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SOCIO-ECONOMIC DETERMINANTS OF THE EFFECTIVENESS OF FOREST MANAGEMENT STRATEGIES EMPLOYED BY RURAL DWELLERS AROUND IMEKO GAME RESERVE, NIGERIA.

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ABSTRACT

Forests are critical natural resources that support rural livelihoods and environmental sustainability, yet increasing anthropogenic pressures continue to threaten their conservation in developing countries like Nigeria. In Imeko Game Reserve, Ogun State, the effectiveness of forest management strategies among surrounding rural communities remains poorly understood, necessitating an empirical investigation of the socio-economic factors involved. This study examined the socio-economic determinants influencing the effectiveness of forest management strategies employed by rural dwellers in Imeko Game Reserve, Ogun State, Nigeria. A multistage sampling procedure was used to select 120 respondents from eight communities surrounding the reserve. Data were collected using structured questionnaires and analyzed using descriptive statistics and binary logistic regression. The findings revealed that males constituted the majority (70.8%) of the respondents, with an average age of 42 years and an average household size of approximately 7 persons. Most respondents earned between ₦20,001 and ₦50,000 monthly, with an estimated average monthly income of ₦37,625. Afforestation through regular tree planting was the most widely practiced forest management strategy (95.8%), followed by selective harvesting (91.7%) and protection of regenerating trees (87.5%). Reforestation activities were perceived as the most effective strategy, with 90.8% of respondents affirming that it improved forest regeneration and tree survival. Logistic regression results showed that age (ß = 0.034; $p < 0.05$), education (ß = 0.118; $p < 0.05$), monthly income (ß = 0.000021; $p < 0.05$), and years of residency (ß = 0.052; $p < 0.05$) positively influenced the effectiveness of forest management strategies, while household size (ß = -0.067; $p < 0.05$) negatively influenced effectiveness. It is concluded that socio-economic characteristics significantly affected sustainable forest management.

Keywords: Forest management, socio-economic determinants, afforestation, conservation, Rural

Introduction

Forests constitute one of the most important natural resources that support environmental sustainability and human livelihood across the world. They provide critical ecological services such as carbon sequestration, biodiversity conservation, soil protection, watershed maintenance, and climate regulation, while also serving as sources of food, fuelwood, medicine, and income for millions of rural households (FAO, 2020). In developing countries such as Nigeria, forests play a significant role in rural development because many communities living within and around forest reserves depend directly on forest resources for subsistence and economic

survival. However, increasing anthropogenic activities including illegal logging, agricultural expansion, bush burning, fuelwood extraction, and infrastructural development have continued to threaten the sustainability of forest ecosystems in the country (Adeleke *et al.,* 2020; Oyebade *et al.,* 2017; Duguma *et al.,* 2019).

Forest management has therefore become an essential strategy for ensuring the sustainable utilization, protection, and conservation of forest resources. Sustainable forest management involves the application of scientific, administrative, and participatory approaches aimed at balancing environmental conservation with socio-economic benefits for present and future generations. Common forest management strategies include afforestation, reforestation, selective logging, forest patrol, fire control measures, agroforestry practices, and enforcement of forest regulations. According to the Food and Agriculture Organization (FAO, 2016), sustainable forest management is necessary for maintaining forest productivity, biodiversity, and ecological functions while supporting livelihoods and national development goals. Despite the existence of several forest management policies and conservation programs in Nigeria, forest reserves continue to experience rapid degradation. Studies have shown that weak institutional frameworks, inadequate funding, poor monitoring systems, and limited community participation have contributed significantly to the ineffective management of forest resources in many parts of the country (Agrawal and Gupta, 2005; Larinde and Chima, 2014; Wily, 2021). In addition, population growth and increasing dependence on forest products among rural households have intensified pressure on forest ecosystems, thereby undermining conservation efforts (Duguma *et al*, 2019).

The participation of local communities and forest guards has been identified as a critical factor in achieving sustainable forest management. Forest guards are responsible for enforcing forest laws, monitoring illegal activities, preventing encroachment, and implementing conservation strategies within protected areas. However, their effectiveness is often constrained by inadequate logistics, insufficient manpower, poor remuneration, and lack of technical support (Karimu, 2015). Similarly, the success of forest conservation initiatives largely depends on the willingness of rural dwellers to support and comply with forest management regulations. Studies conducted in different parts of Nigeria have emphasized that community participation enhances forest protection, reduces illegal exploitation, and promotes sustainable resource utilization (Gambo *et al.,* 2025).

Empirical studies have further revealed that socio-economic factors significantly influence individuals' attitudes and participation in forest management activities. Variables such as age, educational level, household size, income level, occupation, and years of residency have been found to determine the extent to which people engage in conservation practices and support sustainable forest management initiatives (Agrawal and Gupta, 2005; Chukwuone, 2020; Cerne, 2022). Educated individuals are generally more aware of environmental conservation practices, while households with higher income levels are less likely to depend excessively on forest exploitation for survival. Conversely, larger household sizes and poverty have been associated with increased pressure on forest resources (Vedeld *et al.,* 2004).

The Imeko Game Reserve, located approximately at latitude 7°29'N and longitude 2°53'E within Imeko-Afon Local Government Area of Ogun State, is one of the important forest and wildlife conservation areas in southwestern Nigeria. The reserve has continued to experience pressure from surrounding communities whose livelihoods are closely linked to forest resources (Larinde and Chima, 2014; Gambo *et al.,* 2025). Activities such as illegal logging, bush burning, grazing, and agricultural encroachment have posed serious threats to biodiversity conservation and sustainable forest utilization within the reserve (Duguma *et al.,* 2019; Adeleke *et al.,* 2020). Although different forest management strategies have been introduced by government agencies and conservation stakeholders to address these challenges, the effectiveness of such strategies remains uncertain due to persistent socio-economic and institutional constraints (Larinde and Chima, 2014; Wily, 2021).

Furthermore, limited empirical studies have specifically examined how socio-economic characteristics of forest guards and rural dwellers influence the effectiveness of forest management strategies in the study area. Among the few available, Chukwuone (2020) explored community participation in forest resource management in Nigeria, while Gambo *et al.* (2025) assessed conservation involvement in a Nigerian national park; however, none have focused specifically on the socio-economic determinants of forest management effectiveness in Imeko Game Reserve.

This study was therefore undertaken to examine the socio-economic determinants of the effectiveness of forest management strategies employed by rural dwellers in Imeko Game Reserve, Ogun State, Nigeria, with the aim of providing empirical evidence that would support improved forest conservation policies and sustainable forest management practices in Nigeria.

Methodology

Area of Study

The study was carried out in Imeko Game Reserve, located within Imeko-Afon Local Government Area of Ogun State, Nigeria. The Local Government is one of the twenty administrative divisions in Ogun State and lies in the western region, sharing an international boundary with the Republic of Benin. Its administrative headquarters is situated in Imeko town, with the reserve lying approximately between latitudes 7°20'N – 7°38'N and longitudes 2°45'E – 3°02'E, covering a total land area of approximately 1,711.43 square kilometers.The area is predominantly agrarian, with farming serving as the principal economic activity due to the presence of fertile soil.

Vegetation in the region consists of a mix of savannah and light forest, making it suitable for livestock production, particularly cattle rearing, as the area is relatively free from tsetse fly infestation. The climate is typically tropical, characterized by a rainy season that spans from March to November. Major crops cultivated in the area include cassava and tomatoes, while cotton production contributes to textile industries across the border in the Republic of Benin. Other agricultural products include maize, pepper, yam, groundnut, vegetables, cocoa, cashew, and teak (Wikipedia, 2011).

Sampling Procedure and Sample Size

The population for the study comprised residents of rural communities situated around the game reserve, whose livelihoods were

closely linked to forest resources. A multistage sampling technique was employed in selecting respondents for the study. In the first stage, the game reserve was purposively chosen due to its richness in forest-based resources. In the second stage, eight rural communities: Ilara, Iwoye, Idofa, Owode, Idiayin/Obada, Moriwi/OkeAgbede, Agborogbomo, and Atapele/Agberiodowere randomly selected. In the third stage, a systematic sampling method was used to select respondents from each community.

The number of respondents varied across communities based on household size distribution: 15 were selected from Ilara, 8 from Iwoye, 25 from Idofa, 19 from Owode, 16 from Idiayin/Obada, 10 from Moriwi/OkeAgbede, 8 from Agborogbomo, and 19 from Atapele/Agberiodo. This variation reflected differences in population size among the communities. In total, 120 respondents were selected across the eight communities for the study.The selection was in proportion to the population of the rural dwellers across the selected communities

Model Specification

A binary logistic regression model was used to examine the influence of socio-economic variables on the effectiveness of forest management strategies.

The model was specified as: $\mathrm{In}(1-\mathrm{P}/\mathrm{P}) = \beta_0 + \beta_1 X_1 + \beta_2 X_2 + \beta_3 X_3 + \cdots + \beta_7 X_7 + \varepsilon$

Where:

- P = Probability that forest management strategies are effective
- X_1-X_7 = Socio-economic variables
- ß = coefficients
- e = error term

Measurement of Variables

The dependent variable was the effectiveness of forest management strategies, measured as a binary variable (1 = effective, 0 = not effective) based on respondents' evaluation of implemented practices.

The independent variables included:

- Gender: Dummy variable (Male = 1, Female = 0)
- Age: Measured in years
- Education: Measured in years of schooling
- Household Size: Number of individuals in the household
- Monthly Income: Measured in Nigerian Naira (₦)
- Secondary Occupation: Dummy (Yes = 1, No = 0)
- Years of Residency: Number of years lived in the community

Result and Discussion

Socioeconomic Characteristics of the Respondents

The socio-economic characteristics of respondents in Table 1 revealed important patterns that shaped their involvement in forest management within Imeko Game Reserve. The findings showed that males constituted the majority (70.8%), indicating that forest-related activities were largely male-dominated. This reflects the physically demanding nature of forest protection, patrol, and enforcement duties, which are often undertaken by men in rural Nigerian settings. Similar gender patterns in natural resource management have been reported in previous studies, where cultural roles and labour demands limited female participation in forestry activities (Ifegbesan, 2016).The age distribution indicated that most respondents were within the economically active and experienced age groups, particularly 41–50

years (37.5%) and above 50 years (23.4%). This suggests that forest management activities benefited from individuals with practical experience and long-term exposure to forest ecosystems. Older respondents are often more familiar with indigenous conservation practices and local environmental conditions, which enhances their contribution to forest governance (Chukwuone, 2020).

Educational attainment was generally low, as half of the respondents (50.0%) had no formal education, while only 27.5% reached secondary school level (Table 1). This implies limited literacy and awareness of modern conservation techniques among a large proportion of respondents. Low educational status can reduce understanding of sustainable forest management practices and compliance with environmental regulations (FAO, 2020). However, it also highlights the importance of incorporating indigenous knowledge systems into forest management approaches. Household size was relatively large, with 34.1% having 4–7 members and 30.0% having 8–11 members. This suggests increased dependency on forest resources for household survival, as larger families typically require more fuelwood, food, and income from forest products. At the same time, large households may also provide additional labour for conservation activities, although greater subsistence and economic needs often result in higher extraction rates(Fisher*et al*, 2005).

Income levels were generally low, with 50.0% earning between ₦20,001 and ₦50,000 monthly (Table 1). This indicates a high level of economic vulnerability and dependence on natural resources for livelihood support. Poverty has been widely identified as a key driver of forest exploitation in rural communities, where households rely on forests as safety nets for survival (FAO, 2020).Themajority of respondents were married (72.5%), suggesting strong household responsibilities that may increase reliance on forest resources for sustenance. Furthermore, more than half of the respondents (55.8%) were indigenes, indicating strong local attachment and access to indigenous ecological knowledge, which can support sustainable forest practices. Years of residency were also relatively high, with 32.5% having lived in the area for more than 15 years, implying deep familiarity with forest dynamics and long-term involvement in resource use and conservation activities.

These socio-economic characteristics suggest that forest management in the study area is shaped by a combination of experience, livelihood dependence, limited formal education, and strong local attachment. These factors collectively influence both the pressure on forest resources and the willingness of individuals to participate in conservation activities, thereby reinforcing the need for targeted policy interventions that address livelihood needs while strengthening sustainable forest management.

Table 1: Socio economic Characteristics of Respondents in the Study Area

Variable	Frequency	Percentage	Mean
Gender			
Male	85	70.8	
Female	35	29.2	
Age			

20-30	24	20.0	
31-40	23	19.1	
41-50	45	37.5	42
>50	28	23.4	
Marital status			
Married	87	72.5	
Divorced	12	10.0	
Widowed	12	10.0	
Separate	8	6.7	
Household Size			
<3	30	25.0	
4-7	41	34.1	6.5
8-11	36	30.0	
>11	13	10.9	
Religion			
Christianity	50	41.7	
Islam	34	28.3	
Traditional	36	30.0	
Education Level			
No formal education	60	50.0	
Primary education	27	22.5	
Secondary education	33	27.5	
Nativity			
Indigenes	67	55.8	
Non-indigenes	53	44.2	
Years of residency			
1-5	27	22.5	
6-10	34	28.3	
11-15	20	16.7	
>15	39	32.5	
Monthly income (₦)			
<20,000	27	22.5	
20,0001-50,000	60	50.0	37,625
50,001- 80,000	33	27.5	
Total	**90**	**100.0**	

Forest management practices implemented

The findings on the forest management strategies implemented in Imeko Game Reserve in Table 2 showed that respondents were actively engaged in a wide range of conservation and sustainable utilization practices, although the level of adoption varied across strategies.Afforestation was the most widely practiced strategy, with 95.8% of respondents involved in tree planting to replace harvested trees. This indicated a strong commitment to forest regeneration and restoration within the study area. It further

suggested that respondents had considerable awareness of the importance of maintaining forest cover for ecological balance. This aligns with FAO (2020), which emphasized that forest restoration through tree planting remains a key approach to reversing deforestation and improving ecosystem resilience.

Bush burning was largely avoided by 86.7% of respondents (Table 2), showing increasing awareness of its harmful effects on biodiversity, soil fertility, and wildlife habitats. This suggests a behavioural shift toward more environmentally friendly practices in the study area. Similarly, FAO (2016) reported that uncontrolled fire remains a major driver of forest degradation in tropical regions, making its reduction critical for sustainable forest management.Fire control measures were also moderately practiced, as 85.8% of respondents created firebreaks while 74.2% engaged in controlled burning. This indicated efforts to manage wildfire risks, although the level of controlled burning suggests that technical knowledge and implementation capacity may still be developing. Ryan *et al.* (2020) noted that effective fire management requires strong technical guidance and coordinated implementation to achieve optimal ecological outcomes. Selective harvesting was highly adopted by 91.7% of respondents, while 87.5% protected regenerating trees. This reflected strong adherence to sustainable harvesting principles and an understanding of maintaining forest structure over time. Kissa *et al.* (2025) highlighted that reduced-impact logging and regeneration protection are essential for sustaining forest productivity and biodiversity conservation.Agroforestry practices were also prominent, with 83.3% of respondents integrating trees with agricultural activities. This indicated efforts to balance livelihood needs with environmental conservation by reducing pressure on natural forests.

Community-based monitoring activities showed moderate engagement, as 66.7% of respondents monitored illegal logging, 59.2% participated in forest patrols, and 79.2% reported forest offences (Table 2). This suggested that while community participation in enforcement existed, it was not yet fully intensive or systematic. Das *et al.* (2026) emphasized that effective forest governance depends heavily on strong community participation in monitoring and compliance enforcement.Grazing control and local regulatory mechanisms were also fairly practiced, with 73.3% restricting livestock grazing, 73.3% participating in community bylaws, and 70.8% maintaining buffer zones. These measures indicated attempts to reduce human and livestock pressure on forest ecosystems. Also, Mwangi *et al.* (2020) observed that such community-based regulations are essential for reducing land degradation and promoting sustainable forest use.However, sustainable harvesting of non-timber forest products was relatively lower at 65.0%, suggesting that unsustainable extraction practices may still persist. FAO (2020) noted that inadequate regulation of non-timber forest products often leads to gradual depletion of forest resources in developing regions.Environmental protection practices were relatively strong, as 75.8% of respondents avoided harmful chemicals and 66.7% implemented soil and water conservation measures. This reflected awareness of environmental protection, although full adoption was not universal. FAO (2022) emphasized that sustainable soil and water management is critical for maintaining long-term forest ecosystem stability.

Finally, 60.0% of respondents maintained sacred groves, while 73.3% supported community-managed forest zones (Table 2). This highlighted the continued relevance of indigenous conservation systems and community-based forest governance. Bhagwat and Ormsby (2020) noted that sacred forests and culturally protected areas remain important reservoirs of biodiversity and play a significant role in traditional conservation systems.

The results indicated that while key sustainable forest management strategies such as afforestation, selective harvesting, and fire avoidance were widely adopted, some practicesparticularly enforcement and non-timber forest product regulation still require strengthening to ensure long-term forest sustainability in the study area.

Table 2: Identification of the forest management strategies implemented by the respondents in the study area

Strategies	Yes	No	Rank
1. (Afforestation) Regular tree planting to replace harvested trees	115(95.8)	5(4.2)	1
2. Avoiding bush burning within and around the forest reserve	104(86.7)	16(13.3)	4
3. Using controlled or prescribed burning to manage vegetation	89(74.2)	31(25.8)	9
4. Creating firebreaks to prevent the spread of wildfires	103(85.8)	17(14.2)	5
5. Selective harvesting of trees instead of clear-cutting	110(91.7)	10(8.3)	2
6. Protecting young seedlings and natural regenerating trees	105(87.5)	15(12.5)	3
7. Monitoring illegal logging activities in the forest area	80(66.7)	40(33.3)	12
8. Participating in community forest patrols	71(59.2)	49(40.8)	15
9. Engaging in agroforestry practices around the forest reserve	100(83.3)	20(16.7)	6
10. Restricting livestock grazing inside sensitive forest zones	88(73.3)	32(26.7)	10
11. Using sustainable methods for collecting non-timber forest products	78(65.0)	42(35.0)	13
12. Maintaining buffer zones around the forest reserve	85(70.8)	35(29.2)	11
13. Participating in community rules or bylaws guiding forest use	88(73.3)	32(26.7)	10
14. Reporting forest offences to local authorities	95(79.2	25(20.8)	7
15. Practicing soil and water conservation measures in forest areas	80(66.7)	40(33.3)	12
16. Avoiding the use of harmful chemicals within	91(75.8)	29(24.2)	8

forest boundaries			
17. Supporting reforestation and afforestation initiatives	100(83.3)	20(16.7)	6
18. Participating in community awareness programs on forest conservation	57(47.5)	63(52.5)	16
19. Maintaining sacred groves or culturally protected forest sites	72(60.0)	48(40.0)	14
20. Supporting the establishment of community-managed forest zones	88(73.3.)	32(26.7)	10

Effectiveness of forest management practices in the study area

The findings on the level of effectiveness of forest management strategies in Imeko Game Reserve in Table 3 revealed that respondents generally perceived ecological and participatory strategies as more effective than institutional and technical interventions.Reforestation was the most highly rated strategy, as 90.8% of respondents confirmed that tree planting improved forest regeneration and tree survival. This indicates strong evidence that restoration efforts were yielding visible ecological benefits in the study area. It also reflects growing awareness of ecosystem recovery among respondents. This aligns with Chazdon *et al.* (2020), who emphasized that forest restoration significantly enhances ecosystem recovery, biodiversity conservation, and long-term environmental stability, and FAO (2020), which identified reforestation as a core strategy for combating deforestation in tropical regions.Selective harvesting was also perceived as highly effective by 78.3% of respondents (Table 3). This suggests that respondents recognized its role in reducing overexploitation and maintaining forest structure. The result implies a gradual shift from destructive logging practices toward more sustainable extraction methods.

Community-based forest protection measures were moderately effective. About 74.2% of respondents indicated that community patrols reduced illegal logging, while 67.5% supported the effectiveness of community monitoring groups (Table 3). This shows that local participation plays an important role in forest surveillance and enforcement, although it may still require strengthening for full effectiveness. Agrawal and Gupta (2005) similarly observed that community involvement improves compliance with forest rules and strengthens governance outcomes in conservation areas. Natural regeneration was perceived as effective by 60.8% of respondents, indicating moderate confidence in the ability of forests to recover naturally when properly protected. This suggests that while respondents recognize its importance, active restoration methods are still preferred. Chazdon *et al.* (2020) highlighted natural regeneration as a cost-effective and ecologically sound approach to forest recovery, particularly in degraded tropical ecosystems.Agroforestry was considered effective by 67.5% of respondents, showing that integrating trees with agriculture is increasingly seen as a viable strategy for balancing livelihood needs with conservation goals. This reflects its dual benefit of improving income while reducing pressure on natural forests.

Fire management strategies recorded relatively low effectiveness, as only 50.0% of respondents considered firebreaks effective

and 41.7% supported controlled burning (Table 3). This suggests weak implementation capacity and limited technical knowledge in fire control practices. The result indicates that fire management remains a critical weakness in the study area. Ryan *et al.* (2020) noted that effective fire management requires adequate training, planning, and institutional support, which are often lacking in tropical forest systems.Institutional measures were among the least effective strategies. Only 40.0% of respondents viewed community bylaws as effective, while 33.3% believed awareness programs improved conservation knowledge. This reflects weak enforcement and insufficient environmental education within the study area. Wily (2021) similarly observed that weak governance structures and poor institutional coordination often undermine the success of community-based conservation systems.Grazing control measures showed moderate effectiveness, as 50.8% of respondents believed that restricting livestock grazing reduced forest degradation. This indicates that while the strategy is useful, its enforcement may not be consistent. Mwangi *et al.* (2020) similarly reported that unmanaged grazing contributes significantly to forest degradation, but can be mitigated through effective community regulation.

Finally, culturally protected sites and sacred groves were considered effective by 62.5% of respondents, highlighting the continued relevance of traditional conservation systems (Table 3). This suggests that indigenous practices still play an important complementary role in forest conservation. Bhagwat and Ormsby (2020) emphasized that sacred groves are vital biodiversity reservoirs and remain effective tools for community-based conservation.Overall, the results show that ecological strategies such as reforestation and selective harvesting were perceived as most effective, while institutional and technical interventions such as fire management and awareness programs were relatively weak.

Table 3: Level of Effectiveness of the Forest Management Strategies Implemented by the Respondents in the Study Area

Items	Yes	No
1. Do reforestation activities improve tree survival in the forest reserve?	109(90.8)	11(9.2)
2. Are community patrols effective in reducing illegal logging?	89(74.2)	31(25.8)
3. Do firebreaks help in preventing or reducing wildfire spread?	60(50.0)	60(50.0)
4. Is controlled burning effective in reducing excessive dry vegetation?	50(41.7)	70(58.3)
5. Does natural regeneration contribute to improving forest growth?	73(60.8)	47(39.2)
6. Is selective harvesting effective in preventing overexploitation of trees?	94(78.3)	26(21.7)
7. Are community bylaws effective in regulating forest resource use?	48(40.0)	72(60.0)
8. Does agroforestry improve forest conservation around	81(67.5)	39(32.5)

your community?		
9. Is the collection of non-timber forest products done in a sustainable manner?	36(30.0)	84(70.0)
10. Is restricting livestock grazing effective in reducing forest degradation?	61(50.8)	59(59.2)
11. Does reporting forest offences help in protecting the forest reserve?	61(50.8)	59(49.2)
12. Are awareness programs effective in improving community knowledge of forest conservation?	40(33.3)	80(66.7)
13. Do soil and water conservation practices reduce erosion in the forest area?	55(45.8)	65(54.2)
14. Are community monitoring groups effective in safeguarding forest resources?	81(67.5)	39(32.5)
15. Do culturally protected sites help in preserving biodiversity within the forest?	75(62.5)	45(37.5)

Factors Influencing perception about effectiveness of Forest Management Strategies

The logistic regression results on the factors influencing the effectiveness of forest management strategies in Imeko Game Reserve revealed in Table 4 that socio-economic characteristics played a significant role in shaping respondents' perceptions of forest conservation effectiveness.Gender had a positive but statistically insignificant influence (ß = 0.521; p = 0.069), indicating that although males were more likely to perceive forest management strategies as effective, gender did not significantly determine effectiveness outcomes. This suggests that both males and females were generally exposed to forest conservation activities, even though males were more actively involved due to the physically demanding nature of forest work. This finding is consistent withAgrawal and Gupta (2005), who noted that gender roles influence participation in forest governance but do not always determine effectiveness outcomes.

Age had a positive and statistically significant effect (ß = 0.034; p = 0.005), showing that older respondents were more likely to perceive forest management strategies as effective. This reflects the importance of experience, indigenous knowledge, and long-term interaction with forest ecosystems in shaping positive perceptions of conservation efforts. Ribot *et al.* (2020) similarly observed that older individuals tend to participate more effectively in forest governance due to accumulated environmental knowledge and experience. Education also had a strong positive and significant effect (ß = 0.118; p = 0.004), indicating that higher educational attainment improved understanding and acceptance of sustainable forest management practices. This suggests that educated respondents were more aware of conservation principles and more likely to support environmental protection measures. FAO (2020) similarly emphasized that education enhances environmental awareness and strengthens compliance with sustainable forest management practices.

Household size had a negative and significant relationship with effectiveness (ß = -0.067; p = 0.021), implying that larger households were less likely to perceive forest

management strategies as effective. This may be due to increased dependence on forest resources for household needs such as fuelwood, food, and income, which places additional pressure on forest ecosystems. FAO (2016) also reported that household population pressure is a major driver of forest degradation in rural areas. Monthly income had a positive and significant effect (ß = 0.000021; p = 0.020), indicating that higher-income respondents were more supportive of forest management strategies. This suggests that improved economic status reduces reliance on forest exploitation and encourages participation in conservation activities

Secondary occupation showed a positive but non-significant influence (ß = 0.436; p = 0.075), suggesting that respondents with diversified livelihoods were more likely to perceive forest management as effective, even though the effect was not strong statistically. This implies that alternative income sources may reduce pressure on forests and support conservation behaviour. Wunder *et al.* (2014) noted that livelihood diversification is important for reducing environmental pressure and enhancing sustainable resource management.Years of residency had a positive and highly significant effect (ß = 0.052; p = 0.004), indicating that long-term residents were more likely to perceive forest management strategies as effective. This reflects the role of local familiarity, traditional ecological knowledge, and long-term engagement with forest environments in shaping positive conservation perceptions. Agrawal and Gupta (2005)similarly emphasized that long-term residence strengthens participation in forest governance and conservation activities.

The regression results demonstrated that socio-economic factors significantly influenced the effectiveness of forest management strategies in the study area. Variables such as age, education, income, and years of residency enhanced effectiveness, while large household size reduced it due to increased resource pressure. These findings suggest that improving education, strengthening livelihoods, and supporting community stability would enhance sustainable forest management in Imeko Game Reserve.

Table 4: Logistic Regression Results on Factors Influencing Effectiveness of Forest Management Strategies

Variables	Coefficient (ß)	Std. Error	z-value	p-value	Odds Ratio
Constant	-1.842	0.756	-2.44	0.015	—
Gender (Male = 1)	0.521	0.287	1.82	0.069	1.684
Age (years)	0.034	0.012	2.83	0.005	1.035
Education (years)	0.118	0.041	2.88	0.004	1.125
Household Size	-0.067	0.029	-2.31	0.021	0.935
Monthly Income	0.000021	0.000009	2.33	0.020	1.000
Secondary Occupation (Yes = 1)	0.436	0.245	1.78	0.075	1.547
Years of Residency	0.052	0.018	2.89	0.004	1.053

Source: Field survey, 2026

Conclusion and Recommendations

The study examined the socio-economic determinants influencing the effectiveness of forest management strategies in Imeko Game Reserve, Ogun State, Nigeria. The findings revealed that although a range of forest management strategies such as afforestation, selective harvesting, and avoidance of bush burning had been widely practiced, their effectiveness varied across different approaches. Ecological strategies were generally perceived as effective, while institutional and community-based measures such as awareness programs and enforcement mechanisms were relatively weak. The analysis further showed that socio-economic characteristics, particularly age, education, income, and years of residency, had significant positive influences on effectiveness, whereas household size had a negative effect due to increased pressure on forest resources. The study established that sustainable forest management depended not only on the availability of strategies but also on the socio-economic conditions of the people involved.

In light of these findings, the following recommendations were proposed to enhance the effectiveness of forest management strategies in the study area:

Strengthening environmental education and awareness programs to improve knowledge and adoption of sustainable forest practices. Providing financial and logistical support to forest guards and conservation initiatives to enhance efficiency and motivation. Promoting alternative livelihood opportunities to reduce dependence on forest resources. Encouraging active community participation in forest management through inclusive and participatory policies. Offering technical training on fire management, sustainable harvesting, and conservation techniques. Implementing measures to manage household pressure on forest resources, including the promotion of efficient energy alternatives.

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