



Munich Personal RePEc Archive

## **Economic Valuation Of Non-Timber Forest Products (NTFPs)**

Adenike Adebunola Adepoju and Adekunle Sheu Salau

Ladoke Akintola University Of Technology & Univeristy of Ibadan

9 April 2007

Online at <https://mpa.ub.uni-muenchen.de/2689/>

MPRA Paper No. 2689, posted 11 April 2007

# ECONOMIC VALUATION OF NON-TIMBER FOREST PRODUCTS (NTFPs)

<sup>1</sup>Adepoju, A. A. and <sup>2</sup>Salau, A. Sheu

<sup>1</sup>DEPARTMENT OF AGRICULTURAL ECONOMICS AND EXTENSION,  
LADOKE AKINTOLA UNIVERSITY OF TECHNOLOGY, OGBOMOSO.

<sup>2</sup>DEPARTMENT OF AGRICULTURAL ECONOMICS.  
UNIVERSITY OF IBADAN. IBADAN

## Abstract

*The paper reviewed the methods in use for the economic valuation of Non-timber forest products. In the main, three methods are used. They are direct market price, indirect market price and non-market estimates. No method is superior to the other but appropriate method of valuation depends on the objective of the study. Also in use, is the financial valuation method. NTFPs can be classified as tradable or non tradable. The tradable NTFPs are significant in international trade. Non-timber forest products also constitute a critical component of food security; it serves as an important source of income for the poor in many developing countries. Value is not the inherent property of an entity. It is only a measure of a relationship between a subject and the object of valuation within a context (time and place or hypothetical scenario). There is a fundamental distinction to be made between a valuation exercise that sets out to explain how choices are made by individual resource users and one that seeks to maximize community. NTFPs include Edibles such as Mushroom, ferns etc. medicinal and dietary supplements, floral products and specialty wood products.*

Keywords: Non-Timber Forest Products (NTFPs), Economic Valuation, Livelihood and Food security

## INTRODUCTION

The term “Forest product” almost immediately brings to mind wood and wood-based products, but there are equally important non-wood products that are procured from the forest. These include all botanical and other natural products extracted from the forest other than timber. Non-timber forest products (NTFPs) are components of the forest system that exist in nature and are generally not cultivated. They are non-timber, but can be made of wood.

What are NTFPs?

Non-timber forest products (NTFPs) are plants or plant parts that have perceived economic or consumption value sufficient to encourage their collection and removal from the forest. That is, they are those items harvested or removed from the forest lands for private use or for resale (excluding, saw-timber, pole timber, natural gas, oil, sand, gravel, shale and building stone all of which are covered under other sections). It can also be referred to as all the resources/products that may be extracted from forest ecosystem and are utilised within the household or are marketed or have social, cultural or religious significance (FAO, 1990). These include plants and plant materials used for food, fuel, storage and fodder, medicine, cottage and wrapping materials, biochemical, as well as animals, birds, reptiles and fishes, for food and feather.

NTFPs which are harvested from within and on the edges of natural and disturbed forest, may be all or part of living or dead plants, lichens, fungi, or other forest organisms. It therefore, represents a diversity of potential products

sought after by a wide variety of people on a continuum of scales and intensities.

Unlike timber-based products, NTFPs came from a large variety of plant parts and are formed into a diverse set of products: leaves & twigs that may be component of decorative arrangements, food items such as fruits, fungi and juices, wood carved or woven into pieces of art or utilitarian objects and roots, leaves and bark processed into herbal remedies or medicines. Like timber, NTFPs may further be processed into consumer oriented products.

Description of these products may pose a problem due to lack of information concerning the distribution systems used to get the products to final consumers. NTFPs are found in a wide variety of outlets e.g. health food store, pharmacy, etc unlike timber-based products. People have benefited from those plants for many generations. In some cases, NTFPs according to chamberlain (1998) contribute significantly to local and regional economics; and with the current trend in the trade and use of NTFPs, it is bound to grow substantially over the next decades.

## CLASSIFICATION OF NTFPs

The number of products available from **NTFP** is considered to be staggering. Energy (1998) identified 138 products from 80 forest species in Michigan Upper Peninsula. The United Nations and Food & Agricultural Organisation claimed that at least 150 non-wood products are found in international markets.

Classifying these products into like categories is an important first step of understanding the NTFPs industry. NTFPs can be broadly classified into edibles and non-edibles. The former include edible plants & animals, honey, oils, fish, spices etc while non-edible products include grasses, ornamental plants, oil for cosmetic use, medicinal products etc.

These two classes can further be divided into four general categories:

1. **Edibles** such as mushroom, the most well known and documented edible forest products and many other food products gathered from

the forest. Since most of these products are not traded widely and are usually collected and consumed by the harvesters themselves, it is difficult to assess their economic magnitudes. These products include ferns, berries or other fruits, nuts, ramps (wild onions), herbs and spices.

2. **Medicinal and dietary supplements:** This includes plant based products that are processed into medicines. Beginning in the late eighteenth century, over 100 plant species indigenous to the U.S were commonly accepted for their medicinal properties. The majority are wild harvested and traded as botanical products (*Foster 1995*).
3. **Floral products:** It includes pine boughs, grapevines, ferns, and other plant products used for decorative applications. These unique forest products may appear in floral arrangements, dried flower decorations, and ornaments, common example include products made from pine boughs, grape vines, moss, ferns, flowers, cone, mistle toe and holly (*Hammett et al 1998*).
4. **Specialty wood products** include handicrafts, carving and turnings, musical instrument containers (basket), special furniture pieces as well as utensils. In general, specialty wood products are considered non traditional if they are produced directly from trees and not from lumber or timber purchased from mills. In other words, the tree may not need to be cut down to produce these items.

## HISTORICAL PERSPECTIVE

The gathering of NTFP is as old as the human species itself. Wild food and other items from the forest provided food, shelter, medicine and materials for ceremonies and worship. When people began to domesticate plants and animals they became less dependent on wild food and other forest material.

Native Americans traditionally used plants and plant products for food, and medicine, and shared this knowledge with early settlers. They used the bark of trees for housing, branches and stems for utensils and other useful

items. This traditional forest product became an integral part of rural economies and many techniques are still in use today. According to Hammett *et al* (1998), there was a dramatic increase in demand for natural products in the 90's including those of NTFPs. This is traceable to a number of factors which includes a growing interest in alternative medicines and homeopathy.

Homeopathy, according to Encarta (2006) is an alternative system of medicine developed in the early 19th century, based on the concept that a disease can be cured when a patient is treated with minute quantities of a substance that produces symptoms of the disease in a healthy person. Homeopathy focuses on healing the underlying cause of disease, not simply eliminating the symptoms caused by the disease.

#### ECONOMIC VALUE AND GROWTH OF NTFPs.

From the economic viewpoint, NTFPs are equally important as wood based products. About 150 types of NTFPs are significant in international trade. They are also increasingly being acknowledged for their role in sustainable development and conservation of ecosystem. Up to 80 percent of the population in developing countries depends on NTFPs for subsistence, both economically and for nutrition. NTFPs are especially important to women in developing countries from Latin America to Asia and Africa (Gbadebo *et al* 1999)

In the past, the rationale for forest conservation was simply to sustain the forest productive role for the timber industry. This has however changed in many countries over the past 15 years, another view that acknowledges the importance of local use of forest has emerged. With the rise of extractive reserves in Brazil, Community Forestry in Nepal, Joint Forest Management in India and similar initiatives in many other countries, local people are gaining access to significant benefits from NTFPs. NTFPs are often common property resources, like fuel wood, fodder, charcoal, poles, medicinal plants and a variety of food stuffs such as fruits and nuts, mushrooms, fibre and resins (Arnold 1995).

Markets for NTFPs to add value at the local level are not well known, but are thought to have significant impact on rural economies. A few of the edible forest products are prominent enough to generate national economic data. According to Foster (1995), the U.S exported about 77tons of wild harvested American ginseng valued at more than \$21m in 1993. Two years earlier, Virginia exported about 6.5tons of ginseng worth over \$1.8m (O' Rourke 1993).

The NTFPs sector is rapidly growing, perhaps faster than the timber industry and it is expected to grow more in the future. According to Mater, (*New York Times* 1996), the market for forest products other than trees has mushroomed by nearly 20% annually over the past years. It was also noted that the U.S herbal medicine market grew at an estimated annual rate of 13-15% with sales of medicinal herbs, a forecast that US economy would earn \$5billion in the year 2000.

New York Times (1996) reported that in the Pacific Northwest, mosses, ferns and other plants have sustained the commercial floral products industry and contributed more than \$125million to the regions economy.

## IMPORTANCE OF NTFPs TO LIVELIHOOD SECURITY

NTFPs are a dependable source of income and food supply in the rural areas. However, it is a diminishing resource as a result of its dependency on land which is known to be under pressure of depletion from agriculture and development of public infrastructures. Non-timber forest products constitute a critical component of food security and it is an important source of income for the poor in many developing countries. Several opportunities for improved rural development are linked to NTFP. In many areas, rural populations are traditionally depended on local forest resources to provide additional income through collection and marketing of NTFPs. Where employment opportunities



from traditional industries are declining, workers looking for alternative income sources often turn to collection of these products from nearby forest.

Millions of people throughout the world make extensive use of biological products from the wild i.e. NTFPs. They are harvested for both subsistence and commercial use either regularly or as a fall back during times of need. They add to people's livelihood security, especially for rural dwellers. NTFPs may also have cultural significance and value (*Cooks et al 2003*).

Charlie *et al* (2004) looked into the role and importance of NTFPs in daily lives of rural people in South Africa and discovered that more than 85% household used products such as wild spinaches, fuel wood, wooden utensils, edible fruits etc. Also, they reported that more than half of the household investigated made use of edible insects, wood for construction Bushmeat, wild honey and reeds for weaving.

In Nigeria, food security of rural dwellers is improved by growing trees in the home gardens and on farms. Leaves, rattan, honey, sap, gums from the small scale industries are important sources of income (Okafor et al, 1994).

Due to the diverse varieties for species obtainable from NTFPs a lot of household were able to meet their immediate needs by collecting these products from the nearby forest. While other households earn income to meet other needs through the marketing of NTFPs harvested.

Against this background, NTFPs are obviously very important as they contribute to meeting food and other basic needs. They provide a source of input into the agricultural system, help households control exposure to risk of various kinds. A better understanding of the magnitude and nature of the role of NTFPs is therefore central to making decision about forest management that adequately reflects society's demand upon the forest resource.

## CONSTRAINTS FACING THE NTFPs SECTOR.

NTFPs when compared with timber products have historically been neglected by governments. The capacity to promote sustainable use of NTFP

and facilitate increased financial benefits to local users as incentives for forest conservation is consequently low. There are yet gaps in understanding the range of products used from forests, their taxonomic classification, socio-economic values, technical packages and the policy contexts for their sustainable use.

Also, the existing expertise and knowledge is not well documented or is inaccessible. This means that many are duplicated while many important issues remain neglected. There is equally a lack of appropriate methods and tools to promote sustainable use of NTFPs and successfully regulate trade and the form policy development i.e. policy development is still largely disconnected from field experiences.

The challenge for coming years is to develop proper tools and methods for sustainable extraction of NTFP and regulation of its trade. This can be achieved by efficiently using the existing knowledge and experience of facilitators, entrepreneurs and researchers in the region. This involves steps such as identifying, connecting and engaging such people in a range of networking activities that stimulate the flow of information and learning, and that yield products of immediate interest and utility to the concerned NTFP conservation initiative.

Considering the issue of sustainable production of NTFPs, there are a number of challenges to be met, some of which includes the disappearing of forest cover, inequitable market access of marginalized population and monopolization of high value NTFP by logging and poaching mafia

## VALUEING NON-TIMBER FOREST PRODUCT

Value is not the inherent property of an entity. It is only a measure of a relationship between a subject and the object of valuation within a context (time and place or hypothetical scenario). There is a fundamental distinction to be made between a valuation exercise that sets out to explain how choices are made by individual resource users and one that seeks to maximize community or societal well-being.

A societal perspective requires a broader approach, usually some type of social cost-benefit analysis and is necessarily a normative exercise because it involves judgement about what outcomes are socially preferable. (*Costanza et al 1997*).

Appropriate method of valuation depends on the objective of the study. Two journal articles were reviewed for the purpose of this study. Murphy *et al* (2005) undertook a survey to evaluate the flow of Non-Timber Forest Products in a district in India where NTFPs were collected in four different forest zone of the district. The study aimed at preparing an inventory of the NTFPs extracted in the region, estimate the quantity of NTFP gathered by locals and the forest department and finally estimate the financial income derived from NTFPs extracted. The households were classified into three i.e. large farmers garden owners and landless labourers based on the farm holdings. In each class, if the number of the household was less than 5, 100% sampling was done; otherwise 25% of the household were randomly selected for the survey.

The result indicated that all classes of NTFPs were available in the district forest zones and they were qualified based on the kind of species extracted e.g. fuel wood measured in kilogram/year i.e. weight of fuel wood fetched on an annual basis. Fodder, honey mushrooms, wild mangoes etc collected was measured in kg / household / year.

The financial valuation of NTFPs which indicate the income of the farming household was carried out irrespective of the gathering household. That is, the total population of each forest zone was considered wholly. The financial valuation of the quantities of NTFPs gathered was estimated by using the current market value and measured in kg/ha/yr. There were variations in the estimated value realized per household as well as differences in their financial value across the zones considered. It was also reported that a comparison of the annual value of timber with a ten year mean (1985-94) of Rs239million and NTFPs value of Rs685million for the year (1995-96) indicates that NTFPs contribute doubly to the economy and benefits flow directly to local communities.

The authors were able to value NTFPs by directly using the current market price to estimate the income of the communities with the quantities of NTFPs gathered. However, financial valuation using market prices could not account for the elements of cost involved in the production and distribution of NTFPs e.g. cost of labour and transportation. Economic analysis would have given a clearer picture of the real value.

Also, the author did not justify why he chose to sample 100% when household was less than 5 and 25% otherwise in each class. An inconsistency in the unit of measurement was observed, while some NTFPs were measured in kg/households/year some were measured in Kg/year without an indication of the value of land cultivated. But the financial valuation considered the land value used.

The households were classified into large farmers, garden owners and landless labourers based on their farm holdings, this classification is not exhaustive, it should include other classification like small farmers, and possibly medium farmers among others. In addition, the author did not indicate what was responsible for the observed variations in the estimated value of NTFPs realized by the households as well as the differences in the financial value per hectare of NTFPs across the four zones considered.

A similar study by *Shacleton et al (2004)* on the importance of NTFPs in rural livelihood security focused on the extent of use and value of NTFPs at a broad scale. They value their NTFPs collected in two ways

- (1) By using 'direct use value' which was based on the farm gate prices and input cost was considered. This method of valuation acknowledges cost-benefit analysis.
- (2) Also, NTFPs were valued based on their contribution to livelihood i.e. by assisting household to cope in times of adversity manifested at sudden changes in the economic and social or biophysical environment e.g. flood, death of head of household etc. Here the "direct use value" of NTFPs used during period of adversity does not adequately reflect their

true value because it does not account for emergency insurance component of use during the times of hardship.

In these situations the changed or increased use of NTFPs is typically a coping strategy, with the products providing a safety net for the household.

In the articles reviewed, there was an assumption that underestimates possible post harvest losses and the market cost of perishable NTFPs. The authors also assumed that all the NTFPs are tradable, this may not be true. For non traded NTFPs, non-market prices are supposed to be used. The study will be richer, if the authors had separated the NTFPs between Traded and non-traded before estimating their financial value. Also, no indication was made about the estimate of the value of NTFPs used for domestic purpose by households.

### **Economic Valuation of Non-Timber Forest Product**

Value is the worth of a product or service to an individual or a like-minded group in a given context, often involving a complex of relationships (*Brown 1984*). Values are of concern not just in the field of economics for example, they are dealt with by philosophers in their treatment of ethics. Economic values are human oriented and human assigned. Values are specific to a given context and situation.

Forest valuation should therefore, always be situation specific and result should be attributed back only to the group studied and to the actual context and situation studied. (*FAO 1995*).

Types of forest values

Economic value associated with forest can be classified into four categories.

- (i) Direct-use values (including consumptive & non consumptive values).
- (ii) Indirect-use values.

(iii) Option values

(iv) Existence and bequest values

An addition of all these value is the total economic value. The purpose of valuation is to make the value of each forest use explicit and not necessarily to put a total value on nature (*Michael 1995*).

**Total Economic Value (TEV)** is an aggregate of:-

- (1) Total use value: This can be divided into direct-use value, indirect-use value and option value.
- (2) Total non-value: include Existence & bequest value.

## CLASSIFICATION OF FOREST VALUES.

1. Direct use value are associated with

- Consumptive uses: (a) Commercial & industrial market goods, Fuel wood, timber, pulpwood poles, fruits, animals, medicines etc.  
(b) Domestic non-market goods and services (fuel wood, non-commercial non-wood products, animals, fruits etc).
- Non consumption uses: (a) Recreation (jungle, cruises wildlife, photography, trekking)  
(b) Science and Education (forest studies)

2. Indirect use values are associated with

- Environmental protection
- Waster shed protection, nutrient recycling, soil fertility agricultural productivity.
- Gas exchange, contribution to climate stabilization.
- Habitat and protection of biodiversity.
- Aesthetic, cultural and spiritual values.

3. Option value

- People may value the option to use a forest in the future. Although such values are difficult to measure in economic term, they should be recognized in valuing the contribution of forest to human welfare.

#### 4. Existence & Bequest values.

- People may value forests purely for its existence without the intension of using it directly in the future.
- People may value forest as a bequest to their children.

It is not so easy to compute these value separately as they are dependent on each other e.g. the felling of trees by harvesting may degrade (or improve) the habitat for specific birds and animals.

### MEASURES OF VALUE.

Three main types of measure can be used for forest valuation i.e. direct market price (*as used by Murphy et al 2005*), indirect market price (*as used by shackleton et al 2004*) and lastly non-market estimates of values

The first two measures are based on estimate of exchange values where buyers and sellers exchange goods or service for money or other goods and services. In the case of indirect market price, we have assumptions regarding proxy market conditions and how buyers and sellers will behave under different circumstances (*Dixon et al 1994*).

However, non market values estimate the willingness of buyers to purchaser or pay for specific goods or services under defined conditions. Non market value estimates are not directly comparable with market based exchange values.

### SUMMARY AND CONCLUSION.

The simplest and most commonly used method of valuing any good or service is to take its market price. Thus, the price of NTFPs directly harvested from the forest determines their value. When these products and services are not directly traded in the market, their value can be derived from their

contribution in other production processes or their impact on the prices of other commodities.

NTFPs values can also be determined through assessing the cost of man-made products, infrastructure or technologies that could replace these goods. It could also be valued by what people are willing to pay for the goods and services, or their willingness to accept compensation for their loss.

## REFERENCE

**Arnold. J.E.M (1995):** Poverty & Conservation. Society and Non-Timber Forest Products in Tropical Asia. Ed. Fox J. Occasional paper No 19, East West Centre; Honolulu, Hawaii USA.

**Brown. T.C. (1984):** The Concept of Value in Resource Allocation. Land Economic. Pp 231-46.

**Charlie, S. and Sheona S. (2004):** The Importance of Non-Timber Forest Products in Rural Livelihood Security and as Safety Nets: A Review of Evidence From South Africa. In: South Africa Journal of Science 100 Nov/Dec 2004. Pg 58-664.

**Cooks, M.L. and Wiersum K.F. (2003):** The Significance of Plant Diversity to Rural Household in The Eastern Cape Province of South Strica. Forest Trees Livelihood 13 Pg 39-58.



- Costanza, R., and C. Folke (1997):** Valuing Ecosystem Services with Efficiency, Fairness and Sustainability as Goals. Island Press Washington D.C. USA. Pg 49-68.
- Emery, M. (1998):** Seeing, Gathering, Managing Gathering Special Forest Products and Public Land Management. In Proc, Special Forest Product: Working Together in a changing World. Western Forestry & Conservation Assoc. Portland Oregon Pg 31
- Food and Agricultural Organization of the United Nations FAO (1989):** *Women in Community Forestry* in Unasylva Vol. 36 No. 46 April. Rome. pp. 5-7.
- Food and Agricultural Organization of the United Nations FAO (1990):** The Major Significance of "Minor Forest Product. The Local Use and Value of Forest in the West. African Humid Forest Zone. Community Forestry Note 6 Rome.
- Food and Agricultural Organization of the United Nations FAO (1992):** Forest, Trees and food Rome. pp. 2-4
- Food and Agricultural Organization of the United Nation FAO (1995):** Valuing Forest: Context, Issues and Guidelines, by Gregersen H.M. Arnold J.E.M, Lindgren A.L & Contreras – Hernosilla. FAO Forestry Paper No 127, Rome.
- Foster, Steven (1995):** Forest Pharmacy: Medicinal Plants in American Forest. Forest History Society. Durham NC pg 57.
- Gbadebo J.O and U. Gloria (1999):** The Non-Wood Forest Products of Nigeria. A report produced as out put of the ec-fao partnership programme (1998-2000) - project gcp/int/679/ec
- Hammett, A.L. and J.L. Chamberlain (1998):** Sustainable Use of Non-Traditional Forest Product. Alternative Forest Based Income Opportunities. In: Natural Resources Income Opportunities on Private Land Conference. April 5-7<sup>th</sup> 1998. Hagerstown, Maryland Ed. Jonathan, S.K. Pg 141-147.
- Michael S.G.(1995):** Economic Valuation of the Multiple Use of Forest: The Case of Bwindi Impenetrable National Park, Uganda. University of Edinburgh, U.K (M.Sc) dissertation).
- New York Times, (1996):** From Necessity, New Forest Industry rises. Sunday 24<sup>th</sup> March. National Report Section, Front page. United Nations (1995): Non-wood News. Writer Food & Agricultural

Organisations Rome Italy.

**Okafor, J.C.; Omoradion, F.I. and Amaja (1994):** *Non-Timber Forest Products*

(*Nigeria*): Consultancy Paper prepared by the Tropical Forest Action Programme

(TFAP) Forest Management, Evaluation and Co-ordination Units (FORMECU) and Federal Department of Forestry (FDF) Abuja, Nigeria. P. 8.

**Murphy, I.K, Bhat P.R., Ravindranah, N.H and R. Sukumar (2005):** Financial

Valuation of Non-Timber Forest Product Flows in Uttara Kannada District, Western Ghats, Karnataka. In: *Current Science*, Vol.88, No.10, 25 May 2005. Pg 1573-1579