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CRITICAL FACTORS IN WILLINGNESS TO PARTICIPATE IN FOREST MANAGEMENT: THE CASE OF GAMBARI FOREST RESERVE, OYO STATE NIGERIA.

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ABSTRACT

The study investigated the factors that could motivate members of forest adjoining communities to participate in the management of Onigambari Forest Reserve, Oyo State, Nigeria. Stratified quota sampling was used to select one hundred and fifty-eight respondents among the local community members. Data processing was by simple statistics, chi- square test of independence and logistic regression analysis. Results indicate that application of financial incentives does not have significant effect on willingness to participate ($p > 0.05$), but the effects of non-financial incentives and sociological factors are significant ($p < 0.05$). Results of logistic regression show that age, educational status; incentive requirement (technical) and roles played in forest management have significant impact on willingness to participate in forest management with a log- likelihood ratio of 278.317 (X^2 tab.= 124.342; df.=138 and P= 0.05) . In view of the fact that socio-economic factors such as age; education; incentive requirement, tennurial rights, marketability of forest products and forest protection technics have significant effect on willingness to participate; it is recommended that government should embark on massive awareness campaign to educate the people on the benefits they stand to derive by actively participating in forest management. The practice of *taungya* should be encouraged in order to motivate landless strangers to participate in forest regeneration.. The forest reserve should be managed to supply multiplicity of goods and services for social acceptability and ecological sustainability. Community Associations should be encouraged to establish nurseries from which timber takers would be required to purchase seedlings for replacing felled trees.

Introduction

A forest is a resource from which valuable timber and other non-timber products could be drawn in perpetuity. For a forest reserve to fulfill its role as a "revolving fund", products removed from it have to be replaced by the process of forest regeneration. Increasing quantities of tropical forest produce are being extracted for export and local use but neither the users nor the forest authorities have ensured adequate regeneration or replanting. Obviously, forest services are usually insufficiently funded and staffed to cope with these problems while policy makers do not demonstrate sufficient political will to regenerate the

forest. According to Amakiri (1995), little or no systematic efforts had been made in Nigeria to implement an integrated rural development plan centered on forest resources.

Forest management has been defined by Osmatson (1968) as the management of social, economic and other factors that affect decisions about the forest. Implicit in this definition, is that effective forest management must consider the socioeconomic characteristics of the forest adjoining communities so as to properly understand the people- forest interactions. This could be achieved by involving the local communities in taking decisions which affect the forest and sharing the benefits there-from.

Community participation has often been seen as the involvement of the local people in development. It is an active process whereby beneficiaries influence the direction and execution of development projects rather than merely receiving benefit. Community participation in forest management is a means of widening the range and distribution of forest benefits by bringing the community members into decision making and the over-all management of forest resources (Feeney,1998). However, there are many political, economic, institutional and technical problems that need be overcome before all wood-hungry communities can reach their appropriate level of integration, and before all those lands that are and should be forested can be protected and managed.

Over the past decades, a large number of programmes have been launched and funded by states or Federal Governments or international agencies to promote tree growing in the rural areas of Nigeria. Many of these field projects have however not achieved their targets. The objective of the projects and method of implementing them are not all-inclusive. This is due to the fact that there is usually little or no consultation between the local community and the project initiators in most project cycles from identification to implementation to guarantee that project objective coincides with the people's aspirations. However, environmental damage due to removal of tree cover has reached unacceptable proportions in the study area and could only be curtailed if people were mobilized to participate actively in forest production, management and sustainable utilization. Gambari Forest Reserve is managed by the Oyo State Forestry Department. There are fifteen members of staff directly responsible for the management though with low management input. This has resulted in over-exploitation of the forest resources, frequent forest fires, numerous failure-spots, serious illegal felling and collection of fuel woods. These problems constitute a threat to biodiversity conservation in the forest reserve which used to be an abode of diverse species of both plants and animals but which is now becoming poor. Attempt to rehabilitate the degraded forest would require a complete overhaul of the management style so as to ensure the involvement of local communities. This study attempts to identify the factors that could pre-dispose forest community members in the rehabilitation of the forest reserve.

Study objective

The objective of the study is to examine the factors that will influence community members to participate in forest management planning and decision-making in the study area. The aim is to identify the factors which influence participation of the local people in forest management and the incentives necessary to encourage various stakeholders to participate in the management of Onigambari Forest Reserve.

Methodology

Data collection was mainly through the use of oral interview and questionnaire survey. Oral interviews were conducted with the community leaders. Preliminary information on the forest reserve were gathered through discussions with the Zonal Afforestation Programme Officer and Forest Supervisors at Oyo State Department of Forestry and the Zonal Forestry office at Jericho, Ibadan. Additional information was gathered from the files, records and resource persons in the state Department of Forestry.

The villages adjoining Gambari Forest Reserve were stratified into 7 zones according to the chiefdoms. Random sampling was used to select the households needed for the analysis. Twenty percent of the households in each of the zones were randomly selected for questionnaire administration. However, 100% sampling was carried out at both Ibusogboro and Oloowa (zone1) due to limited number of households. A total of 158 questionnaires were used for the study (Table 1).

Table1: Sample distribution of Selected Households In and Around Gambari Forest Reserve

Zones	Selected Communities	Estimated Number of Households	20% Random Sample	Percentage Sampled
1	Ibusogboro	24	24	100
	Oloowa	10	10	100
2	Onigambari	105	21	20
3	Daley north and south	78	17	20
4	Onipe	96	19	20
5	Mamu	200	40	20
6	Olubi	50	10	20
7	Onipannu	84	17	20
Total		647	158	-

Source: Field Survey, 2001.

The data generated were analyzed using frequency tables, chi-square (χ^2) and logit analysis. Chi square was used to investigate the level of dependence between willingness to participate and non –financial incentives on one hand, and community sociological factors on the other.

Logit analysis was further used to investigate the combined effects of community structural factors, such as age, gender, level of education, marital status, family size and so on ; on the willingness to participate in forest management.

Logit model specification

Logistic regression equation was employed to find out whether respondents' willingness to participate in the management of Gambari Forest Reserve (dependent variable) would be influenced by community sociological factors (independent variables) such as age (x_1), (gender) (x_2), educational level (x_3), marital status (x_4), family size (x_5), (ethnic status (x_6), incentive requirement(x_7).tenurial right (x_8), membership of community association (x_9), beneficiary status (x_{10}), marketability of forest products (x_{11}), awareness on sustainability (x_{12}), post-held in the community (x_{13}), cooperative society membership (x_{14}), selective/specific harvesters (x_{15}) wildlife mediators (x_{16}), watershed protection awareness (x_{17}), forest protectors (x_{18}), access to extension services (x_{19}).

The logistic regression equation is specified as follows:

Let Y= Dummy variable

If Yes, Y= 1

Otherwise, Y=0

$$P_i(Y=1) = \frac{1}{1+e^{-z_i}} \quad \text{...eqn.(1)}$$

$$P_i(Y=0) = [1 - P_i(Y=1)] \quad \text{... eqn.(2)}$$

Identity equation:

$$P(Y=1) + P(Y=0) = 1$$

$$P_i(Y=0) = (1 - P_i(Y=1)) = \frac{1}{1+e^{z_i}} \quad \text{...eqn.(3)}$$

$$\left[\frac{Pi(Y=1)}{[1-Pi(Y=1)]}\right] = \frac{1}{e^{-z_i}} \; ; \quad \text{...eqn.(4) ;but } \frac{1}{e^{-z_i}} = e^{z_i}$$

$$\text{So } \frac{P_i(Y=1)}{[1-P_i(Y=1)]} = e^{z_i} \quad \text{...eqn.(5)}$$

$$\ln_e\left[\frac{P_i(Y=1)}{[1-P_i(Y=1)]}\right] = Z_i \quad \text{...eqn.(6)}$$

$$Z_i = \ln\left[\frac{probability\ \ of\ \ yes}{probability\ \ of\ \ no}\right]$$

Hence the estimating equation:

$$Z_i = B_0 + B_1x_1 + B_2x_2 + \ldots B_n x_n + E_1$$

Where ; B_0 = constant; B_i.....B_n = estimated regression coefficient; X_1 ... ..X_{19} = independent variables; and E_i = Error or random distribution term.

Results and Discussion

The information gathered from the communities adjoining Gambari Forest Reserve show that males are more involved in farming and forestry activities than their female counterparts. This may be due to the physical strength required for the job. As shown in Table 2, 43.0% of the indigenes were willing to participate in the management of the forest reserve thus showing their sense of belonging and concern for the improved condition of the reserve. It must be remembered that the indigenes were the original owners of the forest land As generally assumed,the land had been stealthily taken away from them by the colonial masters and constituted into forest reserve thereby depriving the indigenes the traditional right to their land.

The indigenes would therefore naturally be eager to be involved in the management of the forest land which originally belonged to them with the aim of achieving a sense of belonging and probably benefit from the output of forest management.

Table 2: Participation in Forest Resources Management by resident status

Distribution	Response	Percentage (%)
Indigene (Willing)	68	43.0
Indigene (unwilling)	34	21.5
Migrant (willing)	41	26.0
Migrant (unwilling)	15	9.5
Total	158	100.0

Source: Field Survey, 2001.

Furthermore, the number of individuals with formal education who were willing to participate in forest management were more than those with no formal education. This could imply that educated individuals are better enlightened probably through the mass media or through interpersonal relationships with other people who have interest in forest conservation. People with no formal education may find it difficult to adopt new initiatives as the full implications may not be clear to them. Table 3 also shows that more of the people with secondary education than those with primary education were willing to participate; while the least came from those with tertiary education. The highly educated individuals may consider forestry activities inferior to their status and might prefer white collar jobs. Those with secondary education were largely job seekers who would be willing to take up forest management activities.

Table 3: Participation in Forest Resources Management by Educational Status.

Distribution	Response	Percentage (%)
No formal education (willing)	25	15.8
No formal education (unwilling)	15	9.5
Primary education (willing)	30	18.9
Primary education (unwilling)	22	13.9
Secondary education (willing)	45	28.5
Secondary education (unwilling)	8	5.1
Tertiary education (willing)	8	5.1
Tertiary education (unwilling)	5	3.2
Total	158	100.0

Source: Field Survey, 2001.

The percentage of non- stakeholders is higher (34.5%) than that of stakeholders in terms of willingness to participate (Table 4). Stakeholders are those already involved one way or the other in forest management or utilization The fact that more of the non- stakeholders were willing to participate in the management of the forest reserve may be explained by the eagerness of those who have been alienated from decision making to get involved for the possibility of deriving some benefit from the forest reserve.

Table 4: Participation in Forest Resources Management by beneficiary status

Distribution	Response	Percentage (%)
Stakeholders (willing)	53	33.5
Stakeholders (unwilling)	21	13.3
Non-Stakeholders (willing)	55	34.8
Non-stakeholders (unwilling)	29	18.4
Total	158	100.0

Source: Field Survey, 2001

Table 5 shows that access to forestry extension services was very low and many of those that had access to extension services were willing to participate in forest management. This underscores the importance of a well organised forestry extension service in the sustainable management of our forest reserves. It could well be that the unwillingness of the people who did not have access to information was as a result of their ignorance of the benefits accruable to them and the society at large if the forest was sustainably managed.

Table 5: Willingness to Participate in Forest Resources Management due to Access to Extension Services.

Distribution	Response	Percentage (%)
Access (willing)	35	22.1
Access (unwilling)	14	8.9
No Access (willing	33	20.9
No Access (unwilling)	76	48.1
Total	158	100.0

Source: Field Survey 2001.

Chi- square (χ^2) analysis shows that the effect of financial incentives was not significant ($\chi^2_{calc.} = 2.15$; $\chi^2_{tab.} = 7.81$, df. = 3; p = 0.05), revealing that financial incentives such as credit facility, cost-sharing and market/ price regulation had no significant influence on peoples' willingness to participate in the management of the forest reserve . On the other hand the effect of non-financial incentives was significant ($\chi^2_{calc.} = 10.25$; $\chi^2_{tab.} = 7.81$; df. = 3; p = 0.05). This indicates that provision of non-financial incentives like seedlings, technical assistance, availability of market and provision of employment would motivate peoples' participation in the management of the forest reserve rather than the financial incentives.

The effect of villagers' sociological factors was significant ($\chi^2_{calc.} = 15.9$; $\chi^2_{tab} = 11.1$; d.f. = 5; p = 0.05) which implies that project channelled through well-structured good leadership and creation of peasant organizations with support from outside will encourage community participation in forest management. This agrees with Zhang, (1997). The logit regression model had a calculated Pearson's chi-square of 278.317 and table values of 124.4 and 135.807 (df. = 138; at p = 0.05 and p = 0.01respectively) indicating a significant relationship between the independent and dependent variables.

The variables age, tenurial rights and availability of market for forest produce were found to have a highly significant impact on people's willingness to participate in forest management within the study area (Table 6). The fact that age had a highly significant effect on willingness to participate may be interpreted to mean that the people's interest change with age . While the older people may be more resilient and willing to participate in programmes within their home environment; the younger ones are likely to be restless with a lot of ambition . They would rather prefer to move to the urban centrer in search of white collar jobs.

Land is an important factor in forest management. As observed by Fotsman *et.al.*(1997),security of tenure is one of the major constraints to community participation in Africa. Those who are willing to participate in the management of the forest are mainly the

indigenes who have a stake in the forest land . As earlier pointed out , these people would be eager to participate in the management of their land.

Marketability of forest produce affects the attractiveness or otherwise of forestry projects. Many people would be willing to participate in the management of the forest in anticipation of some reasonable income from forestry activities. Thus the fact that this factor had a highly significant effect on willingness to participate in the management of the forest reserve is justified. Furthermore, educational level and incentive requirement were found to have significant impact (p = 0.05) on willingness to participate in forest management in the study area (Table 6). The status as a forest protection agent had a significant positive influence on willingness to participate in the management of Gambari Forest Reserve (p = 0.1). The level of resource insecurity in the forest reserve was quite high. It is therefore not surprising that many of the forest protection agents were willing to participate in the management of the forest reserve. They are an important stake holder in the forest reserve.

Table 6: Logit Regression Model Result

Community	Regression	Standard	Coefficients' Standard
Structural factors	Coefficient	Error (S.E)	Error
Age (years)	-0.03734	0.0071	- 5.2418** *
Gender (dummy)	- 0.03857	0.1549	-0.2492
Education level (years)	-1.03887	0.2206	-4.7088 **
Marital Status (dummy)	-0.39225	0.2546	-1.5402
Family size (dummy)	-0.02641	0.0541	-0.4880
Ethnic Status (dummy)	0.13377	0.1726	0.7752
Incentive requirement (dummy)	0.48317	0.1944	2.4843 **
Tenurial right (dummy)	0.6940	0.1501	4.6240***
Comm. Association Membership (dummy)	0.1774	0.1826	0.9715
Beneficiary status(dummy)	-0.02979	0.1451	0.2055
Marketability of forest produce(dummy)	-0.76390	0.0649	-11.7523***
Sustainability awareness (dummy)	0.28598	0.1821	1.5706
Post held (dummy)	0.11489	0.1935	0.5938
Co-operative society membership (dummy)	0.17286	0.1481	-1.20202
Selective/specific harvesting (dummy)	0.17307	0.1482	1.1667
Wildlife mediator (dummy)	0.19311	0.1544	1.16803
Watershed awareness (dummy)	0.05751	0.1686	0.3410
Forest protector(dummy)	0.58386	0.3195	1.8275 *
Access to Extension Services	0.02781	0.1478	0.1882

Source: Field Survey, 2001
Pearson's Chi- square = 278.317;
Likelihood ratio = 278.317
$X^2_{0.05}$;138 =124.342
$X^2_{0.01}$; 138 =135.807
* =Significant at 0.1
* * =significant at 0.05
*** =significant at 0.01

Management Implication of Results

The fact that more male respondents than their female counterparts were willing to participate in forest management could be explained by the fact that forestry practice is an activity that needs a lot of physical exertion and endurance; most of the females might not feel comfortable with it. There is need to encourage women to participate more in the management of the forest reserve.

Level of Education: The population's level of education is generally low, most of them have only secondary education. This may influence the disposition of the participants to acquisition of knowledge and the adoption of improved forestry practices, and technologies. However, this may be an advantage for forest management in terms of availability of unskilled labour.

Multiplicity of Benefits: Apart from timber harvesting, other benefits such as fuel wood gathering , leaf collection, snail collection, herb collection, charcoal - making , animal grazing , honey collection are also derived from the forest reserve. This multiplicity of benefits has a long-term effect on sustainable management of the forest. Benefits, which improve members' welfare, should be encouraged among the communities (FAO, 1978) as this will reduce pressure on the timber resources of the forest. The idea of multiple-use forest management has been canvassed by various authors (Mayers and Kotey,1995 Saint-Lauret, 1997 and Abramovitz,1998) as a way of gathering political support for sustainable forest management. This thus calls for a review of the management plan to ensure that all components of the forest ecosystem are taken into consideration with a view to increasing the number of interest group, which benefit from the forest reserve. This must, however, be carefully planned to ensure sustainability of the resources.

Watershed Protection: Most of the respondents interviewed claimed that rivers and streams within and around the reserved serve as sources of portable water for the communities and therefore were being adequately protected by the forest vegetation. This agrees with Oguntala (1993) who observed that forests protect watersheds and ensure regular supply of good quality water for dependent communities. This calls for renewed efforts at rejuvenating the vegetative cover of the water-sheds within the forest reserve for sustained provision of portable water for the people.

Forestry Extension Services: The long distances between villages, lack of reliable transport facilities and few number of trained extension staff, could be perceived as major constraints to access to forestry extension services among the communities adjoining Gambari Forest Reserve. Field Officers should be provided with transport facilities to enhance easy access to villages.

Membership of Social Groups: Most of the people interviewed claimed that they belonged to one or more community associations. According to FAO (1990), community associations are political units and even administrative in nature, hence their approval and consent must be sought before sustainable forestry practices could be achieved. Another point of view is that government has laid more emphasis on revenue generation than other forestry policies in the State. Therefore, government has neglected the sustainability of the forest as well as the communities adjoining the reserve. Little land area remains for the community members to produce food crops. This, therefore, has forced them into the reserve in order as to supplement their food production.

Non-Financial Incentives: The results obtained indicate that provision of non- financial incentives will motivate peoples' participation in the management of the reserve. Therefore provision of seedlings, technical assistance, regulation of market and provision of employment should be incorporated into subsequent management planning of the reserve.

Conclusion and Recommendation

The findings of the study have implications for forest policy makers in Oyo State, and decision makers in the planning of integrated rural development projects. The study recognizes the importance of popular participation in the development process and the capacity of grassroots and leaders and institutions to help plan, implement, and manage community development efforts. Popular participation in the management of the forest reserve could be achieved through effective devolution of central authority for development purposes. The essence of community participation should be a genuine participation in the decision making process. Direct involvement of the people in decision-making will attract keen interest in political, administrative and conservation programmes in the study area.

Youth involvement in forest exploitation activities is much more than the adult. Moreover, the increasing rates of illegal exploitation may be attributed to the increased unemployment in the study area. In view of the foregoing; the state government should ensure the right of forest communities, and recognize that they also have important stake in the management of the reserve through sponsoring of tree planting competition among the community organization and peer groups.

In order to encourage peoples' participation and avoid over-exploitation and resource exhaustion, institutional changes in property right arrangements may be necessary. This may involve renting-out of a portion of the reserve by the state to the registered community associations. This would involve a legal document between the two parties stating the terms of agreement.

Government should encourage the establishment of forest nurseries by community association through the award of contracts to the associations to supply seedlings for re-afforestation programmes. Furthermore, the timber contractors should be mandated to replant each tree felled and the seedlings for such operations should be purchased from the nurseries of community/association's.

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