

## Sustaining the Roles of Non-Timber Forest Products in Rural Poverty-Reduction and Household Food Security in Nigeria

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**Abstract:** Forest outputs are broadly classified into timber and Non-Timber Forest Products (NTFPs). While the timber component has been widely acknowledged as great contributor to both national and local economies, the equally important non-timber component had received little attention from social scientists and development planners until very recently. Non-timber forest products are all those goods and services of biological origin obtained from forests or associated ecosystems, which contribute directly or indirectly to human welfare. The non-timber forest products contribute immensely to household food security and income generation in Nigeria. Hence they play a significant role in rural poverty reduction. In Nigeria poverty, incidence had increased from 27.2% in 1980 to 65.6% in 1996. This disturbing trend has prompted the federal government and international agencies to formulate various programs aimed at reducing the poverty incidence in the country. Many of such programs have however failed to achieve the desired objectives because they failed to understand the intimate relationship between the rural people and their immediate environment. The poor depends largely on land and various plants and animal resources obtainable from it. The closely interwoven relationship between the people and their biotic environment should be carefully understood and adjusted in such a way that the ecosystem balance is sustained. This study examines the significant roles played by non-timber forest products in rural livelihood sustenance in Nigeria. Various strategies for sustainable production and utilization of the products are discussed.

**Key words:** Sustainability, non-timber, forest products, household, poverty alleviation

### INTRODUCTION

Non-timber forest products are goods of biological origin other than timber derived from the forest or associated ecosystems, which are, consumed either directly as food, drugs or medicine or which contribute non-consumptive values to human welfare. The non-consumptive uses may include; microclimatic amelioration, soil and water shed protection and conservation of biodiversity as well as aesthetic and cultural values.

Poverty is a state of need or want or general inability to meet one's basic personal needs such as food, shelter, healthcare, clothing and education services. There is a standard of income below which it is believed that any individual will not be able to meet those basic needs and this is generally referred to as the poverty line. Anybody whose income falls below this line is considered poor. In Nigeria poverty incidence increased from 27.2% in 1980 to 65.6% in 1996<sup>[1]</sup> Table 1. Poverty is more widespread in the rural areas where the major sources of income are farming and such other low-income activities as harvesting of forest products. About 70% of the rural population of sub-saharan Africa live in poverty. The

Table1: Poverty incidence, estimated total population and poor population in Nigeria

Year	Poverty incidence	Estimated population (Millions)	Population in poverty (Millions)
1980	27.2	65.0	17.7
1985	46.3	75.0	34.7
1992	42.7	91.5	39.7
1996	65.6	102.3	67.1

Source: FOS<sup>[1]</sup>

rural poor thus rely substantially on non-farm activities for household income supplement and food security particularly during the "Hungry Season", when food crops are out of season. Also because of the fact that orthodox medicine is far away from the rural areas and when available are unaffordable to the rural folks, majority of rural populace depends on herbs and other materials of forest origin for their healthcare delivery.

There has been an increased pressure on the forest for the supply of these products in recent years as a result of increased population, bad economic atmosphere and unfriendly government policies, which have driven more and more people to the forest in search of sustenance. This trend is likely to continue for sometime to come as the factors responsible for it continue unabated. The implication of this is that the genetic resources of many of the useful forest products providing the various goods

and services are under intense pressures while some are endangered, others are already extinct. It is thus necessary that biological and social scientists develop pragmatic management and conservation strategies that would ensure the continued availability of these valuable goods and services collectively referred to as non-timber forest products.

The objective of this study therefore is to highlight the various contributions of non-timber forest products to poverty reduction and household food security in Nigeria and suggest measures to sustain these contributions through appropriate management and conservation strategies.

**Non timber forest products in rural poverty alleviation:** The contributions of non-timber forest products to the reduction of rural poverty in Nigeria are in two forms viz: direct and indirect contributions. The direct contributions include the supply of goods such as fruits; vegetables; resins, fibers, fuel-wood, charcoal, bush-meat and medicinal plants which could be marketed for money or consumed at the household level. Over 75% of the country's population lives in the rural areas and more than 80% of the rural inhabitants depends directly on wood energy for cooking and preservation of foods and food accessories such as fish and bush-meat. Many households subsist either wholly or partially on income derived from sale of firewood in Nigeria. Bush-meat marketing is another forest-based activity, which generates a lot of income for rural dwellers. It is a common scene in many parts of the country to find bush meat displayed for sale along roadsides and in specialized markets Fig. 1.

Plants such as *Chrysophyllum albidum* (white straw apple) *Dacryodes edulis* (native pear), *Treculia africana* (African bread fruit); *Parkia biglobosa* (Locust bean) *Vitellaria paradoxum*, (Shear butter); *Annona mauricata* (sour sop), *Phoenix reclinata* (date palm); *Tetrapleura tetraptera*; *Xylopia aetiopica*; *Tamaridus indica* and *Irvingia* sp. (bush mango) and various species of chewing sticks and wrapping leaves constitute valuable source of income particularly for rural women. Species such as *Gnetum africaum*, *Carpolobia* sp. (Shepherds sticks) *Irvingia* sp. and various species of bush meat are already involved in international trade along the West coast of Africa. Income is generated from their sales to supplement the farm income. In fact there are individuals who derive up to 80% of their incomes from the sales of these products<sup>[2]</sup>. Other forest products such as honey; *Acacia Senegal* (gum Arabic), Chewing sticks; *Sannda* sticks (*Capolobia* sp.) Fig. 2 and medicinal plants of various kinds are major sources of income to both rural and urban dwellers. Other forest-based activities such as mat-making and charcoal production.



Fig. 1: Smoked animals displayed for sale at a bush meat market in South Western Nigeria



Fig. 2: Stacks of *Capolobia* sp. (Shepherds' sticks) awaiting transportation to a city market in South-western Nigeria (the sticks are used by cattle rearers to drive their flocks)

also contribute significantly to rural income. The ability of non-timber forest products to directly enhance people's income is a significant contribution to poverty reduction in Nigeria.

There are also indirect contributions of non-timber forest products to poverty alleviation. These include their various roles in the ecosystem such as pollination of useful plants by nectivorous insects; dispersal of seeds by frugivorous birds and animals; contribution to soil fertility by soil micro and macro-organisms, watershed protection and the various roles of plants and animals in succession and ecosystem renewal. These various contributions ensure that the ecosystem can continue to supply the various goods and services upon which the livelihood of the people depends. Though these indirect uses are often not easily quantifiable their contributions to human welfare are no doubt enormous.

**Non-timber forest products in household food security:**

Many products of both plant and animal origin are consumed by man either directly as food or as supplements to other food products. Some are eaten in raw form without prior cooking, boiling or processing while others are only consumable after processing. Which ever form, in which the products are consumed they play significant roles in supplementing household food intake particularly during the period of scarcity of food when the previous years crops are exhausted and the new crops are yet to mature.

Plants, which contribute to food security, may come in form of fruits such as: *Treculia africana*, *Carica papaya*, *Irvingia gabonensis*, *Adansonia digitata*, *Phoenix reclinata*, *Anana mauricata* and *Dacryoides eduli* Which, are either eaten as full meal or as snacks to ease hunger while on the farm before the actual meal is ready. They may also come in form of leafy vegetables such as *Lactuca taraxaxifolia*, *Vitex doniana*, *Bombax, buonopozense*, *Adansonia digitata*, *Gnetum africanum*, *Sesamium radiatum* and *Moringa olivera*.

These vegetables are available at the time when most cultivated vegetables are off-season. Hence they come handy when they are most needed. Species in this category include Bush meat and fish also contribute to household food security. Honey is an age long food which has retained its prime position in rural and urban diets. It has recently become more prominent in the diets of diabetic and hypertensive patients who use it in place of table sugar. The major sources of animal protein particularly in the rural areas are bush meat and fish. According to Hoskins<sup>[3]</sup>, 80% of animal protein consumed by rural Nigerians in forest adjoining communities in varied forms either cooked, boiled, sun dried or smoked came from bush meat. Insects and birds are also consumed in many parts of the country. Insects such as palm worm; flight termites, grasshoppers and crickets are consumed in various parts of the country and they contribute meaningfully to food intake. Condiments and flavour plants also play significant role in household dietary supplements. Species such as *Pipper guineense*, *Occimum gratisimum*, *Allium sativum*, *Tetrapleura tetraptera*, *Xylopia aethiopica*, *Parkia biglobosa*, *Tamarindus indica* and *Aframomum meligueta* are added to food to impart certain characteristic aroma or taste on the food. Many of these local condiments also serve medicinal functions in the body.

**Non-timber forest products in environmental amelioration:**

Many forest species both within and outside forest environments contribute immensely towards making our environment conducive for human

beings as well as other members of the ecosystem. Species such as *Bamboosa vulgaris*, *Azardiracta indica*, *Acioa barterii*, *Eucalyptus* sp. have been found useful in controlling gully and wind erosion in different parts of Nigeria. Many plant species also provide cover and breeding grounds for other plants and animals. Animals such as tree squirrel (*Funisciurus* sp.), Pangolin, (*Manis tricupsis*), Porcupines (*Artherurus* sp.) and tree hyrax (*Dendohyrax dorsalis*) leave either partly or entirely on trees. Many mangrove (*Rhizophora* sp.) species provide spawning grounds for various species of fish. In many parts of the world trees are used in microclimatic amelioration such as provision of shade, wind breaks and soil stabilisation. Some plant species help to reduce particulates in the air; some may reduce Nitrogen oxides (No and No<sub>2</sub>) through foliar uptake while others are able to remove carbon from the atmosphere in form of Carbon monoxide (Co)<sup>[4]</sup>. Most plants fix carbon dioxide in the process of photosynthesis. This is very vital in reducing the risk of global warming. Landscaping is rapidly gaining acceptance in most of Nigerian urban centers. Beautiful sceneries in dwelling places stimulate mental relaxation while the gaseous exchange between the plants and the atmosphere enhance good body functioning. These services functions of the forest translates to improved productivity and healthy living environment and hence reduces poverty incidence.

**Non-timber forest products in rural employment and income generation:**

Apart from the facts that the majority of rural households in Nigeria and a large proportion of urban households depend on forest products to meet some part of their nutritional needs as highlighted above; very large number of households generate part of their income from selling tree products. According to Arnold<sup>[5]</sup>, employment and income from small-scale non-farm enterprises activities are nearly everywhere becoming increasingly important in the rural economy. Studies carried out by Kilby and Liedholm<sup>[6]</sup>, has revealed that rural non-farm work often provides 20-45% of rural household income. Similarly, Falconer<sup>[7]</sup>, in a survey of selected villages in the high forest zone of Southern Ghana found out that 68% of the households surveyed are employed in small-scale forest-based industries. Even where absolute densities of forest products based employment are low, they often account for a high proportion of overall non-farm employment.

Forest-based activities are usually seasonal and often depend on the seasonality of farming, wage labour and other activities as well as fluctuations in the availability of labour. Most of such activities thus decline at the peak of farming activities or are sometime

deliberately phased to take place during slack periods. Others are governed by seasonally induced cash needs such as school fees, traditional or religious festivals or the need for cash to procure food during “hungry season”.

A recent study in the tropical rainforests of Southern Cameroon revealed that local communities rely heavily on the use of forest products for their subsistence. More than 500 plant species and 280 animal species are used in one way or the other. About 20 non-timber forest products make it to the local markets and contribute significantly to the income of rural people<sup>[8]</sup>. Individual contribution of each NTFP may be little but collectively they contribute significantly to the rural economy and can add to export revenues. Many income generating activities in the rural areas are based specifically on the NTFPs. Nkwatoh<sup>[9]</sup> in a study carried out on Ejagham forest reserve in Cameroon between 1995-1998, found that a total of 563, 131 kg of *Gnetum africanum*; 251, 594.7 kg of *Irvingia* sp.; 1, 19112, 288 kg of *Capolobia* sp. and 1, 109, 367 kg of *Massularia* sp. were extracted from the forest reserve within the period. The total income from the sales of these products was estimated at US\$788, 128.4.

Stems, fruits and seeds of various kinds all contribute to financial security of rural dwellers particularly during the emergency periods. In the high forest zones of Eastern and Western Nigeria, bush meat, snails and fish harvesting and sales are a major income generating activity almost all year round. In the savanna zone of the central and northern Nigeria, honey, fuel-wood, locust-bean seeds, gum Arabic and charcoal-making generate a lot of income to the rural dwellers. Hence Egunjobi<sup>[10]</sup> while reporting on the potentials of Non-timber forest products of Omo Forest reserve observed that the contributions of non-timber forest products to the rural economy in Nigeria is as much if not more than that of timber. Harvesting and processing of NTFPs in many places have graduated from the subsistence level of household dietary needs alone and sales at local markets to international cross-boundary trades. There are a lot of forest products involved in cross boarder trading between Nigeria, Cameroon, Ghana and Benin Republic.

Obviously, the economic importance of non-timber forest products have been recognised globally, although economists may be of the opinion that the supply of most of them are rigid and that the increasing prices and the low competitiveness for them portray their extraction as an essentially primitive activity which is likely to give way to domestication and the cultivation of similar products. It is very crucial that the potentials of NTFPs in rural poverty alleviation be appreciated and recognised.

**Non-timber forest products and household health:** It has been said that 80% of total households particularly in the rural areas depend on natural herbs for their healthcare delivery<sup>[11]</sup>. Recent trends have confirmed this observation, as the number of people depending on herbs for their health needs keeps increasing. This is due in part to the worsening economic situation in the country, which makes orthodox medicine unaffordable to the rural poor. Often times, the distances between rural communities and orthodox medical centres are quite considerable hence, rural dwellers naturally rely on traditional herbs when the need arises. It is only when the situation gets out of hand that they seek modern medicine’s assistance e.g. during complicated labour, fatal accidents and prolonged illnesses.

As observed by Hoskins<sup>[3]</sup>, there is no clear distinction between food and medicine. Most products, which are consumed directly as part of daily meals or as supplement to other diets, do have medicinal properties. Examples of these include: *Vernonia amygdalena*, *Zingiber officinale*, *Pipper guineense*, *Tetrapleura tetraptera*, *Aframomum melegueta*, *Xylopiya aethiopica*, *Alium* sp. and honey.

When medicinal plants are referred to, this definitely includes those used for the treatment of both human and animal ailments. Herbal medicines, especially local herbal remedies have always attracted a great deal of interest to the layman. People use a range of different healthcare options, depending on their particular ailment, their socio-economic status or past experiences. In a study carried out in Ghana Falconer<sup>[12]</sup> reported that all the people interviewed in the study area used herbal medicines while 80% of them rely on wild plants as their main medicine source. Generally speaking, many Africans believe that certain illnesses are best treated using traditional plant cures and these may include: goiter, epilepsy, mental and spiritual problems.

The use of traditional medicine is not restricted to developing countries. FAO<sup>[13]</sup> reported that at least 25% of drugs used in modern pharmacopoeia are derived from plants, while many others are synthetic analogues built on prototype compounds isolated from plants.

Few medicinal plants are cultivated, because the low price of materials harvested from the wild still makes cultivation financially unattractive. However, as natural forests are being lost to deforestation and over-harvesting, it is obvious that more species will have to be domesticated in the nearest future. For now, wild sources of medicinal plants are important and will continue to be at least in the developing countries for sometime to come. Some species will be difficult to cultivate or synthesis of their active ingredients will be

problematic. FAO<sup>[13]</sup> has thus recommended a combination of cultivation and/or sustainable wild harvesting of medicinal plants.

In addition to the fact that millions of people depend on medicinal plants for household health, commercial harvesting of medicinal plants may be one of the few opportunities for paid employment or for earning supplementary income in the rural areas as earlier analyzed in the preceding sections. Another palpable fear being entertained in the ecologists' circle concerning the commercialization and large scale harvesting of medicinal plants is the access control which is often transferred to a concessionaire system (individual, company or through a kind of extractive reserve community scheme) or a trading board often depriving some local people of access to the resource, either for household use or as a source of income.

Furthermore, the impact of the increasing demand on medicinal plants constitutes significant threat to the survival of many medicinal species. In a number of cases, the organs of Perennation and reproduction such as the roots, fruits and seeds are massively exploited with little or no care for the plant's ability to continue to survive. Glaring examples of this in Nigeria include felling and debarking of both juvenile and mature trees of *Annonia chloranta* (*syn. Enantia chloranta*), root mining in species like *Azalia bela* and *Xanthoxylum xanthoxyloides*, fruit harvesting in *Tetrapleura tetraptera*, *Kigelia africana* and seed harvesting in *Piper guineense* and *Xylopiya aethiopica*.

Obviously, there is a need for concerted efforts on the parts of forest scientists, policy makers and field foresters to explore ways of ensuring that the genetic materials of these useful plant species are not lost completely. One of the ways to achieving this may be through the incorporation of such useful plants into forest development planning through multiple use forestry. Domestication and conservation of the necessary genetic resources through integration into traditional farming systems will also be very useful in this situation. There is no gainsaying the fact that non-timber forest products contribute significantly to household economy and welfare particularly in the rural areas and especially during emergency cash needs. It is however disturbing to note that the genetic resources of most of these species are under intense pressure and that many of them are ecologically threatened, endangered or even extinct in a number of cases.

The following approaches could be very useful in sustainable management of the resources:

**Regular detailed inventory of forest resources:** Harvesting of non-timber forest products has not been

based on adequate information on available resources. This has resulted in arbitrary harvests leading to over-exploitation. Permanent/semi permanent sample plots may be established within which the production potential of each of the valuable species of interest might be determined through experimental harvesting. This will assist managers to fix sustainable harvesting regime for the species.

**Integration of non-timber forest products into existing forest plantations:**

When natural forests are cleared to raise mono-specific plantation many variable species of NTFPs are lost in the process. It is however gratifying to note that there are many species of NTFPs which are capable of growing alongside plantation trees as they explore different horizons of the ecosystem. Therefore, species such as *Thaumatococ danielii*; *Pipers guineense*; *Zingiber officinalis* *Piper umbelatum*, *Aframomum melegueta* and *Momordica angutiisephalas* should be raised in plantations. These are characteristic under growth species and climbers, which would not pose serious threats to development of forest plantation but could contribute immensely to maximize the output per unit area of forestlands. This approach would also help in genetic resources conservation. The long gestation period of most forest species has often been a disincentive to private participation in forest development. Integration of non-timber forest products into forest plantations would encourage private participation as intermediate earnings could be obtained from these non-timber forest products, which could be used to defray the cost management. The little income derived from non-timber forest products harvesting could also serve as a financial succor to farmers while the timber component matures. In addition it would assist in conserving forest biodiversity as it simulates the natural forest where many species subsist within the ecosystem with each species occupying a niche and the different species exploring different horizon of the forest ecosystem.

**Domestication of non-timber forest products:** Many species of plants and animals could be domesticated and produced under intensive management system. Species of everyday importance such as *Vernonia amygdalina*, *Ocimum* sp. *Treulia africana*; *Aframomum meligueta*, *Piper guineense* etc. could be raised in home gardens and compound farms. It may even be profitable to raise some medicinal plant species in large farms from where they may be harvested for domestic or commercial purposes. Snail farming, bee farming, fish farming and wildlife farming could be very useful in producing the all

important honey and animal protein in order to supplement the output from the natural forest.

**Improved product handling:** Only a small percentage of what is harvested from the forest is eventually utilized. A larger percentage is wasted during storage and processing. Users particularly of medicinal plants should be trained on how to extract the active ingredients totally from the harvested plant parts. Also the wastage between the harvest time and the time of utilization could be reduced through post harvest preservation methods such as Sun-drying, cold storage and oven-drying. These measures will reduce wastage of resources thereby reducing the frequency at which harvesters need to go to the forest for harvesting and hence the harvesting pressures on the natural stocks.

**Adoption of multiple use forest management techniques:** FAO<sup>[13]</sup> defines multiple use forest management as a form of management, which combines harvesting of a non-timber product either with other NTFPs or with timber harvests so as to optimize overall forest output. Careful study of biological compatibility of the different components of the forestland will afford the manager the opportunity to select the range of outputs to produce from the forest in an optimal manner. Mathematical models such as linear and goal programming have been found very useful in planning for multiple use forest management<sup>[2,14,15]</sup>. These techniques ensure that the forest houses as many genetic resources as possible while maximizing its uses within the limits of available resources. It is thus desirable for sustainable production of non-timber forest products. Non consumptive uses of the forest such as recreation, tourism, environmental amelioration and soil conservation are equally important and should be built into management plans right from the onset. This approach to forest management in addition to being environmentally friendly is also economically attractive and socially desirable. This is the centerpiece of sustainable forest management.

**Forest legislation:** Forest regulatory laws should be reviewed or formulated where necessary to set the limit to what Level of resources could be removed from the forest land at a given time in order to ensure that the resources are not over harvested. Furthermore, punishments for forest offences should be such that they would serve as deterrent to others.

**Economic empowerment of rural people:** One of the incentives for unsustainable forest harvesting is rural poverty. The urge to encroach into forestland could be

reduced via the creation of alternative Income-Generating Activities (IGRAs) outside the forest. Rural based activities such as cassava processing, poultry, piggy, snailry and bee keeping have helped significantly to reduce pressures on natural forests in various parts of the country<sup>[16,17]</sup>.

## CONCLUSION

It is hoped that this highlight of the great potentials of non-timber forest products to contribute to poverty reduction and household food security in Nigeria will attract meaningful attention from policy makers to address their sustainability more seriously. This should also generate research interest in the areas of selection, breeding, improvement and domestication of valuable wild products. Forestry authorities in the country are advised to enact necessary laws that will recognize the multiple contributions of forests to the people's welfare and fund scientific research on the development of the resources to ensure their sustainability.

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