CHAPTER 7

WILLINGNESS TO PAY FOR SYSTEMATIC MANAGEMENT OF COMMUNITY FORESTS FOR CONSERVATION OF NON-TIMBER FOREST PRODUCTS IN NIGERIA'S RAINFOREST REGION

Implications for poverty alleviation

NNAEMEKA A. CHUKWUONE[#] AND
CHUKWUEMEKA E. OKORJI[##]

[#] *Centre for Entrepreneurship and Development Research and Department of Agricultural Economics, University of Nigeria Nsukka*
[##] *Department of Agricultural Economics, University of Nigeria Nsukka*
E-mail: nnachukwuone@yahoo.com

Abstract. Despite the importance of non-timber forest products (NTFP) in sustaining livelihood and poverty smoothening in rural communities, they are highly depleted and poorly conserved. Besides, conservation initiatives in Nigeria to date are rarely participatory. Even community forests, the main source of NTFP, are poorly conserved. Therefore, to enhance participatory conservation initiatives, this study determines the willingness of households in forest communities in the rainforest region of Nigeria to pay for systematic management of community forests using the contingent-valuation method. A multistage random-sampling technique was used in selecting 180 respondent households used for the study. The value-elicitation format used was discrete choice with open-ended follow-up questions. A Tobit model with sample selection was used in estimating the bid function. The findings show that some variables such as wealth category, occupation, number of years of schooling and number of females in a household positively and significantly influence willingness to pay. Gender (male-headed households), start price of the valuation, number of males in a household and distance from home to forests negatively and significantly influence willingness to pay. Incorporating these findings in initiatives to organize the local community in systematic management of community forests for NTFP conservation will enhance participation and hence poverty alleviation.
Keywords. non-timber forest products; systematic management of community forest; willingness to pay

INTRODUCTION

Non-timber forest product (NTFP) issues, especially its conservation, has attracted considerable global interest in recent years and is accepted as a veritable means of

Rob B. Dellink and Arjan Ruijs (eds.), Economics of Poverty, Environment and Natural-Resource Use, 117-137.

achieving poverty alleviation because of its role in livelihood sustenance, food security and environmental objectives such as biodiversity conservation. Non-timber forest products are goods of biological origin other than timber, derived from forests, other wooded land and trees outside forests (FAO Forestry 1999). In many parts of the world, non-timber forest products provide off-farm employment to a large part of the rural population and accounts for a large share of household income. These resources are essential, especially for the rural poor and women, and may provide them with the only source of personal income (Rodda 1991; Falconer 1996). In Nigeria, NTFP is a dependable source of income and food supply and it remains central in socioeconomic wellbeing and sustenance of the rural population (Osemeobo and Ujor 1999). Non-timber forest products are derived from wild animals, herbs, leaves, latex, gum, resins, ropes, fruits, seeds, fungi, fodder, forage, gravel, clay, limestone and natural salt. Generally, NTFPs are put into two broad categories, namely, flora and fauna species. Some plant species found in Nigeria include; *Gnetum africana, Gongronema latifolium, Ocimum gratisimum, Pterocarpus soyauxii, Treculia africana, Dacryodes edulis, Dennettia tripetala, Chrysophyllum albidium, Piper guineense, Garcinia kola and Irvingia gabonensis* (Osemeobo and Ujor 1999). The key resources of the region, according to Sunderland (2001), include *Irvingia gabonensis, I. wombulu*, *Gnetum africanum*, *Garcinia mannii* (chewing stick) and rattan canes.

Non-timber forest products provide off-farm employment to a large part of the rural population and account for a large share of household income. Estimates of the number of people who are dependent on NTFPs, for at least part of their income, range from 200 million in Asia and the Pacific to 1 billion worldwide (Van Rijsoort and De Pater 2000). In Nigeria, rural communities derive substantial revenue from the collection, processing and marketing of these NTFPs, which improves their economic status through poverty alleviation. Although not well documented, in 1996 in south-eastern Nigeria, 35.7% of the rural population collected NTFPs daily. It accounted for 94% of the total income from minor sources (Nweze and Igbokwe 2000), which has a considerable smoothening effect, especially during hunger periods. In Ghana, total household incomes obtained from non-timber forest products range between 49 and 87 percent, while in Cameroon extractive activities around one forest contribute to over half of the local income (Chege 1994). Income from NTFP is particularly important for poorer groups within the community, especially in places where there is unrestricted access to forest (Arnold 1996). Bisong and Ajake (2001) found that women in southern Nigeria depend heavily on NTFPs. For many women this is the only way to earn an independent income (Van Rijsoort and De Pater 2000). Generally, many Nigerians depend on NTFPs for food, fibre and herbal medicines. In recent times there has been a reasonable and noticeable shift from the earlier preference in favour of orthodox medicine to greater acceptance of traditional (herbal) medicines in Nigeria as in many other countries worldwide (Akunyili 2003). Over 90% of Nigerians in rural areas and 40% in urban areas depend partly or wholly on traditional medicine (Osemeobo and Ujor 1999). NTFPs also provide raw materials for large-scale industrial processing, including processing of internationally traded commodities such as foods and beverages, confectionery, flavourings, perfumes, medicines, paints and polishes. At present, at

least 150 NTFPs are significant in terms of international trade. They include honey, Arabic gum, rattan and bamboo, cork, forest nuts and mushrooms, essential oils and plant and animal parts for pharmaceutical products. Thus promotion of NTFPs can complement the objectives of rural development and appropriate forest management (Hammett 1993).

However, despite the importance of non-timber forest products in sustaining livelihood and poverty smoothening in rural communities, especially those living on the forest fringes of Nigeria, they are highly depleted and poorly conserved. NTFP is a diminishing resource because the land base is under pressure of depletion from agriculture and public infrastructure. In fact, a great percentage of Nigeria's luxurious vegetation has been removed and several species have become extinct (United Nations 2002). The World Rainforest Movement (1999) records show that between 70 and 80% of Nigeria's original forest has disappeared and presently the area of its territory occupied by forests is reduced to 12%. In the period between 2000 and 2005, Nigeria lost about 2,048,000 ha of forest (FAO 2005). Although Nigerian government established several forest reserves for conservation of forest resources, these forest reserves have been seriously neglected and received little or no improvement in terms of investment and management. The management of forests has been at low tide since the 1980s due to poor funding and overexploitation of the forests by government and rural communities. The management of forests is practically based on the rule of thumb and is not participatory as the rural communities are rarely involved. Therefore, no adequate records are kept on resource exploitation, yet management attention is focused mainly on timber harvest. Although recent forest management initiatives in several states are beginning to involve rural communities, such as the Cross River State established the Forest Management Committees involving local communities in the management of reserve areas, they are mainly involved in the control of timber exploitation. Free areas, which are mainly community forests and which are a major source of NTFP, are rarely accounted for in conservation initiatives. Notwithstanding that, some non-governmental organizations, for example, DFID and Living Earth Foundation, have helped several communities in Cross River State to implement forest management plans, trained some community members on cultivation techniques of bush mango and *Genetum aficanum*, helped communities establish nurseries and initiated micro-credit programs to help the local population in establishing forest-based enterprises. A lot still needs to be done as many forest areas are still left out. There is a need to involve the rural communities, especially in producing and implementing forest management plans, to ensure that the resources are conserved. It is equally important to know whether the efforts by donors can be sustained by the communities themselves as most of the projects have ended. In addition to this it will also be important to know the value the people attach to their NTFP resource. This study therefore determines the willingness of households in forest communities in the rainforest region of Nigeria to pay for systematic management of community forests using the contingent-valuation method (CVM) to ensure the conservation of plant species for NTFP. Systematic management entails an organized management whereby the community, through their local institutions, will regulate harvest levels and periods, engage in enrichment planting, monitoring

to avoid infiltrators, clearing of forest edges to avoid bush fires, etc. It is expected that systematic management will enhance the sustainability of NTFP in their forests and the income and general livelihoods of the community members.

Although there has been some previous research done on willingness to pay for community forestry, for example those by Mekonnen (2000) and Köhlin (2001), their studies focused on establishment and management of community wood lots. Based on our own literature research, no study has ascertained the willingness of the rural population to pay for systematic management of community forests/free areas for conservation of non-timber forest products.

The remainder of this chapter is organized as follows: Nigerian forest resources and management; theoretical basis for involving community people in participatory conservation of a common poll resource; study design and econometric approach and empirical analysis; findings and discussion; and conclusion.

NIGERIAN FOREST RESOURCES AND MANAGEMENT

Nigeria is rich with abundant forest resources; however, its forests are seriously threatened by deforestation and other environmental problems. FAO (2005) statistics indicate that 12.2% of Nigeria's land area, more or less 11,089,000 hectares, is covered with forest. Forest resources in Nigeria include timber, fuel wood, wildlife, inland fisheries and forage, which are physical and have market-determined values. Other outputs of forests are recreation, amenity and environmental protection, which all have non-market-determined value. An estimated 4,614 vascular-plant species have been recorded in Nigeria. According to Hutchinson and Dalziel (1936), these include 38 endemic species of the defunct Western and Midwestern area, 39 endemic species from what used to be the Northern region and 128 from the former Eastern region. On NTFPs resources, Okafor et al. (1994) identified 8 NTFPs from the mangrove swamp, 19 traded products from the moist forests, 17 from the southern Guinea savannah, 12 in the Sudan savannah and 56 for the whole country. Nigeria has a very rich fauna as a result of its diverse vegetation types. With 18 primate species, the Okwangwo Division of Cross River National Park has the highest diversity recorded at any single site in Africa, including the endangered Cross River Gorilla, *Gorilla gorilla* diehli. Eight major forest types are found in Nigeria, including savannah woodland, lowland rain forest, freshwater swamp forest, mangrove forest, montane forest, riparian forest, plantation (agriculture) and plantation (forest).

In order to manage and conserve forest resources, Nigeria established several conservation areas. Aminu-Kano and Marguba (2002) reported that Nigeria's first formal (modern) forest reserve was created in 1889. By 1950, forest reserves covered about 8% of the country's land area and gradually rose to 11% by 1980. Thereafter, an apparent lack of policy making to establish more reserves prevailed across the country, leading to the current era where several protected areas are being de-reserved. Four categories of protected areas are recognized in Nigeria, which are: national parks, game reserves, forest reserves and special ecosystem and habitats such as sacred grooves, lakes and streams. Additionally there are community

forests/free areas, which are forested areas that are not under strict management by the State Forestry Departments. They provide additional sources of forest products and services. In fact, they constitute the major part of Nigeria's forest resources and are considered to be very important for private forestry development.

Forest reserves are areas set aside by state governments for the protection of their timber, non-timber forest products, fuel wood and other forest resources in its domains. These forest reserves are owned by the state governments and are managed by the State Forestry Departments, which have professional and technical staff including forest rangers who are responsible for protecting the forest against trespassing and poaching. In some of the forest reserves, harvesting of resources is usually allowed under a permit or when special concessions are granted to local people. Poor management often results in a lack of control of resource utilization and conflicts among resource users (Olaleye and Ameh 1999). Currently Nigeria's forest resources are under threat due to poor funding and lack of proper management plans. In the period between 2000 and 2005 Nigeria's total deforestation rate was about 3.3% per year, meaning it lost an average of 410,000 ha of forest annually (FAO 2005). Even as the situation persists, most community forests/free areas are not under any form of management. Besides several projects for some forest communities, such as the project pioneered by Living Earth Foundation in Akamkpa Cross River State, Nigeria Conservation Foundation in Buru and Krumi Local Government Area of Taraba State, little has been done in putting community forest into any form of management. Some communities have Forest Management Committees but they are involved in controlling timber harvest and warding off poachers. In the Cross River State, the forestry regulations empower communities to exploit their non-timber forest resources. Forest management in Nigeria faces a great challenge, hence there is an urgent need to rebuild and restore the depleting resources in Nigeria. Employing a participatory approach involving local communities in the management of forest resources is a tenable option. Hence it is important to determine whether the local communities would be able to pay to manage their forest to conserve NTFP species. Willingness to pay and manage forests by local communities will have positive implications for forest and environmental conservation and poverty reduction in Nigeria.

THEORETICAL BASIS FOR INVOLVING THE LOCAL COMMUNITY IN FOREST RESOURCE CONSERVATION

Community-based forest management is becoming the main management technique used by governments around the world for enhancing the conservation and management of forest resources. Around one quarter of forests in developing countries is now under the control of local people (White and Martin 2002). This is often as a result of the transaction costs involved in forest management, issues of access and the benefits derived from community participation in management of forests as a common poll resource. In fact, due to the issue of cost involved in forest management, the benefits of common property resource and the fact that rural people depend on the resources derived from forest for livelihood, especially from

community forests where the rural people have access, governments around the world are devolving rights on forests entirely to local communities. Thus one of the theoretical bases for researching strategies of involving the community in the management of forests, a parting from the existing management framework where the government is the manager and decision maker, is the transaction-cost theory proposed by Ronald Coase (Coase 1937). The theory describes firms in organizational terms, that is, as governance structures. Coarse defined transaction costs as costs made by using the markets. Transaction costs are costs of seeking information, conducting negotiations, writing up contracts, and monitoring and enforcing compliance among economic agents. Transaction costs are the economic equivalent of friction in physical terms. In the transaction-cost theory, Coase (1960) compares the cost of information, planning, adapting, monitoring, coordination and enforcement of contracts under alternative governance structures. The basic insight of transaction-cost economics is to recognize that in the world of positive transaction costs, some forms of governance are better than others (Macher and Richman 2002). Governance structures that are weak and inefficient are weeded out over time by competitive pressures. Therefore, in order to cope with competition, organizations strive to establish efficient and optimal governance structures. Organizations that choose the wrong governance structure for transactions will incur high costs for a given level of output compared to organizations that choose a more efficient governance structure. Hence, the weaker organizations will eventually be driven out of the market. Within a small closed economy, in which there are few institutions and face-to-face transactions are possible, transaction costs are low due to the fact that economic activities are restricted to interpersonal exchanges. However, in a large complex economy, especially with weak institutions where laws and property rights (weak basic institutions) are not reliable and where public-funded entities act under sub-optimal governance structures (as the network of interdependencies widens), impersonal exchange processes give considerable scope for all kinds of opportunistic and counterproductive behaviour resulting in high transaction costs.

In Nigeria, like most developing countries, there are weak economic, political and legal institutions and a poor property-rights regime. When governance structures are weak and sub-optimal so that opportunistic behaviour, such as cheating, corruption and rent seeking are abound, it will create high transaction costs. In addition to this, marked increase in responsibilities of government with concomitant increase in budgetary provisions under stagnant economies has made the situation precarious. Currently the government can no longer provide the incentives it used to provide. Most ministries and parastatals no longer receive funding for capital projects. The forestry sector is not left out. Due to lean government finances and increased transaction costs, the forest sector, especially the forest reserves in Nigeria, have been seriously neglected, let alone forests outside forest reserves and community forests. In fact, there has been poor funding of the forest sector (United Nations 2002) even as Nigeria plans to increase the area of forest cover from 10 to 25% by 2010. Only about 10% of the budget allocated to the agricultural sector is made available to forestry development (Osemeobo and Ujor 1999). Most state forest sectors have not received funds for capital projects since the era of military governance in Nigeria. Forest workers are not paid their salaries resulting in

diminishing returns in their performance incentives. This condition even encourages corruption and unwholesome attitude and hence further increases transaction costs.

In this situation, forest resources, especially NTFPs, cannot be conserved. This may lead to loss of livelihood for those who depend on it. To improve the current situation, there is a need to evolve strategies to reduce transaction costs. Institutions that evolve and aim at reducing transaction costs are the key to the performance of economies (Meier 1995). Transaction costs are generally low in situations where the supply of services is competitive with reduced uncertainty. Involvement of private entities will help make the environment competitive as resources are used efficiently and responsibly by lowering transaction costs. Private involvement in projects can be in the form of private property, partnerships or other collective entities like common-property regimes where access to the use of resources is confined to members of a defined user group, thereby securing the group the same usage rights as private property. In several respects, a well-designed and well-functioning common property resource is like private property (Ostrom and Schlager 1996). In Nigeria, where there is no forest certification and where local people depend heavily on forest resources and own a community forest with access rights, privatization is out of place. Therefore to save the community forests, and sustain the benefits there, it is important to involve the local communities. Community involvement in the management of forest resources is a form of common property resource, which, if effective, will help in lowering transaction costs. In fact, in some ecological and social contexts (when costs of protecting private property are high or when the yields are low and very variable), a common property resource may simply have lower transaction and other costs and thus be more efficient compared to private property (Sterner 2003).

Also, the emerging issue of agrarian forests approach, which drops the distinction between community, state and market as separate and mutually exclusive entities (Sikor 2006), justifies the policy measure of involving the community in modern forest management. The agrarian perspective acknowledges that larger economic and political forces reach forest villages by means of states and markets. Local social relations, states and markets together influence forest relations as they shape the type of actors recognized, distribution of rights and access, objects considered valuable, and sources of authority providing legitimacy. The agrarian perspective emphasizes the linkages between local social relations and larger economic and political forces.

STUDY AREA, DESIGN AND ECONOMETRIC APPROACH AND EMPIRICAL ANALYSIS

Study area

The study was carried out in Cross River State, which is home to the main rainforest area in Nigeria. In fact, all of the country's remaining primary rainforest watersheds, covering about 7,000 km^2, are located in Cross River State (World Rainforest Movement 1999). Thus it is important to conserve the resources in these areas if Nigeria does not want to lose its remaining primary rainforests. Sunderland (2001)

observed that many of the species are over-harvested as harvests are uncontrolled and carried out in a highly destructive manner. There have been widespread reports of depletion of some of the species in the area, especially *Gnetum africanum*. Additionally extensive clearing of forests for cocoa planting and farming remains in the area. In addition to this, research undertaken as part of the first Overseas Development Administration (ODA)-assisted project (1992-1995) highlighted the importance of the harvest and trade of NTFPs to the rural communities of the Cross River State (Sunderland 2001).

Sampling and sample size

A multistage sampling technique was used when selecting respondents (households). In the first stage, two local government areas were randomly selected from the list of local government areas, identified as having forest resources in their state. In the second stage, from each of the two local government areas, five rural communities identified as 'having community forests' were randomly selected from the list of communities identified as 'having forest resources', giving a total of 10 communities. The identification of areas with forest resources was done with the help of officers from the Cross River State Forestry Commission. Finally, in the third stage, the list of households in each community was obtained with the help of community leaders. Twenty households were randomly selected out of the total 10 communities, giving a sample size of 200 households for the study. Due to some accessibility problems, actual data were collected from 180 respondent households only.

Study design and econometric approach

CVM was used in this study to determine the willingness per household head to pay for systematic management and improvement of community forests from which they harvest or extract NTFPs. The contingent-valuation method (CVM) measures both use and non-use values. This method uses a survey to determine the willingness to pay (WTP) for a particular environmental good or willingness to accept compensation (WTA) for a loss of a particular environmental or public good. It provides a direct method of measuring the value of natural resources without resorting to the market-valuation method. The CVM application can be split into six stages, namely, setting up the hypothetical market, obtaining bids, estimating the mean WTP and/or WTA, estimating bid curves, aggregating the data and the evaluation of CVM (Hanley and Spash 1993). The WTP figure can be derived through a bidding game, closed-ended-questions referendum, payment card and open-ended questions. CVM is more effective when the respondents are familiar with the environmental good or service and have adequate information on which to base their preferences (Munasinghe 1993). CVM is currently the only way to measure passive uses and has become one of the most widely used methods of non-market valuations (Brian et al. 1995).

The goal of contingent valuation is to measure the compensating or equivalent variation for the good in question. Compensating variation is an appropriate measure when the person must purchase the good, such as an improvement in environmental quality, while equivalent variation is appropriate if the person faces a potential loss of the good (FAO 2000). Both compensating variation and equivalent variation can be derived by asking a person to report a WTP amount either to obtain a good or to avoid a loss. Formally, WTP is defined as the amount that must be taken away from the person's income while keeping his utility constant (FAO 2000). This can be given in the form:

$$U(y - WTP, p, q_1; z) = U(y, p, q_0; z) \quad (1)$$

where U denotes the indirect-utility function, y is income, p is a vector of prices faced by the individual, and q_0 and q_1 are the alternative levels of the good or quality indexes (with $q_1 > q_0$ indicating that q_1 refers to improved environmental quality). CVM is subject to some bias, which includes strategic and compliance bias. Strategic bias occurs when respondents deliberately shape their answers to influence the study's outcome in a way that serves their personal interest, while compliance bias occurs when the respondents shape their answers to please either the interviewer or the sponsors, especially when they do not have a well-considered view of the survey topic (Mitchell and Carson 1989). Strategic bias is reduced if the sample has little or nothing to gain by undervaluing the good, while compliance bias will be reduced through careful development of the survey, training and supervision of fieldwork. Other forms of bias include starting-point bias (the starting bid may influence the respondent to understate or overstate actual WTP if a bidding process is used to determine WTP or WTA); vehicle bias (a respondent may be willing to pay more depending on the hypothetical, such as entrance fees or taxes); information bias (the way information on the hypothetical program is presented, including its sequence, can affect respondent's WTP or WTA); hypothetical bias (results from a hypothetical situation may not reflect the choice a respondent would make in a real situation); and operational bias (the fact that the operating conditions in the hypothetical program may not approximate actual market conditions may bias result). However, not withstanding these biases, proponents' argue that through proper survey design and implementation, CVM is a reliable means to measure the use and non-use values of natural resources. After two months of study, a panel convened by the National Oceanic and Atmospheric Administration of the U.S. Department of Commerce in 1993 and co-chaired by two Nobel laureates in economics, concluded: "CV studies can produce estimates reliable enough to be the starting point of a judicial process of damage assessment, including lost passive values".

The use of WTP in this study is based on the property-right structure. Community forests could be considered a quasi-public good. It satisfies one of the features of a public good by being non-excludable but rivalrous. Non-excludability applies when it is impossible or at a high cost to prevent those who have not paid for the product or service from benefiting from it, while rivalry applies when the use or

consumption of a good or service reduces the supply available to the others (Feldman 1980; Kessides 1993; Umali-Deininger 1997). Pure public goods are non-excludable and non-rivalrous. For community forests (a common-property regime), some benefits accrue to the individuals directly, e.g., NTFPs, while some are indirect, e.g., soil conservation and carbon sequestration. Also, it is difficult (only at a high cost) if not impossible to exclude individuals who have not paid for a common resource from using it. Therefore, given the property-rights structure, one would not know the value rural people attach to community forests.

Furthermore, some scepticism has been expressed in the use of CVM in developing countries, especially due to their low income and illiteracy. However, it has been shown by a number of studies that CVM can actually be meaningfully applied to developing countries (Wittington 1996; Georgiou et al. 1997). CVM has also been applied in forestry issues as by Mekonnen (2000) in the valuation of community forests in Ethiopia; Köhlin (2001), who looks into WTP for social forestry in Orissa, India; and Lynam et al. (1991), whose study was on WTP for environmental services from trees on communal land in Zimbabwe. Others are Kramer and Mercer (1997), who used CVM to estimate the U.S. residents WTP to protect tropical rainforests, which was estimated to be $1.9 billion; Garrod and Wills (1994) found CVM a useful tool in informing local-level management decisions, providing information on use and non-use values of forests accruing to members, values of new additional reserves of different habitat types and the income generation potential for a new conservation program.

The value-elicitation format used was discrete choice with open-ended follow-up questions. Although the dichotomous-choice format is a common elicitation method, the use of an open-ended follow-up question to a binary (closed-ended) one has been proposed and used by Mitchell and Carson (1989). In addition, Green et al. (1995) argue that a binary question with open-ended follow-up questions provides far more information on WTP and information on plausibility of responses than alternatives such as the double-referendum method. Generally, introduction of follow-up questions to the dichotomous-choice payment question helps to improve the precision of the WTP estimates (FAO 2000). Also, the idea of unfamiliarity with market scenarios is not always a problem, particularly when open-ended questions are presented as a follow-up to a binary question (Mekonnen 2000). In fact, this type of elicitation format is closer to what the respondents are familiar with as it mimics a bargaining process in which the respondents as buyers of a commodity would first expect the price to be stated by the seller and then after some bargaining would decide on a final amount he or she would pay, as obtained in developing countries. Mekonnen (2000) applied this elicitation format in the valuation of community forestry in Ethiopia, and Köhlin (2001) applied it in contingent valuation in social forestry in Orissa, India.

Before the actual field survey, focus-group discussions were organized for a group consisting of women only and a combined group of men and women from two randomly selected communities out of the communities used for the study. The focus group discussed issues on activities of rural people in NTFP conservation in community forests and gender roles. The findings from the focus-group discussions guided the wording of introductory speech painting the market scenario and

payment vehicle in the CVM question. Also, before the actual field survey, a pilot study was done using 30 randomly selected households, using an open-end CVM format. The starting prices of the discrete-choice question in the actual field study were based on answers to the open-ended questions in the pilot survey. The starting prices used were N300, N500, N700 and N1000 (the official exchange rate at the time of interview was $1 to N132.00) per year. The prices were assigned randomly to the respondents. In the CVM questionnaire, the scenario and payment vehicle, which was contribution to a community common fund/purse, were described to the respondents. Also, because of the assumption that several rural people experience cash constraints, they were given an option of payment in kind or contribution of labour for forest maintenance. Individuals who indicated that they were not willing to pay were asked the reason for not willing to pay. In the description of market scenario to the respondents in the CVM, specific management types/activities were not included; this may have affected their WTP bids. However, the focus-group discussions showed that they were familiar with some level of management; the local management in existence in the communities was presented elsewhere in this work. In addition, the study did not aim to identify a particular system of management but to find out if people of the community would pay to enhance NTFP conservation to sustain livelihoods. In addition to the CVM questions, data were collected on the socioeconomic attributes of the respondents and the existing management institutional framework available for forest management in the communities. Data collection was done with the help of trained research assistants.

Empirical analysis and model specification

Before performing the model estimation, the data were checked for valid and invalid responses. Invalid responses include protest zeros, outliers and cases where the maximum willingness to pay is less than the accepted starting price. Protest zeros were those who protested to WTP questions. They were determined based on the statement the respondent made in his/her response to the follow-up questions to the valuation question. Some of the responses of those categorized as protest zeros include: pay what?, the forest is free, the money will not be used properly, the forest belongs to my forefathers, nobody can handle things belonging to the public well, the government will take advantage of us, the forest is not planted by anybody and no good accountability, among others. It is important to note that not all those who gave reasons for not willing to pay are protesters. Outliers include those whose WTP was over 5% of their income (or referred to as (-trimmed means in Freeman 1993) and well above the maximum starting price to be used. From the analysis of responses to the valuation question, out of the 180 questionnaires completed, 25% (45) were considered to have invalid responses. Out of the 45 respondents, 50% protested, 33.3% were cases where the maximum WTP was lower than the accepted starting price, while 16.7% were outliers.

Ordinarily, in estimating the determinants of WTP, the most convenient approach would be to discard the invalid responses and use the valid ones. However, since there is no way to determine if the sample remaining after excluding the

invalid responses is a random sample, although the initial sample was a random one, discarding the invalid responses could lead to sample selection bias. This, in turn, could lead to inconsistent parameter estimates of the valuation function to be used to test the theoretical validity. Additionally the estimated benefits measures and hence the aggregated values may also be biased. Therefore, to guard against inconsistent estimates of the parameters due to possible sample selection bias, the means of variables of the valid and invalid response groups were compared using t-statistics to find out whether discarding the invalid responses is justified. Differences in the means will warrant the use of a selectivity model for estimation. The result of mean differences is presented in Table 1.

Table 1. *Mean comparison of some variables for respondents with valid and invalid responses to the valuation question*

Variable	**Mean for valid responses**	**Mean for invalid responses**	**t-statistics**
Starting price	505.93	537.78	-0.86
Age	48.01	46.31	0.73
Number of years of schooling	10.67	8.22	2.74***
Occupation (farming)[a]	0.39	0.78	-4.72***
Proportion of food	4.96	3.96	2.74***
Distance	4.37	5.32	-2.90***

*** indicate significance at 1% level of probability
[a] 1 if occupation is farming; 0 otherwise, civil servant
Source: Computation from field survey data 2005/06

The result of mean comparison shows that the means of the variables of respondents with valid and invalid responses were significantly different at 1% level of probability. The variables include number of years of schooling, occupation (farming), distance to forest from home (km), and proportion of household food that is from NTFP. Thus the significant differences found justify the use of a sample selection model.

Hence a sample selection model (Heckman 1979) was used for the empirical estimation of the bid function. Willingness to pay was censored at zero for households that give valid responses. The estimation was done based on maximum-likelihood estimates, since the estimates obtained using Heckman's two-step estimation procedure, where OLS is used in the second step, would be inefficient and inconsistent (Green et al. 1995) due to the censoring. A tobit model with selectivity (Green et al. 1995) was used to examine more rigorously whether there is a difference between the valid and invalid responses and at the same time estimate the factors that influence the maximum amount willing to pay conditional on being a valid response. The model used takes the form:

$$\begin{aligned} &Y^* = \beta^1 X + \varepsilon \\ &Y = 0 \text{ if } Y^* \le 0, Y^* < T \\ &Y = 1 if Y^* > 0, Y^* \ge T \\ &and \ \mathrm{Y} = Y^* \text{otherwise} \end{aligned} \tag{2}$$

$$\begin{aligned} &Z^* = \alpha^1 V + U \\ &Z = 1 \ if \ Z^* > 0 \\ &and \ Z = 0 \ if \ Z^* \le 0 \end{aligned} \tag{3}$$

where Y is a vector of WTP that is censored at 0; T is the offered start price; X is matrix of explanatory variables that are hypothesized to influence WTP; Z is a vector of a dummy variable which is 1 when the observation has a valid response and 0 otherwise; V is a matrix of explanatory variables that may influence the probability of giving a valid or invalid response; α and β are vectors of unknown parameters to be estimated corresponding to the matrix of explanatory variables V and X, respectively; ε and μ are error terms that could be correlated with correlation coefficient ρ; and Y^* and Z^* are unobserved or latent variables corresponding to Y and Z, respectively. Y values are observed when Z equals l. The existence of selection bias would be confirmed if there is correlation between the error terms of equations (2) and (3) as measured by estimates of ρ and its standard error, hence making the use of tobit model with sample selection appropriate. The outcome equations deal only with individuals that made a valid response, that is, that have positive WTP.

DATA DESCRIPTION, RESULTS AND DISCUSSION

Data description

The result of descriptive statistics of the socioeconomic variables used in the analysis is presented in Table 2. Some of the variables measured household characteristics expected to influence WTP. These include household size, wealth status of the respondents, age and sex of the household head and occupation. The number of males and females in the household was included to ascertain whether gender composition of household influenced WTP. Based on the role of women in forest product collection as found out in the focus-group discussions, it is expected that the number of females in a households will positively influence WTP.

Table 2*. Value means and standard deviation of the variables*

Variable	No of observations	Mean	Standard deviation	Min.	Max.
Start price	180	513.89	215.53	300	1000
Gender [a]	180	0.92	0.28	0	1
Age	180	47.59	13.10	26	77
Age^2	180	2445.94	1351.01	676	5929
Any existing form of forest management	180	0.33	0.47	0	1
Occupation (Farming) [b]	180	0.48	0.50	0	1
Number of years in school	180	10.07	5.33	0	18
Distance to forests	180	4.61	1.93	1	10
Cultivation	180	0.72	0.45	0	1
Wealth category 2[c]	180	0.29	0.46	0	1
No of males in household	180	3.88	2.56	1	16
No of females in household	180	3.34	2.66	1	18
Valid amount willing to pay	135	582.59	433.28	0	2000
Valid amount if start price was accepted	113	696.02	380.73	300	2000
WTP if valid amount was equal to start price	58	465.51	179.23	300	1000
Valid-Invalid	180	0.75	0.43	0	1

Sample Size = 180
[a] 1 if Gender is male ; 0 otherwise (female)
[b] 1 if occupation is farming; 0 otherwise, civil servant
[c] 1 if wealth is medium; 0 otherwise, low
Source: Field survey data 2005/2006

Wealth categories were determined based on ownership of materials that communities use. These were initially obtained through key-informant interviews. Based on the information given by the key informants, who were individuals who had lived in the communities for five years, household heads owning a large cocoa farm (above one hectare), a compound/house of his own, wife and children, a university diploma and a large banana/plantain farm (above one hectare) were categorized as 'high wealth'. Household heads who own either a large cocoa farm or a large banana/plantain farm (above one hectare), a compound/house of his/her own, wife and children were categorized as 'medium wealth', while household heads with a small cocoa farm or a small banana farm (less than one hectare), a compound of his/her own and wife and children were categorized as 'low wealth'.

Starting prices were also included to check whether the responses were influenced by the starting prices. A measure of access to the forests, distance from home to forests where NTFP are normally collected, was also included. Also, when the household food consumption is shared into ten parts, the part that is from NTFP was also included to ascertain whether household demand for NTFP influences WTP. Furthermore, the number of years of schooling of the household head and occupation were also included. It is expected that those who have an occupation that involves entering the forest often, for example, farmers, would be more willing to pay. A household involvement in conservation of private NTFP resources was captured by the cultivation variable. The variable ascertained whether a household was involved in cultivation of NTFP or not. The variable to capture the existence of forest management in a community was also included in the model. The existence of any form of forest management was included as a dummy variable. The mean amount that those who gave valid responses were willing to pay was N582.59 ($4.55) annually.

Institutional approach to existing forest management in the study area

Out of the 180 respondents, 97.8% indicated that they have access to forests in their communities anytime. Only 29.4% indicated that they have an organized form of managing forests. Thus, organized forest management is non-existent in most of the communities. Among those who indicated that they have some organized form of management practices, different approaches are employed across communities. Some of the respondents indicated that forest management committees are established to take care of timber harvesting. Village elders select youths who are organized to secure the forest area while in some communities the selected committee sells mainly timber and renders account to elders. Furthermore, some have a land committee who also take care of forests by collecting rent from timber exploiters. In fact, management is mostly for timber, however, they have regulations for the collection of some NTFP.

Results and discussion

The results of the sample selection model are presented in Table 3. The results show that the ρ was significantly different from zero, thus justifying the use of a sample selection model as discarding the invalid responses will lead to sample selection bias. In estimating the bid function, different variables from the ones listed in Table 2 were used in the selection and outcome equation. The preferred model based on the likelihood ratio test and the z-test is presented in Table 3. The table shows the selection (probability of valid WTP) and outcome (size of WTP) equations.

The result shows that some variables significantly influenced having a valid or invalid response. Considering that the age variable was included in the selection equation in both linear and quadratic forms, the result shows that age had a significant and negative effect on making a valid response up to the age of 45 years (X=- β_1/2 β_2; where β_1 = -0.181 and β_2 = 0.0020), after which the effect becomes

positive. Thus being less than or equal to 45 years decreases the likelihood of making a valid response, but after the age of 45 the likelihood of making a valid response increases. Invariably, individuals after the age of 45 are more likely to make a valid response. The tendency of making a valid response also increases with the household head being from a community where there is an existing form of forest management. This could be because of the fact that they are already more aware of the gains of organized management.

Some variables, on the other hand, influenced the amount of willing to pay subject to being a valid response. It is important to note that the coefficient for the variables that appeared in the outcome equation but did not appear in the selection equation, is the marginal effect of one unit change in that variable on the dependent variable (valid amount WTP). The variables which appeared only in the outcome equation and which positive or negatively influenced valid amount WTP are gender, occupation (farming), number of years in school, wealth category 2, distance to forests where NTFP is collected, number of females in the household and number of males in the household. Gender had a negative and significant effect of valid amount WTP. This suggests that females were more likely to pay for organized/systematic management than males. Previous studies, for example, Bisong and Ajake (2001), have shown that women depend more on NTFP, thus this could be the likely reason for WTP exhibited by females. Responses from the focus-group discussion organized as part of this study show that men do not normally collect NTFP and as a result they may less likely be interested in the conservation of the resource compared to women. A household head being a farmer as against being a civil servant was positive and significant in the outcome equation showing that farmers are more willing to pay than civil servants. In addition, number of years of schooling and number of females in a household positively influenced WTP. The positive and significant effect of number of years of schooling shows that increased education would have a positive effect in involvement of the community in the management and conservation of a common poll resource.

Table 3. *Parameter estimates of the sample selection model*

Variable	**Selection equation results (probability of valid WTP)**	**Outcome equation results (size of WTP)**
Start price	-0.000063	1.162***
	0.00047	0.149
Gender [a]		-393.212**
		174.553
Age	-0.181***	0.823
	0.060	2.554
Age^2	0.0020***	
	0.0006	
Occupation (Farming) [b]		427.346***
		79.394
Any existing form of forest management [c]	0.535**	50.171
	0.231	58.890
Production [d]		-86.131
		64.845
Number of years in school		42.477***
		7.930
Wealth category 2		142.321**
		55.794
Distance to forests		-33.514**
		16.812
Number of males in household		-48.745***
		15.010
Number of females in household		55.625***
		12.977
Constant	4.227***	-32.273
	1.413	258.399
Rho (ρ)	-0.817***	
	0.107	
Sigma	320.253***	
	28.879	

Variables in parenthesis are standard errors
Number of observations = 180, censored = 45, uncensored = 135
Log likelihood (full model) = -1040.343
LR test of indep. eqns. (rho=0): chi2(1) = 5.77 prob > chi2 = 0.0163
***, **, indicate significance at 99% and 95% levels, respectively
[a] 1 if gender is male ; 0 otherwise (female)
[b] 1 if occupation is farming; 0 otherwise, civil servant
[c] 1 if any forest management, whether organized or not, exists in the community, 0 otherwise
[d] 1 if household produces NTFP; 0 otherwise
Source: Field survey data 2005

This suggests that household heads who have more schooling and those who have more females in their household are likely to pay more for conservation of a common poll resource. Wealth category 2 was positive and significant in the outcome equation suggesting that households in the medium-wealth category are likely to pay a higher amount compared to those in the low-wealth category. Households in the medium-wealth category have more possessions, therefore they are expected to contribute more to organized forest management for NTFP conservation. The negative and significant effect of the number of males in households suggests that households with more males are less likely to pay for management of community forests for conservation of NTFP. Distance to source of NTFP negatively and significantly influenced WTP. This suggests that households that move a long distance to collect NTFP are less likely to pay for organized community forest management. Thus, poor access to a resource is a disincentive for conservation.

Moreover, the variable that appeared in both the selection and outcome equation and which had a significant influence on a valid amount willing to pay is start price. Usually, the coefficient in the outcome equation, for a variable that appeared in both equations, is affected by its presence in the selection equation as well. Hence, the coefficient of the significant variable in the outcome equation is not the marginal effect of a unit change in that variable on WTP. However, the marginal effect of each of the K^{th} element of the variable on the conditional expectation of WTP is derived after which the mean value is calculated. The equation for deriving marginal effect of the K^{th} element of the variable is $\beta_k - (\alpha_k * \rho * \sigma_n * Dpr)$ where β = coefficient of the variable in outcome equation; α = coefficient of the variable in selection equation; ρ = rho (correlation between error terms in the two equations); σ = sigma, which is error from the outcome equation; and *Dpr* = inverse mills ratio plus the probability of being selected. Based on the above formula, the mean of the corrected coefficient for start price (corrected coefficient shows the marginal effect of the variable on the conditional expectation of WTP) is 1.169; the standard deviation is 0.002 while the maximum and minimum values are 1.162 and 1.172, respectively. Thus, the average β is close to the estimated β. The result generally shows that start price positively and significantly influenced WTP subject to having made a valid response. The positive and significant starting price for the outcome equation suggests that there could be a significant starting-point bias. It is important to note that there are no reliable methods to deal with starting-point bias. Mitchell and Carson (1989) noted that there is no generally valid method to compensate for the effect of starting-point bias.

CONCLUSION

This study used the contingent-valuation method (CVM) to ascertain the determinants of willingness to pay (WTP) for organized management of community forests for non-timber forest product (NTFC) conservation. A Tobit model with sample selection was used in estimating the bid function so as to guard against the bias that may result from excluding the invalid responses to the CVM questions. The

findings show that the mean amount a household was willing to pay annually for systematic management of community forests by community members was N582.59 ($4.55). Some variables, which include wealth category (medium wealth as against low wealth), occupation (farming as against civil servant), number of years of schooling and number of females in a household positively and significantly influenced WTP. Gender, number of males in a household and distance from home to forests negatively and significantly influenced WTP. Hence, to ensure conservation of NTFP resources and to facilitate poverty alleviation, the rural communities in the rainforest region should be organized for the management of community forests as the rural people are willing to pay and contribute to organized management of NTFP resources. The issue of organized/systematic management should be incorporated in the forestry act that is under review. The Ministry of Environment and State Forestry Commissions should institute policy initiatives to encourage communities to organize themselves. Policies to encourage collective action for resource conservation could be in the form of assistance for communities that have organized themselves for systematic management of forests for conservation of NTFP. Such assistance could be in form of increasing the percentage of forest permits remitted to the communities, provision of credit facilities and development of forest management plans especially focusing on NTFP management and conservation for community forests among others. The management plans should indicate that there would not be government intervention and that the communities will pay to facilitate management. However, introduction of payment would be gradual, otherwise those who may be indifferent or who do not have capacity to pay will opt out, for example, those who do not derive much of their household food from NTFP, non-educated people in the community and non-farmers. In organizing them, households with some wealth possessions as indicated by the wealth items of those with medium wealth, women-headed households, those with more females in the household and those whose household head has undergone some years of schooling and who are engaged in farming should be considered potential contributors and supporters of organized management of community forests for NTFP conservation. Particular attention should be paid to women who have shown to be more willing to pay for systematic management. In fact, in several previous studies women have been found to be major users of forests for NTFP collection. International and local non-governmental organizations can help in initiating organized forest management. This can be started with communities that already have some form of management, especially for timber exploitation. Incorporating the findings of this study in such initiatives will enhance participation, conservation of NTFP and hence poverty alleviation.

ACKNOWLEDGEMENTS

The authors gratefully acknowledge the financial support from the African Economic Research Consortium (AERC) and the African Forestry Research Network (AFORNET).

REFERENCES

Akunyili, D., 2003. Registration and regulatory requirements for production and marketing of plant-based medicines in Nigeria: what you need to know. *In: Innovation Science and Bio-business Development Conference and Expo, HerbFest at Sheraton Hotels and Towers Abuja*.

Aminu-Kano, M. and Marguba, L.B., 2002. History of conservation in Nigeria. *In:* Ezealor, A.U. ed. *Critical sites for biodiversity conservation in Nigeria*. Nigerian Conservation Foundation, Lagos, 5-12.

Arnold, J.E.M., 1996. Economic factors in farmer adoption of forest product activities. *In: Domestication and commercialization of non-timber forest products in agroforestry systems*. FAO, Rome, 131-146. Non-wood Forest Products no. 9.

Bisong, F.E and Ajake, A.O., 2001. An economic analysis of women's dependence on forest resources in the rain forest communities of southern Nigeria. *Global Journal of Pure and Applied Sciences*, 7 (2), 345-350.

Brian, B., Copple, R. and Hoffman, E., 1995. The use of contingent valuation methodology in natural resource damage assessments: legal fact and economic fiction. *Northwestern University Law Review*, 89, 1029, 1035.

Chege, N., 1994. Africa's non-timber forest economy. *World Watch*, 7 (4), 19-24.

Coase, R.H., 1937. The nature of the firm. *Economica*, 4 (16), 386-405.

Coase, R.H., 1960. The problem of social cost. *Journal of Law and Economics*, 3, 1-44.

Falconer, J., 1996. Developing research frames for non-timber forest products: experience from Ghana. *In:* Ruiz Perez, M. and Arnold, J.E.M. eds. *Current issues in non-timber forest products research.* Centre for International Forestry Research, Bogor, 143-160.

FAO, 2000. *Applications of the contingent valuation method in developing countries: a survey*. FAO, Rome. Economic and Social Development Paper no. 146. [http://www.fao.org/DOCREP/003/X8955E/X8955E00.HTM]

FAO, 2005. *State of the world's forests 2005*. FAO, Rome. [http://www.fao.org/docrep/007/y5574e/y5574e00.htm]

FAO Forestry, 1999. Towards a harmonized definition of non-wood forest products. *Unasylva*, 50 (198), 63-64. [http://www.fao.org/docrep/x2450e/x2450e0d.htm]

Feldman, A.M., 1980. *Welfare economics and social choice theory*. Kluwer Academic Publishers, Boston.

Freeman, A.M., 1993. *The measurement of environmental and resource values: theory and methods*. Resources for the Future, Washington.

Garrod, G.D. and Willis, K.G., 1994. Valuing biodiversity and nature conservation at a local level. *Biodiversity and Conservation*, 3 (6), 555-565.

Georgiou, S., Whittington, D. and Pearce, D., 1997. *Economic values and the environment in the developing world*. Edward Elgar, Cheltenham.

Green, D., Jacowitz, K.E., Kahneman, D., et al., 1995. *Referendum contingent valuation, anchoring and willingness to pay for public goods.* A paper presented at the the August 1995 World Congress of Econometric Society, Tokyo.

Hammett, A. L., 1993. Non-timber Forest Products: Profits and Panacea. *Focus on Jaributi*, 2-3.

Hanley, N. and Spash, C.L., 1993. *Cost-benefit analysis and the environment*. Edward Elgar, Aldershot.

Heckman, J.J., 1979. Sample selection bias as a specification error. *Econometrica*, 47, 153-163.

Hutchinson, J. and Dalziel, J.M., 1936. *Flora of west tropical Africa*. Crown Agents, London.

Kessides, C., 1993. *Institutional options for the provision of infrastructure*. World Bank Discussion, Washington. World Bank Discussion Paper no. 212. [http://www-wds.worldbank.org/servlet/WDSContentServer/WDSP/IB/1993/09/01/000009265_3970311122301/Rendered/PDF/multi_page.pdf]

Köhlin, G., 2001. Contingent valuation in project planning and evaluation: the case of social forestry in Orissa, India. *Environment and Development Economics*, 6 (2), 237-258.

Kramer, R.A. and Mercer, D.E., 1997. Valuing a global environmental good: US residents' willingness to pay to protect tropical rain forests. *Land Economics*, 73 (2), 196-210.

Lynam, T.J., Campbell, B.M. and Vermeulen, S.J., 1991. *Contingent valuation of multipurpose tree resources in the smallholder farming sector, Zimbabwe*. Environmental Economica Unit, Department of Economics, Göteborg University, Göteborg.

Macher, J.T. and Richman, B.D., 2002. *Transaction cost economics: an assessment of empirical research in the social sciences*. Georgetown University Working Paper.

Meier, G.M., 1995. *Leading issues in economic development*. 6th edn. Oxford Univerisity Press, New York.

Mekonnen, A., 2000. Valuation of community forestry in Ethiopia: a contingent valuation study of rural households. *Environment and Development Economics*, 5 (3), 289-308.

Mitchell, R.C. and Carson, R.T., 1989. *Using surveys to value public goods: the contingent valuation method*. Resources for the Future, Washington.

Munasinghe, M., 1993. *Environmental economics and sustainable development*. World Bank, Washington. World Bank Environment Paper no. 3.

Nweze, N.J. and Igbokwe, E.M., 2000. Non timber forest products in the rural economies of southeastern Nigeria. *Journal of Non-Timber Forest Products*, 7 (3/4), 145-155.

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), Abuja.

Olaleye, O.A. and Ameh, C.E., 1999. *Forest resource situation assessment of Nigeria: report of the EC-FAO partnership programme (1998-2002)*. Federal Department of Forestry, Abuja. Forestry Statistics and Data Collection no. AFDCA/TR/17. [http://www.fao.org/DOCREP/004/AB578E/AB578E00.HTM]

Osemeobo, G.J. and Ujor, G., 1999. *The non-wood forest products in Nigeria: report of the EC-FAO partnership programme (1998-2000)*. Federal Department of Forestry, Abuja. Forestry Statistics and Data Collection no. AFDCA/TN/06. [http://www.fao.org/docrep/003/X6695E/X6695E00.HTM]

Ostrom, E.J. and Schlager, E., 1996. The formation of property rights. *In:* Hanna, S., Folke, C. and Mäler, K.G. eds. *Rights to nature: ecological, economic, cultural, and political principles of institutions for the environment*. Island Press, Washington, 127-156.

Rodda, A., 1991. *Women and the environment*. Zed Books, London.

Sikor, T., 2006. Analyzing community-based forestry: local, political and agrarian perspectives. *Forest Policy and Economics*, 8 (4), 339-349.

Sterner, T., 2003. *Policy instruments for environmental and natural resource management*. Resources for the Future, Washington.

Sunderland, T., 2001. *Cross River State community forestry project: non-timber forests products*. Environmental Resource Management, London.

Umali-Deininger, D., 1997. Public and private agricultural extension: partners or rivals? *World Bank Research Observer*, 12 (2), 203-224.

United Nations, 2002. *Nigeria country profile: political and socio-economic situation*. United Nations Office on Drugs and Crime (UNODC). [http://www.unodc.org/nigeria/en/social_context.html]

Van Rijsoort, J. and De Pater, C., 2000. *Non-timber forest products (NTFPs): their role in sustainable forest management in the tropics*. National Reference Centre for Nature Management, Wageningen. Theme Studies Series / Forest, Forestry and Biological Diversity Support Group no. 1. [http://library.wur.nl/ebooks/minlnv/rapporten/982092.pdf]

White, A. and Martin, A., 2002. *Who owns the world's forests? Forest tenure and public forests in transition*. Forest Trends, Washington.

Wittington, D., 1996. *Administering contingent valuation surveys in developing countries*. International Development Research Centre, Singapore. Environment Economics Program for Southern and Eastern Asia Special Paper. [http://www.idrc.ca/uploads/user-S/10536144310ACF2D2.pdf]

World Rainforest Movement, 1999. *Nigeria: Cross River's forests need your help*. World Rainforest Movement. WRM Bulletin no. 29.