Hypothesis

The null hypothesis (Ho) states that there is no significant relationship between the selected socioeconomic variables (occupation, educational status, income, age, gender and religion)

Table 1. Socioeconomic characteristics of respondents.

| Variable | Frequency | Percentage |
|--------------------------|-----------|------------|
| Sex | | |
| Male | 130 | 62.8 |
| Female | 77 | 37.2 |
| Total | 207 | 100.0 |
| Age (years) | | |
| ≤ 30 | 25 | 12.1 |
| 31-40 | 63 | 30.4 |
| 41-50 | 71 | 34.3 |
| Above 50 | 48 | 23.2 |
| Total | 207 | 100.0 |
| Marital status | | |
| Single | 28 | 13.5 |
| Married | 174 | 84.1 |
| Divorced/Widow/Separated | 5 | 2.4 |
| Total | 207 | 100.0 |
| Religion | | |
| Christianity | 109 | 52.7 |
| Islam | 98 | 47.3 |
| Total | 207 | 100.0 |
| Occupation | | |
| Civil Servant | 37 | 17.9 |
| Trading | 93 | 44.9 |
| Artisanship | 48 | 23.2 |
| Farming | 13 | 6.3 |
| Others | 16 | 7.7 |
| Total | 207 | 100.0 |

Source: Field Survey, 2012.

of the respondents and their perception about the effectiveness of the utilization of NTFPs as medicine while the alternative hypothesis (H_1) states that there is a significant relationship between the socioeconomic variables and respondents perception about the effectiveness of the utilization of the NTFPs as medicine and food.

RESULTS AND DISCUSSION

The socioeconomic characteristics of the respondents are summarized in Tables 1 and 2. From the table, it is shown that majority (62.8%) of the respondents or users of NTFPs found in the urban centers were males and 37.2% were females. This may not be unconnected to the fact that the male folk are mainly the household head and the major controller of household resources, as attested to by Edeh and Mbam (2010) in their research on constraints limiting efficient utilization of improved cassava technologies in Ebonyi State. It was discovered from the field that males uses NTFPs as medicine more as they move in their daily activities. For instance the

Table 2. Socioeconomic characteristic continued.

| Variable | Frequency | Percentage |
|---------------------------------|-----------|------------|
| Educational background | | |
| No formal | 30 | 14.5 |
| Primary | 60 | 29.0 |
| Secondary | 68 | 32.9 |
| Tertiary | 49 | 23.6 |
| Total | 207 | 100.0 |
| Household size | | |
| 1-5 | 54 | 26.1 |
| 6-10 | 85 | 41.1 |
| Above 10 | 68 | 32.8 |
| Total | 207 | 100.0 |
| Household monthly income | | |
| <N10,000 | 26 | 12.6 |
| N10,000-N30,000 | 128 | 61.8 |
| N31,000-N50,000 | 34 | 16.4 |
| >N50,000 | 19 | 9.2 |
| Total | 207 | 100.0 |

Source: Field Survey, 2012.

hawkers of the traditional medicine are seen more on the street, in front of offices and Motor Park in the urban area. About sixty five percent (64.7%) of the respondents were between age range of 31 to 50 years; an indication that the respondents were within the active workforce, with majority (84.1%) married. The respondents that were Christians accounted for 52.7% while 47.3% were Muslims. This implies that both Christians and Muslims use Non timber Forest Products (NTFPs) both as food and medicine in the study area. Larger proportion (about 45%) of the respondents was traders 22% were artisan 37% were civil servant and remaining were farmers. From Table 2, about 62% of them either had primary or secondary school education the remaining had post secondary education. This is an indication that education does not really constitute a barrier in using NTFPs. The World Health Organisation (WHO, 2002) confirmed that 80% of the world's population presently uses herbal medicine and tend towards organic value for some aspects of primary care. It has become indispensable practice. Adekunle and Samwobo (2004) documented 103 plants species of different life forms traditionally used to treat different sickness and diseases. About 74% of the respondents had household size of six or more people, with monthly income of N30, 000 and below accounting for about 74% of the respondents. This implies that majority of the respondents are within the low income class.

Table 3 depicts the various species of NTFPs used as medicine by the respondents. Different reasons were given by the respondents for their use of these species

Table 3. NTFPs used as medicine.

| Local name | Scientific name | Part used | Uses |
|------------------|-------------------------------|---------------------|----------------------------|
| Bamboo | <i>Bambusa vulgaris</i> | Leaves | Syphilis/gonorrhoea |
| Honey | <i>Apis mellifera</i> | Fluid | wound dressing/cough |
| Bitter kola | <i>Garcinia cola</i> | Fruit | Healthy liver/gall bladder |
| Kola nut | <i>Cola nitida</i> | Nut | Asthma/stimulant |
| Walnut | <i>Juglans nigra</i> | Nut | Detoxification |
| Snail | <i>A. achatina</i> | Whole part/fluid | Ulcer/Hypertension |
| Alligator pepper | <i>Aframomum melegueta</i> | Leaves | Malaria fever |
| Shea butter | <i>Vitellaria paradoxa</i> | Fruit/seed | Cosmetics |
| Locust bean | <i>Parkia biglobosa</i> | Roots | Infertility/poison |
| Cashew | <i>Anacardium</i> | Leaves/bark | Diabetes/hypertension |
| Irvingia | <i>Irvingia gabonensis</i> | Leaf/fruit/bark | Diarrhoea |
| Lemon grass | <i>Cymbopogon Spp.</i> | Leaves | Perfume |
| Neem | <i>Azadirachta indica</i> | Leaf,/root/ bark | Malaria/gonorrhoea |
| Pawpaw | <i>Carica papaya</i> | Fruit, leaves | Poison/nausea/typhoid |
| Ugwu | <i>Telfairea occidentalis</i> | Leaves | Anaemia |
| Cassia | <i>Cassia alata</i> | Leaves | Skin infections |
| African pear | <i>Dacryodes edulis</i> | Stem bark | Cough/body ache |
| Scent leaf | <i>Occimum gratissimum</i> | Leaves, tender stem | Diarrhoea/typhoid |
| Mango | <i>Mangifera indica</i> | Leaves/bark/fruit | Fever/hypertension |
| Garden egg | <i>Solanum melongena</i> | Fruit | Heart disease/glaucoma |
| Pineapple | <i>Ananas comosus</i> | Fruit | Healthy bone |
| Tea Leaf | <i>Camellia sinensis</i> | Leaves | Heart disease/cancer |
| Bitter leaf | <i>V. amygdalina</i> | Leaves/root | Diarrhoea |
| Guava | <i>Psidium guajava</i> | Leaves | Diarrhoea |
| Baobab | <i>Adansonia digitata</i> | Bark/Seed | Low sperm count |
| Jatropha | <i>Jatropha curcas</i> | Leaves | Stomach ache |

Source: Field Survey, 2012.

as medicine. These include cheapness, addiction, availability, accessibility and others. This corroborates the works of Amusa et al. (2010) and Jimoh et al. (2012) in which factors accounting for the dependency of communities on traditional medicine were given as culture, efficacy, cost, availability, accessibility and poverty. However, when asked if they observed any side effects from the use of NTFPs as medicine, less than 10% of the respondents claimed they had observed one form of side effect or the other. Some of the side effects include excessive sleeping, dizziness, running stool, weakness of the body, vomiting, and stomach ache. This may not be unconnected to lack of specification on the required dosage or quantity of the medicinal plants to take as many of them claimed they took as much as they can while others claimed they took 2 to 3 cups (with no specific unit of measurement) twice or thrice a day. This also confirms the earlier work by Famuyide et al. (2011) in which the negative effects from the medicinal use of NTFPs were stated as vomiting, nausea, stomach ache and body itching.

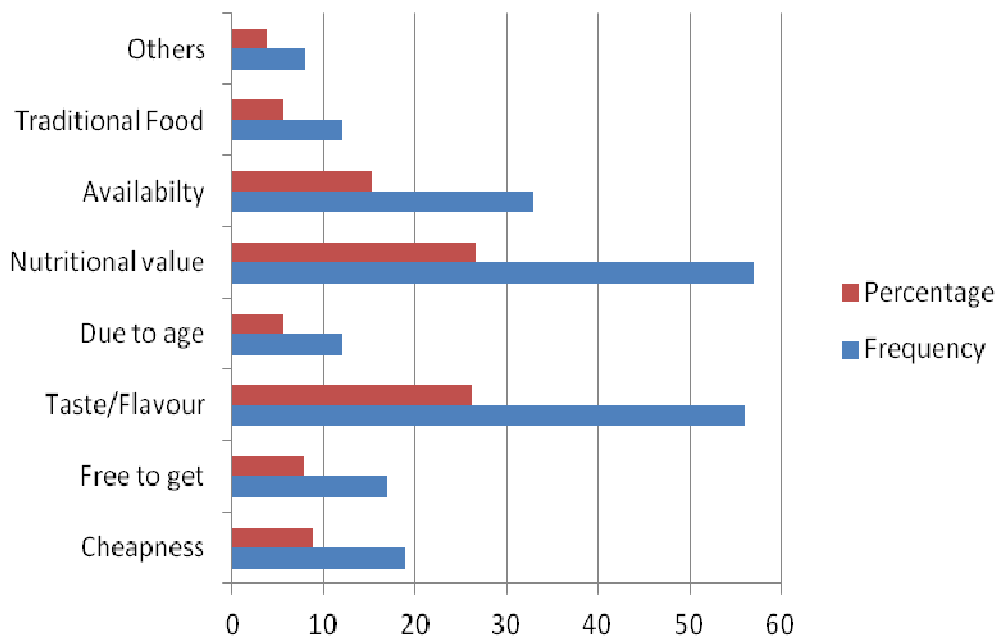
Table 4 shows the species that are used as food by the respondents. Some of these species are eaten raw as

snacks while others are cooked or transformed into edible form. Some of the species that are eaten raw as snacks include *Carica papaya* (pawpaw), *Psidium guajava* (Guava), *Anacardium occidentale* (Cashew), *Irvingia gabonensis* (Bush mango), *Musa accuminata* (Banana), while those cooked or transformed into edible form include *Thryonomys swinderianus* (Grasscutter), *Agaricus bosporium* (Mushroom), *Juglans nigra* (Walnut), *Parkia biglobosa* (Locust bean). Several reasons were given by the respondents for using non timber forest products as food, as shown in Figure 1. Some (26.2%) of the respondents said that they eat NTFPs because of the taste and flavor while about 27% claimed they eat the NTFPs because of their nutritional value, as evident in Figure 1. This corroborates the study by Awe et al. (2009a) in which majority (76%) of the respondents claimed they consumed grasscutter meat (a non timber forest product) because of its taste and quality. Figure 2 shows the different sources where the respondents obtained their NTFPs. About 43% of them claimed they got theirs from the market, while those that got theirs directly from the forest accounted for about 33%. Different reasons were given by the respondents as

Table 4. NTFPs used as food.

| Local name | Scientific name | Part used | Uses |
|-------------|--------------------------------|-------------------|------------------|
| Pawpaw | <i>Carica papaya</i> | Fruit | Snacks |
| Guava | <i>Psidium guajava</i> | Fruit | Snacks |
| Mango | <i>Mangifera indica</i> | Fruit | Snacks |
| Grasscutter | <i>Thryonomys swinderianus</i> | Whole part | Meat |
| Cashew | <i>Anacardium occidentale</i> | Fruit | Snacks |
| Mushroom | <i>Agaricus bosporium</i> | Strip/pileus | Condiment |
| Honey | <i>Apis mellifera</i> | Fluid | Sweetener |
| Walnut | <i>Juglans nigra</i> | Fruit | Snacks |
| Snail | <i>Archachatina marginata</i> | Whole part | Cuisine |
| Locust Bean | <i>Parkia biglobosa</i> | Fruit pump, seeds | Condiment |
| Bush mango | <i>Irvingia gabonensis</i> | Fruit | Snacks |
| Orange | <i>Citrus sinensis</i> | Fruit | Snacks |
| Banana | <i>Musa accuminata</i> | Fruit | Snacks |
| Ugwu | <i>Telfairea occidentalis</i> | Leaves | Cuisine |
| Garden Egg | <i>Solanum melongena</i> | Fruit | Snacks/condiment |
| Pineapple | <i>Ananas comosus</i> | Fruit | Snacks |
| Coconut | <i>Cocos nucifera</i> | Fruit/nut | Snacks |
| Baobab | <i>Adansonia digitata</i> | Fruit | Snacks |
| Bitter leaf | <i>Vernonia amygdalina</i> | Leaves | Cuisine |
| Sheabutter | <i>Vitellaria paradoxa</i> | Fruit/seed | Cooking oil |

Source: Field Survey, 2012.

**Figure 1.** Reasons for using NTFPs as food.

problems being encountered in getting the NTFPs when they needed them. These include seasonality (63.1%), perishability (22.9%), transport cost (8.9%), with others such as proximity, affordability, e.tc, accounting for 5.1%.

Table 5 shows Chi-square analysis testing the

relationship between socioeconomic variables of respondents and their perception about the effectiveness of the utilization of NTFPs as medicine. In other words, the test was to ascertain whether there was any significant relationship between the selected

Frequency

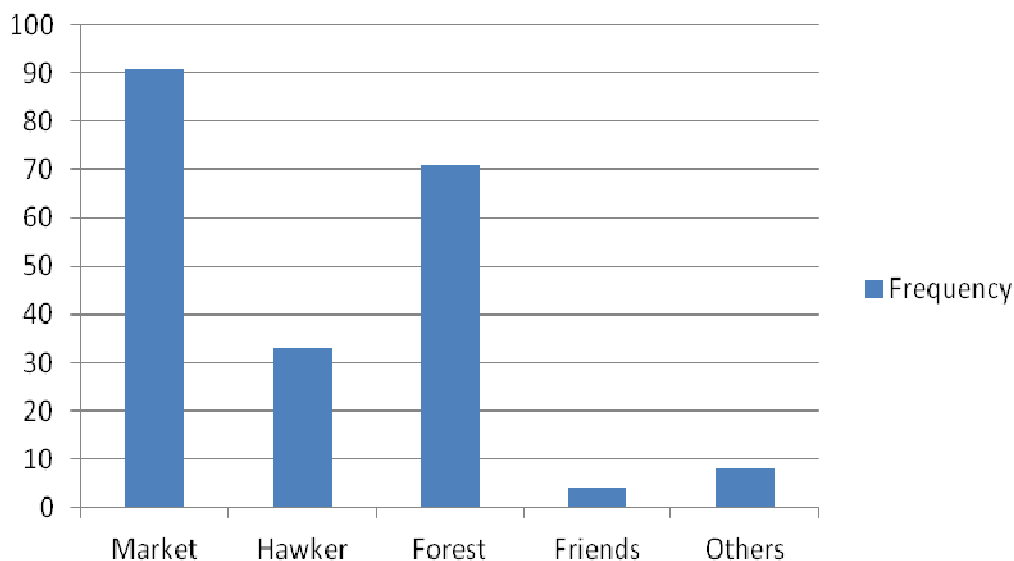


Figure 2. Sources of NTFPs in the area.

Table 5. Chi-square result of relationship between socioeconomic variables of respondents and their perception about the effectiveness of the utilization of NTFPS as medicine.

| Variable | X ² | DF | P-value | Decision |
|--------------------|----------------|----|---------|-----------------|
| Occupation | 12.217 | 4 | 0.001 | Significant |
| Educational status | 16.014 | 3 | 0.002 | Significant |
| Income | 18.337 | 3 | 0.013 | Significant |
| Age | 19.194 | 3 | 0.011 | Significant |
| Gender | 3.102 | 1 | 0.071 | Not significant |
| Religion | 3.006 | 1 | 0.121 | Not significant |

Source: Chi-square analysis.

socioeconomic variables of the respondents and what they felt about the effectiveness of the medicinal use of NTFPs. It was found that occupation, educational status, income and age were statistically significant while religion and gender were not significant. This implies that religion and gender have nothing to do with what the respondents feel about the effectiveness of medicinal use of non timber forest products in the study area. This conforms with the work of Odebode et al. (2011) in which religion was found not to be significant in determining the perception of consumers about the consumption of grasscutter meat within Ibadan Metropolis. Hence the null hypothesis that there is no significant relationship between the socioeconomic variables of the respondents and their perception about the effectiveness of the utilization of NTFPs as medicine was rejected for occupation, educational status, income and age, while it was upheld for religion and gender.

CONCLUSION AND POLICY RECOMMENDATION

This study assessed the Non Timber Forest Products (NTFPs) used as food and medicine by urban dwellers of Oyo State, Nigeria. The study revealed that majority (62.8%) of the respondents was male while 37.2% were female. It was also discovered that the utilization of NTFPs has no religious barrier as both Christians (52.7%) and Muslims (47.3%) used them. Some reasons given by the respondents for using the NTFPs include cheapness, availability and accessibility and some of the sources where they obtain the NTFPs were given as market, hawkers, forest and friends. Some of the constraints encountered by the respondents in obtaining the NTFPs included seasonality (63.1%), perish ability (22.9%), transportation (8.9%), with others such as proximity, affordability, e.tc, accounting for 5.1%. In view of this, efforts should therefore be made by governments

at all levels and relevant research institutes to train the people on the domestication of these NTFPs so as to achieve sustainability. Pharmaceutical companies should work on processing of NTFPs medicinal plants to make it more available in a refined form, less chemical and still natural. More awareness should be made about utilization of some NTFPs as food for their nutritional value and medicinal value especially when organic food is advocated for globally.

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