**CAPTURING THE TOTAL ECONOMIC VALUE**

**OF ENVIRONMENTAL ASSET AS AN AID TO**

**SUSTAIN RESOURCE USE IN THE NIGER DELTA**

**BY**

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**ABSTRACT**

Total economic value is a method used to identify and estimate the monetary value of all economic benefits that a society derives from a resource. Environmental economists use taxonomy of values for natural resource and the environment in dealing with total economic value concept. It is the sum of use value (UV) and non-use value (NUV). Use value is in turn divided into direct use value (DUV) and indirect use value (IUV). This is applied to the valuation of environmental resources to determine their total economic value. Studies were carried out to determine the use and functions of some non-timber forest products including the total income earned from their extractions. The paper concluded that the current practice of natural resource valuation lead too undervaluation which encourages their overexploitation and unsustainable use.

**KEYWORDS:** environmental asset, environmental sustainability, niger delta, total economic value.

**INTRODUCTION**

The Niger delta covers an area of about 70, 000 sq.km consisting of distinct ecological zones characteristics of larger river delta in tropical region: coastal ridge barrier, mangroves, fresh water-swamp forests and lowland rain forests. Significant changes are taking place in the area both naturally and as a result of coastal zone modification, upstream dam construction and urban growth, deforestation, agriculture, fishing, industry development, exploitation of neutral resources, principal oil operations, and population pressure.

“The Niger delta is the richest part of Nigeria in terms of natural resources. The area has large oil and deposits as well as extensive forest, good agricultural land and abundant fish resources. Despite tremendous natural and human resource base, the regions potential for sustainable development remains unfulfilled and its future is being threatened by environmental degradation and deteriorating economic conditions which are not being addressed by present policies and actions” (Moffat and Linder) 1995; Pp. 527-538). More than 45 years of oil development have not brought significant development in the area.

The region has one of the world’s largest wetlands, encompassing over 20,0000sq.km in southeastern Nigeria. Its natural resource endowment serves a source of livelihood and wealth for the people. It also plays a significant role in poverty alleviation.

Consider it inadequate

There is no doubt that exploitation and use of resources in the Niger delta is not sustainable and compensation for natural resource damage is not a good reflection of the total economic loss to the people. Nigeria mangrove is the third largest in the world and the largest in Africa. Over 60% of this mangrove is found in the Niger delta. (Moffat & Linder, 1998).

Environmental problems in the Niger delta are complex ranging from deforestation, pollution and erosion.Land degradation and depletion of sea life is a common problem in the area. Fish catch per fisher man annually from a high 1.88 tons in 1983 to 0.7 tons for River State and 1.26 in Delta State in 1989 ( Moffat Linder, 1995). Activities of the oil industries have led to loss of agricultural land and reduction in production of agricultural land. There are a lot of disputes with regard to the quantum of compensation paid to claimants in the area for environmental damages as they consider inadequate. It has been argued that the main reason for the over exploitation of timber resource is under valuation of forest resource. Under valuation production, short-term views of government, timber exploiters and local people with immediate opportunities and gains (Obot,2002 Pp. 7-10).

In addition to the above, development strategies have failed to recognized the nexus involving sustainable utilization of natural resources, conversation of biological diversity and economic development.

The problem of environmental devastation and poverty in NigerDelta is further worsened by imbalances in law and practices of resource valuation in Nigeria particularly with capturing the total economic value of natural resources. Existing valuation practice rarely captures the total economic value of resource damage, as some of the losses cannot be priced in the market place. There is no doubt that if natural resource is approximately valued there will be more prudence in their exploitation and will likely be exploited in a more sustainable manner.

**AIM**

This paper is aimed at illustrating how a comprehensive identification of value components of natural resources will lead to determination of total economic value and sustainable resource use.

**OBJECTIVES**

* Identify the nature and scope of environmental devastation in Niger Delta.
* Illustrate the application of environmental valuation technique in the determination of total economic value.
* Demonstrate how the determination of total economic value will aid sustainable natural resource use in the Niger delta.

**JUSTIFICATION OF STUDY**

Environmental resource in the Niger Delta as well as other tropical moist forests (TMFS) are being over exploited, disrupted and depleted, both quantitatively, at ever more rapid rates.

The Niger delta is one of the world’s largest wetlands with a variety of biodiversity,which need to be conserved and used sustainable for the benefit of present and future generations. Biodiversity provides direct benefit like food, medicine and energy, and also provides a life “support system”. It is an important tool for the recycling of essential elements, such as nitrogen, carbon and oxygen. It is also responsible for mitigating pollution, protecting watersheds, and combating soil erosion. When we over exploit resources, we threaten not only our survival but also that of future generations.

The resource in the Niger delta has been exploited for the past 45 years and the people in the area have been living in abject poverty inspite of the compensation being paid them for environmental damages. This exists due to under valuation and under compensation for damages. If proper values are determined, polluters will weigh the cost and benefit of any action before execution. This can only be achieved through total economic value of the environmental asset. This will have the single benefit of creating a proper awareness of the true value of the environment which will place a caution against use with prodigality.

Society has limited resources to meet several objectives such as economic growth,poverty alleviation, and environmental conservation. These objectives compete for resources and may conflict with one another (e.g. economic growth may be seen to conflict with conservation of biodiversity). It is essential that the society find a way to reconcile these objectives and prioritize them to allocate the limited resources in the most efficient way. Otherwise, undervalued environmental objectives will continue to be crushed by other social or economics provides the analytic tools to do this kind of analysis thus making it a good planning tool.

**ENVIRONMENTAL SUSTAINABILITY**

Without improving environmental management, development will be undermined and without accelerated development in poor countries, the environment will continue to degrade… the major challenge is to make the development environmentally sustainable (The World, Bank 1996).

In an African context, it is important to define sustainable development with a historical perspective. It is not enough to compare the present with the future, since the residual effect of past practices must be considered. African cultural heritage and tradition remind us that land and its associated natural resources must be regarded a sacred trust that has been bequeathed to us by our ancestors. This resource base must be handed over to future generations (Okigbo, 1995 in W.B., 1996). In other words we owe a duty to leave the resource of the earth better than we met it.

Sustainable development is development that meets the economic needs of the present without compromising the ability of the future generations to meet their economic needs. It links two basic ideas; ecologicalsustainability which implies that biological elements including humans and processes that keep ecosystem productive and resilient, should be undertaken. Ecological sustainability and economic development must be linked when implementing policies that would lead sustainable development (Lipton et al, 1995)

Sustainability is a much broader phenomenon (than sustainable development), embracing ethical norms pertaining to the survival of living matter, to the sights of future generation and to institutions responsible ensuring that such rights are fully taken into account in policies and actions”

(O. Riordan, 1998:30 in Nwafor 2006).

From all accounts therefore, to define the concept of sustainable development precisely will ever remain difficult undertaking. Of greater relevance in the context of environmental management, however, salience of the concept (Nwafor, 2006). With respect to this, smith (1993) outlined the different ways in the term sustainability could be immense usefulness. First, sustainability as a term is both useful and understood as a desired goal for resource management. Second, aspiring to sustainability directs resource management efforts towards a balance, among societal, economic and environmental objectives. Third development and not just growth becomes just paramount.

Economic growth can generate resources to address environmental problem but is not by necessity environmentally sustainable. Any intervention to promoteenvironmentally sustainable development not adapted to the beneficiary’s mode of thinking will not develop firm roots in their culture.On the assumption that frontline stakeholders, such as government officers, know what is best for the people, projects have been located in areas where the critical linkages needed for local ownership had not been built such projects are hardly ever sustainable. It is only by allowing beneficiaries to internalize the logic that underlies project through a process of informed participation that these projects will be sustainable. That is sustainability requires an understanding of internal dynamics of changing social structures at the local level.This is a key to challenge in promoting environmentally sustainable development (ESD).

All these constraints are interdependent and mutually reinforcing and make ESD difficult to achieve (Bank, 1996). It is important that the issue of sure need and preference is considered in any effort to achieve sustainability, as these will produce the highest aggregate benefit to the concerned community and environment. It is hoped that placing appropriate value on the resources of the Niger Delta will encourage sustainable resource exploitation.

The key problem driving the accelerated widespread destruction and degradation of the natural environment in the Niger Delta and the rest of the country is that the importance of environmental conservation sustainable development to socio-economic development is undervalued by the society. Biological … ecological processes create connection between the rates of the resource use in the present and the quantity and quality of resources available to future generations. It is these connections that are the focus of what has to be called sustainability (Field and Field, 2002).

**ENVIRONMENTAL DEGRADATION IN THE NIGER DELTA**

The NigerDelta Development Commission (NDDC) act 2000 listed the following as member states of the Niger Delta Region: Abia State, AkwaIbom, Bayelsa,Cross River, Delta, Edo, Imo, Ondo and Rivers.

The most degraded areas include Rivers, Delta, Bayelsa and AkwaIbom. The area contains both fresh and inland waters and a highly urbanized brackish ecosystem impacted by municipal and industrial activities of import and expert of petroleum-related products. The region has witnessed an intense crude oil production for decades. Over the years there have been countless occurrences of oil spill resulting from carelessness to sabotage. These spills often enter the waterways, farmlands and areas of normal day-to-day activities of people in a given community in the region (Anyakora, 2006). In addition to the sensational and much publicized incidents, there are other non-sensational crude oil pollution such as seepages to the ground water from oil storage facilities, and the seepages that enter the ground in the course of crude oil transportation.

On January 13 2007, Shell Petroleum Development Corporation team extinguished headwell fire arising from oil leakages in K-Derecommunity in Ogoni land. The headwpells are Bormu 41 and 50 (This Day Newspaper, Vol. 11, No. 4288, Pg. 5, Jan. 17, 2007). The community prevented the oil company from securing the wells out of anger. It is an established fact that an effective step to stopping headwell fire includes stopping the source of leakage of gas and oil that feeds the fire. With the prevention of the oil company from securing the well heeds, the oil and gas will continue to leak and could saturate the environment with flammable liquids. This could expose the people and the environment to uncontrollable fire. Environmental degradation in the Nigerdelta is mainly caused by oil industry activities in the area.

The exploration and development activities for oil and gas involve seismic, drilling and well completion. Each phase differs to some extent in type and quality of pollution discharged. In Nigeria, the exploration and development activities may be found on shore, near offshore (including swamps, coastal waters, estuaries, rivers, etc.) and far off shore. These physical locations influence the manner in which the operations are conducted, and the effluents are treated and discharged.

The relevant legal authority is provided in the petroleum act 1969 with the petroleum (drillingand production) Regulations 1969, section 25 and 36. Also, the explosive act 1964 andExplosive Regulation 1967 govern the use of explosive during seismic activities.

**EXPLORATION**

Exploration usually consists of special surveys, such as seismic, gravimetric and magnetic to determine the subsurface structure and to estimate the potential for oil or gas accumulation.

Exploration drilling is performed with rotatory drill out filled to a mobile rig for drilling wells and for determining the nature and extent of potential hydrocarbon reservoirs. Rig designs used in Nigeria are those for land and shallow water drilling. The main purpose of exploration rig is to house rotatory drilling equipment whose only function is to make a hole. There are four main subsystems to perform this function, power, hoisting, rotatory and circulating. In addition, facilities for supporting the work crew must be provided.

**DEVELOPMENT**

Development drilling is usually performed from a fixed platform to produce the field by drilling a large number of wells (10-30) in a fixed pattern. Development drilling produces quantitatively the same discharges as exploration drilling. However, because the former involves more number of wells, the quantity of discharge may be much greater than exploratory well.

Exploration and development activities generate water that includes atmospheric emission, liquid waste like drills cutting, drilling fluids, sanitary and domestic wastes and accidental spill like the one by Exxon-mobile in AkwaIbombetween 1997 and 1998. The problem of seismic activity is more of safety from the use of explosives thanthe environmental pollution. However vibrations emanating from the blasting seismic operation can affect building structures, buried pipelines, pumping stations of water wells,dykes, etc.

In the petroleum industry, water pollution is a common feature. Creeks and water ways which are used for fishing, agricultural purposesand in some cases domestic purposes have been rendered less portable by petroleum (oil) pollution. Fishing rights have this been affected (Adewale, 1989). The petroleum regulation provides for compensation for the disturbance of surface and fishing rights. It is important to note that water serves different purpose in the region. In these streams, the fisherman fish, water is fetched for the stream serves domestic purposes, the children bath and many other purposes. The Federal Environmental Protection Agency may need to provide different waterstandards for the various uses. The Harmful Waste Decree provides for a fine against polluters who discharge hazardous or toxic waste into Nigerian waters. When the polluters is a company the fine is an amount not exceeding ₦500,000.00 and an additional ₦ 1,000.00 for an extra day that the offence subsists (Harmful Waste Decree) is defined by sec 15 of the Decree as any injurious, poisonous, toxic, noxious substances and in particular nuclear waste emitting a radioactive substance. If the waste is in such quantity whether with any other consignment of the same or different substances as to subject any person to the risk of death, fatal injury or incurable impairment, physical or mental health; there is no doubt that oil come within the ambit of hazardous substance. Oil containing toxic cancer producing substances and can be a long-lived environmental contaminant where it is spilled. (Adewale,1989; Anyakora, 2006). The health impact of environmentaldegradation is often ignored in Nigeria. It is important for this to be well articulated and value placed on it. The department of petroleum resources (DPR) needs to strike a balance between a clean environment and the development of petroleum industry.

According to official estimates of Nigerian National Petroleum Corporation, a total of approximately 2, 300….m of oil are split in 300 separateincidents annually (Moffat and Linder, 1995). The quantity and number of spills are underestimated or a times unreported by the oil companies; it is likely that the total volume of spill may be ten times higher than the official figure. The number of oil spills has not changed now as in the 90sas oil spills have been reported to cause mortality of bivalves such as oysters and fish kills (Powels,1994). There are cases where spills have contaminated and destroyed several hectares of mangrove swamps; in addition,gas flaring contributes to crop failure and skin disorders on people living within the vicinity.

**LEGAL FRAMENWORK AND RESOURCE ATTRIBUTES/VALUES CONSIDERATION**

Valuation of environmental damages in Nigeria is statutory and is guided by various legislations which include the following;

* Land use decree of 1978, section 28-29 provides for compensation over acquisition of land mining,pipe lining, or any incidental purposes. It provides for valuation to be carried out as recommended by the appropriate officer.
* Petroleum decree 51 of 1969, schedule 1, section 2 provides for fair and adequate compensation surface rights.
* Oil pipeline act 1959 amended 1969 provides for payment of compensation but excludes compensation in proven cases of sabotage.
* Petroleum (Drilling and Production) Regulation, section 17 (1c) and (II) provides for adequate compensation for damage to buildings, economic trees or crops by one who surveys, digs, or lays pipes for supply and distribution of energy fuel.
* The Constitution of the Federal Republic of Nigeria 1999, section 44

There is a general misconception that the Land Use Act does not encourage the use of open market in valuation of crops and economic trees. The problem here is that the appropriate officers and the relevant professional body have chosen on their own to use arbitrary selected rates to apply the valuation of the resources. The provision is quite flexible and not in it prohibits the appropriate officers from using the appropriate method of valuation to reflect the full loss of utility in the resource. The professional body should provide an appropriate standard for best practices. This is however an issue for another occasion.

**TOTAL ECONOMIC VALUE**

It is not every resource that can be in the market place. Natural resources are often defined as elements of the natural environment that provides economic and social service to human society. Traditional definition of natural resource was limited to resources providing quantifiable economic products such as timber Agricultural land and industrial mineral. Moreover, consideration of economic products is limited to those traded in the market, ignoring the economic value of substance use.

The definition of natural resource has expanded in scope to include ecosystem processes and ecological elements that provide services as purification of air and water, flood control, detoxification and decomposition of wastes and formation and maintenance of fertile soils. For example, a wetland provides filtration services that improve and maintain water quality and habitat.

The severity of environmental impact often depends on the accumulation of problems (overtime, over space or both). Many environmental goods and services do not enter markets, or do so only imperfectly (W.B., 1998). For some goods and services; (e.g. a kilo of beef, a cubic meter of timber), the market provides prices that are good reflections by the values society places on them.For other goods and services, market prices either do not exist or only capture a small part of the total value. Total economic value (TEV) is based on the idea that any good and service is composed of various attributes, some of which are visible and easily measured, while others may be more difficult to quantify. The total value is the sum of the components. It facilitates the understanding of the origin of different values. It is primarily a means of identifying different uses and services, which could be potentially provided by an environmental good or service. It basically comprises use and non –use values. There are also direct and indirect uses (Dharmatne and Strand, 1999). Non-use value includes existence value, option value, bequest value, altruistic value, and the value of ecological services (McCracken and Abaza, 2002).

TEV=DUV=IUV+DV+BV+EV

Where TEV= Total Economic Value

DUV=Direct Use Value

IUV=Indirect Use Value

OP=Option Value

BV=Bequest Value

EV=Existence Value

The formula represents all the issues that represent the local economic value of an environmental asset in a broad sense. Table indicates various values for different forest products.

Table 1: Forest TEV components.

|  |  |
| --- | --- |
| **TOTAL ECONOMIC VALUE OF FORESTS** | |
| Use values | Non-use Values |

|  |  |  |  |
| --- | --- | --- | --- |
| **Direct Uses**  -*Timber*  Fuel wood, pulp wood  Saw timber  -*Food*  Fruits, mushrooms, berries, nuts, edible plants  -*Medical Plants*  -seeds, forage, hunting and fishing, tourism and recreation, genetic resources and educational uses | **Indirect Uses**  Watershed  Protection, soil protection, climate control (carbon storage), micro-climatic regulation, nutrient cycling | **Option**  Future direct and indirect uses | **Bequest**  existence |

Source: Adapted from bishop (1999), on Arin and Siry, (2000)

FIGURE 1: TOTAL ECONOMIC VALUE

TOTAL ECONOMIC VALUE

USE VALUE NON USE VALUE

DIRECT USE INDIRECT USE OPTION EXISTENCE OTHER NON-USE

VALUE VALUE VALUEVALUE VALUE

Output that can be Functional Future directandValue from knowledge

consumed directly benefits indirect use of continued existence

Food Biomass Ecological function Biodiversity Habitats

recreations flood control conserved habitats endangered species

storm protection

Adapted from Arin and Siry, 2000.

McCracken and Abaza (2000) explained further that the direct use values are estimated by methods that elicit preference either by conducting experiments or by using questionnaire based surveys, within local market.

A fundamental distinction between the way economic and other discipline such as ecology use the term value in the economic emphasis on human preferences. Thus, the functionality of economic value is between one entity and a set of human preferences. If a coastal area is degraded it supports a lower abundance of organisms, an ecologist will characterize this degraded area as less valuable for those organismsthan a non-degraded area. In economic terms however a polluted area only has less value than an otherwise equivalent to non-polluted area if some individual members of society prefer non-polluted areas. If no one cares that there are few organisms in the polluted area, then there is no difference in economic value (Lipton etal 1995).

Economic value is a measure of maximum an individual is willing to forgo in other goods and services in order to obtain some good, service or state of the world. This measure of welfare is formally expressed in the Concept called Willingness to Pay (WTP). Thus, the loss of value from a degraded environment is the maximum amount of economic value is summarized as follows:

* Products or services have value only if human beings value them directly or indirectly.
* Value is measured in terms of trade-offs, and is therefore relative.
* Typically,money is used as a unit of account.
* To determine value for society as a whole, values are aggregated from the individual values.

Basically, the utility concept is central to economic value. It is utility that triggers demand for any goods or service. For instance, the tropical forest are the homeland of many indigenous people, they provide habitat for many flora and fauna (biodiversity) which have extensive uses including educational crop breeding and medicinal purposes. Tropical forest in addition provide hardwood, timber and other forest products such as fruits, nuts, latex, rattans, meat, honey, resin, oil, etc. they provide recreational facility, (e.g. ecotourism) protect watershed in terms of water pollution, organic nutrient cleaning, act as store of carbon dioxide and addition provide possible regional micro climate function ( Pearce, 1999 in Otegbulu, 2003).

The African forest is rich in herbal medicine context, and promises cure for most of the world’s dreaded diseases. We are grateful to the plant kingdom for such useful drugs like vinblastine from the African Periwinkle, CatharanthusRoseus, used for treatment of leukemia. The chologernic drug, physostigmine, used in the treatment of glaucoma, comes from Calabar bean which was used in South-eastern Nigeria as an “ordeal poison”, Curare for surgery, respine for high blood pressure and for cancer (Iwu et al, 1997). Around a quarter of all prescription drugs sold in the United States are believed to be based on chemicals derived from only 40 plant species. So far less than 1% of the world’s 265,000 flowering plants have been tested for curative powers (Time, Nov. 1998, Vol. 22).

A French man patented an extract from the bark of African Pigeum tree, which native healers have used for the cure of the old man disease, enlargement of the prostrate. Throughout Africa, hundreds of tons of bark amount to more than 220 million dollars a year (McGuire, 1998).

To capture the total economic value of a natural resource, it will be proper to bring fore all the attributes both tangible and intangible associated with the resource. In the case of forests, the total economic value approach takes into account, the complex set of biological, physical, spatial and temporal linkages between the various uses and values of forest. It helps to determine all valuable linkages between forest use and values of forest and to identify the presence of significant tradeoffs between conventional market value and generally unpriced environmental services and functions. The knowledge of these tradeoffs will help to avoid situations in which relatively small gains derivable from market values (from things like unsustainable timber harvest) lead to large losses in terms of unpriced values, notable soil and water shed protection, aesthetic and recreational values and other non-use values. A due consideration of these factors ensures that limited forest resources will be put to uses that generate the highest benefit in the society (Arin and Siry,2000).

Most valuers look at forest resource in terms of timber alone. Most often, the valuer of non-timber fiber products (NTFPs) is higher than that of timber. There are climber trees that depend on timber for their growth. These include soger (Afang,ukazi), Gnetum, Etazi,Utazi. Other forest products include wild animals, fish, insects, etc. Obot (2002) asserts that more important and fundamental reason for over exploitation of timber resource is its under-valuation. This implies forest is only viewed as timber without regard or consideration for its other products or services like flood control, climate moderation, etc. in Cross River National Park, a woman harvest about 14 bundles of Afang (ukazi) everyday which she sells at the Cameroon borders for 100 CFA (₦14)per bundle. This quantity could be multiplied by the number of days and women involved in this activity and then average for the 59 villages within the supported zone of the park; the revenue form the resource within the area will be quite substantial. The partbeing emphasized is that the total utility derived from a resource must be considered I any damage valuation.

In a study carried out by Arin and Siry (2000) in Georgia, a Turkish State, to estimate the current value of Georgian forests, it was discovered that the forest is characterized by lack of resources for and virtual stoppage of appropriate forest management, growth of uncontrollable and increasingly unsustainable harvesting of timber resources in a number of areas, uncontrolled hunting and grazing in the forest land across the country, which undermines the watershed protection, biodiversity and wildlife habitat functions of the forest threatens forest landscapes treasured by the society. Below is typical valuation schedule applying the total economic value concept.

**Table2**: Monetary Values of forest (US $million)

Forest benefit Annual Net Value

**Direct use**

Timber 12.00

Mushroom 1.50

Nuts 0.58

Berries and wild fruits 1.95

Medical plants 0.08

Seeds 0.44

Forage 3.75

Hunting and fishing 2.10

Tourism and recreation 2.25

Indirect use no data

Option value no data

Non-use value no data

Total 24.75

Adopted from Arin and Siry, 2000.

Table 2 above shows that apart from timber other non-timber forest products (NTFPs) equally command high value. Results from a Mac Arthur foundation funded research project carried out by a team from BioresourceDevelopment And Conversation Programme, Environmental Law Institute, Washington D.C And A.C Otegbulu & Partners indicated the following mostly extracted NTFP’s in Ndoki and Kalabari communities in Niger Delta.

**Table 3**: Ten Mostly Extracted NTFPs (Fauna & Flora) by Respondents

|  |  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- | --- |
| S/N | Local Name | | Common Name | Botanical Name | Freq. | Uses | How Used | Market Sold |
|  | **Ndoki** | **Kalabari** |  |  |  | Food/medicine |  |  |
| 1 | Akilu | Akin | Bitter Kola | *Garciania kola* | 23 | Food | F | Local/distant |
| 2 |  | Isem | Periwinkle |  | 43 | Food | C | Local/distant |
| 3 |  | Isila | Mudskipper |  | 28 | Food | C | Local/distant |
| 4 |  | Angala | Mangrove | *Rhizophoraracemosa* | 48 |  |  |  |
| 5 | Nkwu |  | Oilpalm | *Elaiesguineesis* | 88 | Food | C | Local/distant |
| 6 | Akazi | Okazi |  | *Gnetum Africana* | 44 | Food | FC | local |
| 7 | Utazi |  |  | *Gongronemalatifolia* | 32 | Food/Medicine | FC | local |
| 8 | Ngwo |  | Raffia palm |  | 20 | Food/Building | F | Local/distant |
| 9 | Uziza |  |  | *Piper guineese* | 34 | Food/Medicine | FC | local |
| 10 | Oji |  | Kolanut | *Kolanut*  *Cola nitida* | 28 | Food | F | local |

Note: 1. the species in table 3 above have a frequency of at least 20 F= Fresh, C=Cooked.

**Table 4**: Income realized by an average collector from each of the ten most harvested species

|  |  |  |  |
| --- | --- | --- | --- |
| S/N NTFP Species | Local Name | | Amount Realized **(₦)** 2000-2002 |
|  | **Ndoki** | **Kalabari** |  |
| 1 *Garciania kola* | Akilu | Akin | 40,660.83 |
| 2  *Periwinkle* |  | Isam | 59,758.58 |
| 3  *Mudskipper* |  | Isila | 118,192.59 |
| 4 *Rhizophorracemosa* |  | Angala | 129,950.06 |
| 5 *Elaiesguineensis* | Nkwu |  | 66,800.00 |
| 6 *Gnetumafricana* | Ukazi | okazi | 52,854.76 |
| 7 *Gongionamalatifolia* | Utazi |  | 20,294.44 |
| 8 *Raffia palm* | Ngwo |  | 137,777.76 |
| 9 *Piper guneense* | Uziza |  | 44,628.44 |
| 10 *Cola nitada* | Oji |  | 20,814.81 |

The result in table 4 above shows that the highest amount of income ₦137,777.76) was realized from raffia palm while the lowest amount₦20,294.440 was from *GongoronemaLatifolia*. The highest amount from raffia palm could be because of the fact that the wine the local people tap from raffia is brewed into hot drinks, known locally as “kaikai”, which is widely consumed and is lucrative.

**COMPARATIVE ANALYSIS OF VALUATION UNDER TOTAL ECONOMIC VALUE AND OPTS RRRATES**

Palm tree will be used for the purpose of our analysis. In this, sixty (60 No.) palm trees are to be considered. Investigation indicated that the 6 No. palm trees will yield approximately 600 fresh fruit bunches per annum, which will produce 2.5 tons of palm oil, 0.5 tons of palm kernel oil. The current market price is ₦36,000 per ton for palm kernel oil and ₦60,000 for oil palm. Each palm tree can produce five brooms and 4 baskets from the frond annually. A broom sells ₦25 while a basket sells ₦80 on the average… Revenue from soap is about ₦150 per annum while that of palm wine is ₦5,000 per annum per tree. It should be noted that when palm tree is producing palm wine the fruit will not be produced.

**Income Summation/Valuation**

₦

Income from palm kernel (0.5\* ₦36,000) 18,000.00

Income from palm oil (2.5\* **₦**60,000) 150,000.00

Income from basket/broom 26,700.00

Income from soap 9,150.00

**Total** **203,850.00**

Less expenses and production cost @ 30% 61,155.00

142,695.00

YP@ 10% & 2.5% for 30 years 8.14.00

Capital Value 1,161,537.00

Option Value Nil

Bequest Value Nil

Existence Value Nil

Total economic value= ₦1,161,537 or

Capital value for 600 palm trees = ₦1,161,537

60

= **₦**19,385.00

Say **₦**19,000.00

The 1997 OPTS rate which is still applicable provides a rate of ₦1,000 per palm tree. The government rate between ₦20 and ₦100 depending on the state. These shows a difference if 1,800%.

This valuation can be repeated for different non-timber forest product with the same charming result. Most African countries, particularly Nigeria, don’t appreciate the value of environmental resources. Relevant laws Cited in the earlier part of this paper for fair and adequate compensation but unfortunately, the reverse has been the case. If the polluters of the environment know the true economic value of what they are drama has been the case. If the polluters of the environment know the true economic value of what they are damaging they are bound to be more careful and cautious. In spite of the madness in Lagos roads and the recklessness of commercial bus drivers, they are always more careful when drivingbehind an extensive car than small cars. There is no doubt that capturing the total economic value in natural resource valuation will lead to sustain resource use and management in the Niger delta.

**RECOMMENDATION AND CONCLUSION**

**RECOMMENDATIONS**

* Estate surveyors must learn to think outside the box and embrace modern trends in natural resource valuation.
* There is an urgent need to interpret the relevant compensation laws including the Land Use Act for the purpose of placing correct values on environmental asset in a professional manner.
* There is a need to encourage the registration of people engaged in different trades and occupations in bothurban and rural areas to provide baseline data.
* The valuation practice for damage assessment and compensation should be multi-disciplinarywhen situation warrants. This will be based on a team approach,involving relevant professionals such as valuers, environmental economists, lawyers, biologists, economists, taxonomists, etc.
* In situations where environment damage leads to displacement and inability of the community residents to practice their trade, there will be need to teach them new skills with which they couldearn a living.
* Establishment ofa baseline data on natural resources,including collection of existing but disparate data, and location of such at one source stop. In this regard, a call was made for the takeoff of a Nigerian clearing house mechanism for biological resource. A principal role was identified for Nigeria Delta Development Commission (NDDC). Recommends furtherresearch and documentation of the full use of plants found in tropical forests s that their valuation will be based on their full utility.
* That natural resource valuation and damage assessment is based on total economic value of natural resource (TEV) approach to ensure equity as well as capture the full value of natural resource, including the contributions of indigenous communities as custodian of biodiversity.

**CONCLUSIONS**

A review of the relevant literature,laws and analysis of empirical data demonstrates that current practice of natural resource valuation leads to under valuation and promotes rural poverty in the Niger delta and other affected communities. The existing situation is manifestation of a nation that places equity at the back burner. It is also an eloquent manifestation of a society where people who profess to be professionalshavefailed to respond to the challenges of their time through the use of their intellect.

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