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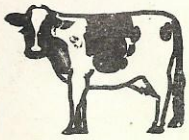
Sharing Concerns for the Future



4: Proportion of sampled Farmers who have currently or have previously Practised a soil conservation technique in the study area

Soil Conservation	Proportion of farmers currently engaged in the practice (%)	Proportion of farmers that gave up the practice (%)	Status of Practice
plant residue ement	8.6	11.2	Indigenous
ver crop	17.1	24.8	Non-indigenous
g	19.8	24.8	Indigenous
pping	0.0	0.0	Non-indigenous
g	0.0	0.0	Non-indigenous
pping	0.8	5.0	Non-indigenous
rtilizer	64.0	14.2	Non-indigenous
ation	5.1	6.3	Non-indigenous
low	50.8	0.0	Indigenous
cultivation	0.0	22.1	Indigenous
n tillage	60.9	14.7	Indigenous
ıge	35.5	9.6	Indigenous
across the slope	15.2	0.0	Indigenous
along the slope	1.2	8.8	Indigenous
anuring	0.0	0.0	Non-indigenous

: Field Survey, 1996/1997

5: The Predominance of Various Conservation Practices in Ogun State

		RANK			
		FIRST	SECOND	THIRD	FOURTH
ΓA	MOST COMON PRACTICES	Use of fert. (99%)	Minimum Tillage (89%)	Mulching; (11%)	Use of Cover Crops (8%)
	MOST COMMON PRACTICES	Minimum Tillage (61%)	Use of Fert. (50%)	Bush Fallowing (34%)	Zero Tillage (26%)
	MOST COMMON PRACTICES	Bush Fallowing (96%)	Zero Tillage (95%)	Minimum Tillage (58%)	Manure/Plant Residue Mgt (28%)
	MOST COMMON PRACTICES	Bush Fallowing (67%)	Use of Fertilizer (64%)	Minimum Tillage (41%)	Zero tillage (38%)
N	MOST COMMON PRACTICES	Fert. Use (64%)	Minimum tillage (61%)	Bush Fallowing (51%)	Zero Tillage (36%)

E: Field Survey Nov.-January (1996/97)
ntages in Parenthesis represent the proportion of farmers practicing oil conservation practice.

MONETIZATION OF FORESTS' SERVICE FUNCTIONS FOR SUSTAINABLE FOREST MANAGEMENT

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ABSTRACT

This paper examined the concept of monetization and its importance in valuation of the forest's social and environmental service functions, vis-à-vis its sustainable management. Various monetization techniques are highlighted and discussed. Some of these include surrogate price and replacement costs or costs avoided, value of production increases, opportunity costs, travel costs, hedonic pricing and contingent valuation method. (CVM).

The use of CVM is canvassed for, because of its highly flexible framework for the valuation of virtually all social and environmental benefits. It can also be easily adapted in developing and less developed countries, where inadequacy of data on socio-economic and environmental characteristics make the use of most other valuation techniques problematic. Keen interest in monetization of forest's non-market benefits, will ensure "holistic approach" to conservation of our natural environmental resources.

INTRODUCTION

Valuation of forest resources has been a concern in forestry for quite a long time. However, most valuation efforts until the 1950s were limited almost entirely to the timber component of the forest. (Kengen 1997 a) One of the early references advocating the need to value the broad range of forest goods and services occurred at the 5th World forestry Congress, held in the United states in 1960. It was stated that it was "not only through the production of wood, but by means of all other forest values that forests could contribute to national prosperity".(World Forestry Congress 1960).

Even though timber continued to be the major concern in forest valuation during the following decades, valuation of recreation, water, wildlife and other non-timber goods and services from forests were given increasing attention, particularly in United States, Canada and some European Countries. However until recently, relatively little attention was focused on developing comprehensive valuations of the different goods and services supplied by the forest, especially such environmental and social services which include carbon sequestration, biological diversity, watershed protection, mitigation of local and global earth warming, reduction in water, soil, air, glare and noise pollution, improvement of microclimate, improvement of visual image/physiognomy in and around human settlements, outdoor recreation, wildlife gaming and viewing and seclusion for spiritual meditation.

Monetization of forests' service functions is the process of ascribing monetary values or the act of economic valuation of the unquantifiable social and environmental services of the forest (Ajewole 2000). Monetization increases the available knowledge about the broad range of

values associated with forests, hence providing decision makers with useful information for making choices among alternative uses of the forest and land that meet the needs of various user groups. It can also provide useful information for the allocation of environmental protection funds, since it enhances comparison with other benefits that can arise from alternative use of funds expended on forests' social and environmental rehabilitating projects. Furthermore, it makes comparison between competitive and disparaging goods and services of the forest possible.

Monetization reveals in monetary terms, the people's real value for forests' social benefits, as well as the degree of concern for their environment, which can be observed from the estimation of their willingness to pay (WTP) functions. Those values if sufficiently large can offer supportive argument for the invaluable roles the forest plays in the provision of life support requirement and maintenance of environmental quality. This is because the key players involved in policy formulation as well as in the management and uses of the forest are favourably disposed and are very familiar with the meaning of gains and losses expressed in money terms.

Apparently, monetization is an important input and aid to the forest and the decision-making and policy formulation of other land use options. Barbier (1991) observes that the central theme of sustainable development should be the need to place proper values on the services provided by the natural environment. And moreover, that any economic analysis of tropical deforestation must be primarily concerned with the total economic value of the forests which consists of both the market and non-market goods and services. Chapter II of the conference document Agenda 21 of the United Nations Conference on Environment and Development (UNCED 1992) reports that one of the major reasons for widespread failure to practise sustainable forest management, deforestation and transfer of forests to other land uses, was the inadequate recognition and the under estimation of the values of the total package of goods and services, provided by forests at the local, regional, national and global level.

Similarly, Aina and Salau (1992) iterate that some of the major impediments of sustainable economic development in Nigeria include the inavailability of effective resource pricing instruments for resource conservation and nature protection. This is in addition to lack of appropriate damage costing and auditing, especially those that take into consideration damage to ecosystems. It is therefore, obvious that, appropriate pricing and or valuing of forest resources will take adequate care of the basic conservation themes which include resources scarcity, ecological balance, quality of life, and wasteful or destructive use of our forests. (Popoola, 1995). Hence the true value of the forest must include not only its productive value as a commodity such as timber, but also its non-timber use value: the indirect use values of the forest's environmental and social service functions as well as relevant existence values.

ECONOMIC VALUE OF FOREST

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 set of relationships (Brown 1984). All values within the economic context are anthropocentric by nature, i.e. they are human oriented and human

assigned, and are specific to a given context and situation (Kengen, 1997a).

Economic values associated with forests can be classified into four categories:

- Direct use values which include consumptive and non-consumptive use values,
- Indirect use values,
- Option values and
- Existence and bequest values

Kengen (op-cit) gives examples of each type of forest value and their characteristics below:

Direct use values associated with:

1. **Consumptive uses**
   - commercial and industrial market goods (fuelwood, timber, pulpwood, poles, fruits, animals, fodder, medicines, commercial non-wood products such as rattan.
   - Domestic non-market goods and services (fuelwood, non-commercial non-wood products, animals, skins, poles, fruits, medicinal plants).
2. ***Non-consumptive uses***
   - Recreation (jungle cruises, wildlife photography, trekking)
   - Science and education (forest studies).

3. ***Indirect use values are associated with:***
   - Environmental protection (against wind and water erosion)
   - Watershed protection, nutrient recycling and soil fertility, agricultural productivity enhancement
   - Gas (e.g. carbon dioxide/oxygen) exchanges, contribution to climate stabilization and carbon storage.
   - Habitat and protection of biological diversity
   - Aesthetic, cultural and spiritual values.

Option Values

People may value the option to use a forest in the future. For instance people may be willing to participate or pay for preservation of a particular forest/wildland, for the purpose of its possible use in the future. Although such values are difficult to measure in economic terms, they should be recognized in valuing the contributions of forests to human welfare.This concern can contribute to the conservation and preservation of forests.

Existence And Bequest Values

- People may value a forest or resource complex purely for its existence, without any intention of using it directly in the future. This includes intrinsic value.
- People may also value a forest as a bequest to their children.

VALUATION TECHNIQUES

The public good nature of the forest's service functions, as typified by their non-excludability (being freely available to everyone) and non-rivalry (consumption by one individual does not significantly diminish the quality available to another person), has inadvertently resulted in the failure of the market to reflect forest's social and environmental values. This according to

FAO (1995) can be attributed to the lack of adequate data on production functions, lack of adequate agreement on value-trade-offs criteria, against which values have to be measured and lack of resources to apply many of the time-consuming and complex methods developed. However, great efforts have been made over the years to derive the various measures of values and resultant valuation techniques appropriate for particular forest valuation situation. Subsequently, three types of measures have evolved for use in forest valuation:

a) Direct market pricing (DMP)

This entails direct observation of market transaction or the use of available past records of market exchanges, to determine the value exchange of particular goods and services. It employs the estimates of exchange values where buyers and sellers exchange goods and services for money or for other goods and services. Hence the "market price" refers to the value established in the market as a result of transaction using some form of commonly accepted currency (money), while the "market value" is the value established in the market as a result of transaction which does not involve the use of any form of currency, but only by barter. Direct market pricing is used to value all market goods and services from the forest unless there are market distortions in form of imposed minimum prices or ceilings on goods and services. Direct market pricing however, has a major limitation with regards to valuation of forest's service functions in that it somehow requires the existence of a market where the goods to be valued are exchanged.

b) Indirect market pricing (IMP)

This makes use of market prices of one good or service to infer values for other related non-marketed goods or services. It utilizes assumptions regarding proxy market conditions and how buyers and sellers will behave under different circumstances since it does not depend on people's direct responses to prices for the good or service being valued. Pearce et al(1989), FAO (1995), and Kengen (1997a) identified some of these to include surrogate prices or replacement or avoided costs, value of production increases, hedonic pricing, opportunity cost and travel costs. These are further discussed as follows:

c) Surrogate price and replacement costs or costs avoided

This method assumes that a good or service produced one way cannot have an economic value higher than the costs of producing the same good or service in another way. Similarly, a good or service that helps to avoid other costs cannot have an economic value higher than the alternative costs avoided. Thus the method makes use of market prices for close substitute as a proxy measure of value for the unpriced service being valued. Therefore, the value of the carbon sinking function of the forest cannot be higher than the cost of some other means of fixing the same amount of carbon. Also the maximum value of a watershed program which focuses only on sediment in a down stream reservoir is equal to the alternative market cost of dredging the reservoir of the additional sediment that would occur without the watershed management program. Replacement costs technique is useful in estimating indirect use benefits when ecological data are not available for estimating damage functions with better methods. It is also useful for estimating flood protection and water regulatory services supplied by forested watersheds, which produce natural barrages.

d) Value of production increases

The increased market value of production of goods and services with and without the change of activity being valued can sometimes be used to value that activity or change. Hence this method makes use of market prices of production increase to provide proxy measure of the value of one or a set of inputs. For instance, increased market value of crop production with a windbreak or shelterbelt, over what it would have been without a windbreak provides a proxy minimum gross value for the windbreak or shelterbelt. Associated costs of the windbreak/ shelterbelt are then subtracted to arrive at net value.

e) Opportunity costs

This essentially is a cost measure approach used to provide minimum value for a benefit. It involves the use of market prices for the best alternative forgone, as a measure of the minimum value for a good or service. Therefore, the minimum value of wilderness park is estimated on the basis of market priced value of the goods and services forgone, such as, timber, mineral and grazing.

f) Travel costs

This method according to Kengen (1997b) has been most commonly used to estimate the benefits of recreation and ecotourism. It estimates the willingness to pay for using a particular resource on the basis of expenditures incurred in using it . Hence it makes use of the amounts of time and money visitors spend traveling to a site, as the price proxies, in addition to participation or use rates and visitor attributes to estimate the recreational value of the site. Travel costs method (TCM) assumes that people will react equally to an increase in travel costs and admission fees. Thus at a certain level of costs increase, no one will use the park since there are other recreational options. This method therefore helps to calculate " optional" recreational fees. However, the use of TCM is computationally difficult, and susceptible to bias (e.g. double-visitation bias). Hence, it requires high expertise in economics and statistics to calculate, and apply the questionnaire, as well as analyse and compute the answers. Also, TCM estimated benefits reflect only the willingness to pay of those who use the facility or the environmental resource, which may not be a good representative sample; since it is not the willingness to pay of the society as a whole.

g) Hedonic pricing

This approach employs the market value differences for similar landed properties to reflect the value of some environmental service or cost that varies across the properties. It assumes that people choose specific goods because of their objective characteristics, for instance a property has a collection of attributes, some structural, some environmental and some aesthetics. Any of these attributes can affect the value of a property, depending also on individual need, priority or preference. Therefore differences in market values of a house near a green belt or situated within

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reen environment, and that of another house situated in a stuffy or non-reen environment can be used as a proxy value of the aesthetic and climate amelioration functions of forests in a built environment. Kengen (1997b) reiterates the potential of hedonic pricing for valuing certain forest functions such as micro-climate regulation and ground water recharge. He however cautions that its application to the environmental functions of forest requires that those values are reflected in surrogate markets. Its uses may also be limited where markets are distorted, choices are constrained by income, information about environmental condition and changes are not widespread, and data are scarce. These severally and collectively suggest difficulty in its utilization in the context of a developing/underdeveloped economy where all of these conditions are common place.

h) Non- market estimates

Non-market estimates make use of estimate values inferred from surveys of what people would be willing to pay (WTP) to secure some environmental changes or what they would be willing to accept as compensation to give it up. Demand for these non-market goods is established by first describing a simulated market to the respondents and then asking them directly to reveal their preferences in terms of some common denomination (Munasinghe 1993). Thus in the absence of real market, these surveys are carried out according to what is collectively termed "continent valuation" since the value elicited is contingent upon the simulated market or hypothetical situation presented.

i) Contingent valuation method (CVM)

In situations where markets for environmental goods and services do not exist, or are not well developed or where there are no alternative markets or market prices that can be used as proxies or direct measures of value, it may not be possible to value the social and environmental services of the forest by using the indirect market pricing techniques discussed above. In such instances, it is possible to question people directly about how they would react to a given situation, and based on their answers, the value of a good or service to each person can be determined and then extrapolated to determine the aggregate value of a good or service under consideration. This can be achieved by the use of surveys defined to estimate the respondent's willingness to pay (WTP) for particular goods or services.

Contingent valuation method (CVM) is the most notable among such survey approaches, which according to Bowers (1997) is the most widely used technique for obtaining monetary values of environmental problems. Loomis (1996) also iterates that CVM is the only method generally recognized as being able to capture the general public's total WTP for forest preservation. CVM surveys often ask the public, one valuation question requesting their WTP to protect the forest for several reasons including recreation use, the option for future use, existence and bequest values. Kengen (1997a) further reports that CVM has been successfully applied to the valuation of non-use values. The CVM approach requires postulating a change in environmental attributes such that it is believable to the individual and accurately depicts a potential change. This change must be fully understood by him, and the individual must also believe that the change might occur, and that his contingent [illegible] affect the environmental attribute.

Although, CVM is susceptible to various types of bias such as information bias, instrument or payment vehicle bias, starting point bias, hypothetical bias and strategic bias, (Schulze et al 1981, Pearce et al 1989, Dixon and Sherman 1991, Dixon et al 1994, Bowers 1997), the evolution of diverse and sophisticated improved variants of CVM such as bidding game technique, take it or leave it experiment, trade-off games, costless choice, Delphi technique and payment card technique, has minimized such biases. Also, in order to minimize biases, description of hypothetical situations must be as specific as possible and the alternative should be clearly outlined. Enough information must be given to allow the respondent visualize the alternatives without undue effort.

However, CVM has major advantages over the indirect method that employs market transactions, in that properly conducted surveys can often provide estimates of value that cannot be obtained by other means (Dixon et al 1994), it also offers a way to trace the demand curve for a public good that could not otherwise be gleaned from market data. More so, that indirect methods using market transaction cannot always be counted upon to provide complete measure of the non-use value or existence value which the CVM can capture. Moreover, CVM may be the only way to ascertain how the public values something (Hanemann 1994). The CVM may also be the best way to measure the effects of changes to the environment on social welfare, and can also be useful in validating estimates of consumer surplus obtained by more conventional methods. (Dixon et al, 1994). More importantly, CVM posses highly flexible framework for the valuation of virtually all social and environmental benefits, being universally applicable for the valuation of the various social and environmental services of the forest. Furthermore it is easily adaptable for use in the developing and less developed countries. Therefore, Chokor and Obadan (1991) suggest the use of CVM to establish the cost of environmental damage in Nigeria, based on the inadequacy of data on socio-economic and environmental characteristics that might be needed by other techniques in sufficient quantity.

In this regard, Ajewole (2000) made use of payment card format CVM to elicit public's WTP to a fund for reforestration and preservation of Ibadan urban forests and for greening Ibadan environment. He discovered that 94% of the respondents support the preservation and reforestation of the degraded forests of Ibadan. He also recorded a mean WTP estimate of ₦161 and ₦306 for individual and corporate respondents respectively. Furthermore, the aggregate estimate value of Ibadan urban forests' environmental service functions was estimated to range from ₦185,468,586-₦240,868,294 being the aggregate value of what Ibadan residents are willing to offer to respect reserves in the city, and to plant trees within and around the city for environmental conservation of Ibadan metropolis.

Ajewole (op-cit) submitted that the above WTP responses and amount could be a reliable predictor and indicator of future behaviour if a protection or conservation fund were actually initiated. In addition, they can equally serve as complimentary input for decision makers and forest managers to use in assessing public support for protection of these urban forests, or even as a measure of resistance and displeasure against conversion of these urban forest lands to other uses.

Moreover, these WTP responses can highlight and buttress the fact that failure to appropriately value non timber goods and services leads to excessive deforestation, conflicts with local communities, loss of economic value and environmental damage. He concluded that an ex-ante social and environmental impact study of the deforestation have revealed the public's position and would have expectedly guided the government in taking appropriate decisions on the fate of these forests.

CONCLUSION

The importance of monetization of forest's service functions as a conservation strategy in sustainable forest management cannot be over-emphasized, since it facilitates the capturing of the total economic value of the forest. Bringing into limelight the economic value of non-market forest benefits, monetization invariably becomes a veritable policy instrument for an "holistic approach" to the management of different land use options. Moreover, since inherent in it is the social valuation which often elicits the people's willingness to pay and participate in the management of these environmental resources, it can then be used as a way to elicit and establish public participation potential for forest management which happens to be a major focus in sustainable management of our forests.

Apparently, it becomes very imperative for forest managers and researchers alike to show keen interest and invest in economic valuation of non-market benefits, which often reflects the society's value vis-à-vis justification for conservation of our natural environmental resources.

BIBLIOGRAPHY

Aina, T.A. and A.T. Salau (1992): *The Challenge of Sustainable Development in Nigeria*. Published by Nigeria Environmental Study Team (NEST). 25-92.

Ajewole, O.I. (2000): Economic Valuation of Environmental Service Functions of the Forests in Ibadan Metropolis. M.Phil dissertation in the Department of Forest Resources Management, University of Ibadan, Nigeria 165pp.

Barbier E. (1991). Tropical Deforestation. In Pearce David (ed) Blueprint 2: *Greening the World Economy* 138-166.

Bowers J. (1997):*Sustainability and Environmental Economics: An Alternative text*. Addison Wesley Longman publications. 148-155.

Brown, T.C. (1984). *The Concept of Value in Resource Allocation. Land Economics*. 60:3:31-46

Chokor, B.A. and M.I. Obadan (1991): Environment and Economics in Nigeria. Towards a More Effective Resource Pricing and Conservation in J.A.T. Ojo (ed) *Proceedings of Mobilising Finance for Natural Resources Conservation*. 47-62.

Dixon, J.A. and P.B. Sherman (1991). Economics of Protected Areas: A New Look at Benefits and Costs. Earthscan Publications Ltd. 24-28.

Dixon, J.A., L.F. Scura, R.A. Carpenter and P.R. Sherman. (1994): *Economic Analysis of Environmental Impacts*. Earthscan Publications Limited London 70-81: 165-186.

FAO (1995). Valuing Forests: Context, Issues and Guidelines. *Forestry Paper 127*: 5-10

Kengen S. (1997a): Linking Forest Valuation and Financing. *Unasyl* 188:48, 44-49.

Kengen S. (1997b): *Forest Valuation for Decision Making: Lessons Experience And Proposals For Improvement*. FAO, Rome 1997. 35-52.

Loomis B.T. (1996): Measuring General Public Preservation value for Fore Resources: Evidence from Contingent Valuation Survey. In White W., P.C. Boxal, M.K. Lockert, W.E. Phillips and W.Z. Adamowicz (ed *Forestry, Economics and Environment. CAB International* 91-101.

Munasinghe, M. (1993). Environmental Economics And Biodiversi Management in Developing Countries. *Ambio 22* (2-3) May: 126-135.

Pearce, A.A. Markandya and E.B. Barbier (1989): *Blueprint for a Gree Economy*. Earthscan Publications Limited London: 51-92.

Popoola, L. (1995): Valuation of Tropical Forest Resources. Proceedings UNEP/UFOR Conference on Intergenerational Maintenance, held a FORIG. Kumasi, Ghana 72-87.

Schulze, W.D., R.C. d'Arge and D.S. Brookshire. (1981). Valuin Environmental Commodities: Some Recent Experiments. *Lan Economics*. 57:2, 151-171.

UNCED (1992): Proceedings of the United Nation's Conference or Environment and Development; in Rio De Janerio.

World Forestry Congress. (1960). Proceedings of the Fifth World *Forestry Congress*. Vol. I. Seattle, Washington, USA.