

YOUTH IN PLANTATION DEVELOPMENT: A POTENTIAL TOOL FOR SUSTAINABLE FOREST MANAGEMENT IN ONIGAMBARI FOREST RESERVE, OYO STATE, NIGERIA

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ABSTRACT

This study aims to investigate youth involvement in plantation development (PD) with a view to encouraging forest expansion and sustainability. Purposive sampling was used to select five communities around the reserve. Questionnaires were designed to gather information on the perception and level of participation of youths, socio-economic benefits, and challenges facing PD in the area. A total of 150 respondents were sampled. Data were collected from primary and secondary sources. Data were analyzed using descriptive statistics, chi-square, and logit. The results showed that the majority of the respondents were male (58.8%), the mean age was 30.9 ± 7.28 years; 45.0% were between 25-34 years, 73.3% were married, 48.1% had no formal education while the major occupation was farming. The majority (95.5%) of the respondents were sensitized to PD, and 93.9% showed great interest and participated in PD. Timber exploitation, job opportunities, improvement of agricultural production, medicinal

benefits, income generation, and provision of non-timber forest products, were dependent on the level of participation of youths in PD. These were significant at the 5% confidence limit. Major challenges facing PD are Lack of labor, finance, and level of awareness with odds-ratio of 43.73, 39.32, and 36.27 respectively. Youth involvement in PD is paramount to forest sustainability in the study area.

Keywords: *Plantation, Forest, Sustainable Forest Management, Youths, Onigambari.*

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1. INTRODUCTION

The potential role of plantation developments in the sustenance and provision of other basic products essential to meet the needs of rural communities has been recognized widely (Virts, 2016). Forest plantations are a noteworthy wellspring of wood items for industries and for other uses, such as fuel wood. Aside from that, they help in meeting the monetary needs of provincial individuals for nourishment. They also contribute to environmental, social, and economic benefits (Shorth and Ruf, 2013). Forest plantations help to reduce land degradation occasioned by human activities, absorbing carbon, protecting soil and water, restoring lands completely used up from other land uses, and providing rural employment (FAO, 2014).

The development of forest plantations has led to accelerated involvement of communities and non-public quarters in wooded area administration (Siker and Baggio, 2014). Hence, governments are increasingly seeking the involvement of

youths, communities, and the private sector in plantation development and are using a variety of direct and indirect incentives to stimulate tree growth (Omole, 2012). It is also worthy of note that about 382,000 hectares have been replanted with indigenous and exotic tree species representing about 4 percent of the remaining forest estate (Jongrungrot et al., 2015). Sadly, providing resources to finance the forestry sector in Nigeria has been critically low, making restocking existing forests nearly impossible, especially in the last two decades. To make the forestry sector active again, the government at all levels must find means of involving youths in the local communities as co-managers of the forest estates in order to create joint support towards resource conservation (FAO, 2016).

Onigambari forest reserve in Oyo State is a source of livelihood for communities around the reserve as well as a source of revenue for the government but recently, the area has been faced with the challenge of deforestation. Hence, the need for plantation establishment. However, the establishment of forest plantation entails extensive involvement of man power to ensure success but the level of awareness of youth in the plantation development in the study area is not well defined. There is also little or no information on the level of participation of youths in plantation development in the study area.

In most forest reserves, the socio-economic benefits are vital means of livelihood which includes provision of non-timber forest products (fuelwood), timber exploitation, improvement of agricultural products, medicinal benefits etc. But, there is no

sufficient data on the socio-economic benefits of plantation development in the study area.

Plantation developments in time past have been faced with several challenges which ranges from lack of management to other issues, such as illegal logging. However, there is no proper record on the challenges facing plantation development in the study area.

Therefore, this study seeks to assess:

- a) The socio-characteristics of the respondents.
- b) Perception of youths on plantation development in the study area.
- c) Level of participation of youth in plantation development in the study area.
- d) Socio-economic benefits of plantation development in the study area.
- e) Challenges involved in plantation development in the study area.

2. REVIEW OF LITERATURE

Nigeria is endowed with rich forest resources. Initially, the whole of Southern Nigeria, approximately 39 percent of Nigeria's land area was covered with the tropical rainforest (NEST 1991). Presently, the Nigeria rainforest occupies about 10 percent of the country's landmass (Akinsanmi and Akindele, 2002) but has over the years suffered from large-scale deforestation as a result of over-population with its attendant

demand for wood and wood products, unsustainable agricultural practices and public infrastructural development, inter alia. However, attempts have been made by both the federal and state governments as well as individuals and organizations at reforesting the forest estates in Nigeria with varying degrees of success (Isidore and Akpan-Ebe, 2017). This paper, therefore, examines the involvement of youths in plantation development as a panacea for forest sustainability.

Youths are important actors in forest governance, regeneration, and conservation (Boillat et al., 2017). Globally, forestry has become an important contributor to climate mitigation and biodiversity conservation goals (Persha et al., 2011) as well as to rural economies (Baynes et al., 2015). The forests are managed to generate important benefits for livelihood and contribute to global biodiversity and carbon sequestration goals. For this to be achieved, young people, who can contribute critical energy, ideas, and skills should be well-positioned and involved in taking up forest governance and work.

Over recent years, rural communities have experienced three interlocking social transformations. First, traditional forms of land use have declined, and rural livelihoods have become less territorially based as rural-urban migration has strengthened (Kay, 2015). Second, driven by falls in fertility levels and rises in life expectancies, families have become smaller, and rural populations have both contracted and aged (United Nations; Department of Economic and Social Affairs; Population Division, 2017). Third, mobility and migration have exacerbated these trends, bringing in remittances to supplement and

sometimes replace land-based income; and the provision of new opportunities for work and education has taken youth and working-aged people away from their communities (Robson, 2019). Transformations of this kind pose challenges to forestry development as forest development may experience labour shortages and under-managed forests. Thereby making the forest prone to illegal harvesting and deforestation (Chhatre, 2008). The reality of smaller and aging rural populations has generated calls for more meaningful livelihood opportunities which could include forest-related work (Macqueen, 2020). Across global regions, forest arrangements are often dominated by men, with women and youth underrepresented (Evans, 2019). While the role of women in forest use and management has attracted research attention, knowledge of youth, their perspectives, and their participation in environmental practice and stewardship is more limited (Ginwright, 2002), although these are gaining attraction in rural resource management (McCune, 2017). Similarly, while researchers have solicited youth perceptions of environmental change (Smith, 2016), the implications for youth in resource management and decision-making remain unclear (Macneil, 2017) and few have focused on building youth capacity as environmental actors (Browne, 2011), including in forestry. These are knowledge gaps that need to be addressed.

Youths, through their choices and actions, can play a leading role in shaping the forest's future (Zurba, 2014). In communities with too few young people, or where too many youths opt for other means of livelihood, the social organization, collective labor, ways of knowing, and local institutions that underpin shared land use and management can weaken (Robson, 2019).

At the same time, youth may be open to forest work opportunities as a new landscape of forest use and conservation emerges (Robson, 2019). Involvement of youth in youth-community-forest linkages can help in developing appropriate and forward-thinking plantation establishment strategies, policies, and practices (Clendening, 2019). This paper, therefore, seeks to investigate the involvement of youth in plantation establishment, their level of participation, the socio-economic benefits of plantation development, and the challenges involved in plantation development in the study area.

3. RESEARCH METHODOLOGY

Onigambari Forest Reserve, Oyo State, Nigeria is divided into special series which include: Ibusogboro, Gambari, Onipe, Olonde, Dalley, Oluna, James Village, Seriki, Ladiipo, and Mamu. It lies within latitudes $7^{\circ}21'N$ and $7^{\circ}28'N$ and longitudes $3^{\circ}33'E$ and $3^{\circ}36'E$ and covers an area of 11,613 hectares between the river Ona on the West main road from Ibadan and to Ijebu-Ode on the East. However, the Onigambari Forest Reserve owned by the Oyo State government was established on the 4th of September 1999. The average elevation of the reserve lies between 122 m to 152 m above sea level. Its topography is more or less sloppy varying between 3- 10 degrees. It has an annual rainfall of 1592.3 mm with a relative humidity of 72 - 86.5% and a mean minimum temperature of 22.5°C.

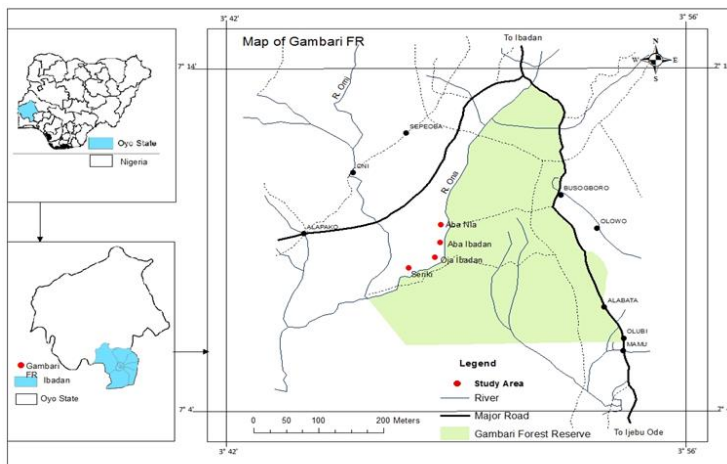


Figure 1. Map of study area

3.1 Sampling procedure and sample size

The survey was carried out for a period of eight (8) months i.e. from January 2022 to August 2022. Purposive sampling was used to select five (5) rural communities around Onigambari Forest Reserve. These include: Ibusogboro, Onipe, Gambari, Ladipo and Seriki. The choice was due to the fact that these communities were known for their active involvement in various forest activities and other land use practices in the forest reserve. The major targets were the youths and forest officials in the area. In the meantime, a report demonstrating the number of inhabitants in different groups was obtained from the National Population Commission of the State, and from this, a projection of the 2022 population of each group was computed using the projection formula:

$$P_n = P_o e^{rt} \dots \dots \dots (1)$$

Where: P_n = Final population, P_o = Initial population (Base population), e = exponential, r = growth rate (average of 3.5%), t = time interval ($x - 2022$) year(s).

Sampling intensity adopted by Diaw *et al.*, (2002) was further used to select respondents for the study. This indicated that 10% sampling intensity be used for populations below 500, 5% for populations between 500 and 1000, and 2.5% for populations above 1000. Therefore, an aggregate of 150 respondents was chosen for this study. The questionnaire was devised to get information on the perception of youth on plantation development, their level of participation in plantation development, the socio-economic benefits of plantation development, and the challenges involved in plantation development in the study area.

Table 1. Sampling procedure for the study

Sampled Communities	Communities Population	Calculated respondents' Sampling Intensity	No. of Respondents sampled.
Onipe	1,097	29.4	29
Gambari	1,607	40.2	40
Ibusogboro	1,425	35.6	36
Ladipo	179	17.9	18
Seriki	274	27.2	27
Total	6,475	150.3	150

Source: Field survey 2022

3.2 Data collection and analysis

Data were gathered from both primary and secondary sources. Primary data were collected with the aid of a structured questionnaire while secondary data were obtained from the NPC document, the internet, and articles to supplement the primary data. Out of a total of 150 questionnaires administered, 131 were retrieved indicating 87.3% recovery, and data were analyzed using descriptive statistics, chi-square, and logistic regression analysis. The chi-square analysis was used to analyze the relationship between the socio-economic benefits of plantation development and the level of participation of youth in plantation development in the study area.

On the other hand, the binary logistic models are very useful in situations where the dependent or response variable is binary in nature. This implies that they can have only two possible values. The models therefore describe the relationship between one or more continuous independent variable(s) to the binary dependent variable. Distinct information provided by logit is the odds ratio. It is defined as the ratio of the odds of an event occurring in the group to the odds ratio of it occurring in another group (Deeks, 1996). Logit also provides information on the consequences of one variable on the other. Hence, it clearly indicates the challenges involved in plantation development in the study area. The logit regression can be expressed as follows:

$$Y = \exp (b_0 + b_1x_1 + b_2x_2 \dots \dots b_{12}x_{12}) / 1 \exp (b_0 + b_1x_1 + b_2x_2 \dots \dots b_{12}x_{12}) \dots \dots (1)$$

Where: Y = Challenges of plantation development (CPD) (Dependent variable) while the independent variables are as follows:

X₁ = Low level of awareness of plantation development (LLAPD), X₂ = Inadequate knowledge by extension agents (IKEA), X₃ = Limited local market for tree products (LLMTP), X₄ = Lack of labour (LL), X₅ = Difficulty encountered in plantation establishment and maintenance (DEPEM), X₆ = Lack of sensitization by the government (LSG), X₇ = Finance for mobilization of youth (FMY), X₈ = Lack of information by the policy maker (LIPM), X₉ = Inadequate provision for machinery by the Government (PMG), X₁₀ = Unavailability of Land (UL), X₁₁ = Lack of incentives (LI), X₁₂ = Issue of Herdsmen invasion (IHI).

4. RESULTS AND DISCUSSION

4.1 Socio-economic characteristics of respondents

The result in Table 2 (see Appendix) showed the statistical qualities of respondents in the study area. The sex distribution demonstrated that a larger part of the respondents was male with 58.8% while the female respondents had a lower level of 41.2%. Indicating that the male engaged in plantation establishment more than the female. The implication of this is that the involvement of the males in active plantation development would enhance productivity since the males are more energetic, leading to the economic viability of plantation development in the area. This confirms the findings of Odeyale and Olawuyi (2018) who reported that males' capacity to withstand stress makes it possible for them to engage in more exhausting jobs than their female counterparts.

The outcome on the age distribution of respondents uncovered that respondents were 30.9 ± 7.28 years, despite the fact that the dominant part falls inside the age class of 25-34 years with 45.0 % while those within the ages of 15-24 years recorded the least percentage (20.6%). The implication of this is that the involvement of the youths in active plantation development would enhance productivity. This corroborated the findings of Adejumo et al. (2016) who stated that those who invest their time and energy on tasks that really matter in agricultural and forestry activities fall within the age class of 31-50 years. Also, the Table showed that a higher percentage of the respondents were married 73.3%, while the slightest number (4.5%) were those respondents who were widowed. This implied that youths who were married were mostly involved in plantation development activities in the area. This however supported the findings of Olawuyi and Agbeja (2018) that the majority of the rustic populations in Nigeria are married.

With reference to the educational level of respondents, it was uncovered that a larger part of the respondents had no formal education with 48.1% while those with secondary training recorded a minimal rate at 13.0%. This implies that although education is an engine for development, most forest-dependent communities do not depend on it to sustain livelihood (Olawuyi and Agbeja, 2018). Furthermore, indigenes were more in numbers and recorded the most astounding rate with 61.1%.

4.2 Perception of youths on plantation development in the study area

The result in Table 3 (see Appendix) revealed the perception of youths on plantation development in the study area. The

majority (95.4%) of the respondents were sensitized about what plantation development is all about and 91.6% of the respondents were conversant with the importance of plantation development. Moreover, 93.9 % of the respondents stated that plantation development was necessary and showed great interest in plantation development. This implies that if youths are given the opportunity to get involved in plantation development, greater success would be recorded in the sustainability of the forest in the short run. Figure 2 shows the level of access to information in relation to plantation development in the study area. It was uncovered that respondents in Onigambari had more access to information on plantation development with 35.5%, this was followed by Onipe with 22.5% while Seriki had the least access with 12.0%. This suggests that the youths in the locality were sensitized of plantation development and as well, had access to information to an extent. However, access to more information can help ginger the youths on the need to engage more in plantation development practices as this has a great impact on their interest to participate, thereby encouraging sustainable forest management. This therefore corroborated the findings of Rebecca (2018) and Clement (2015) who stated that youth's involvement in plantation development can go a long way in the expansion of forest areas thereby encouraging sustainable forest management.

4.3 Access to information on plantation development

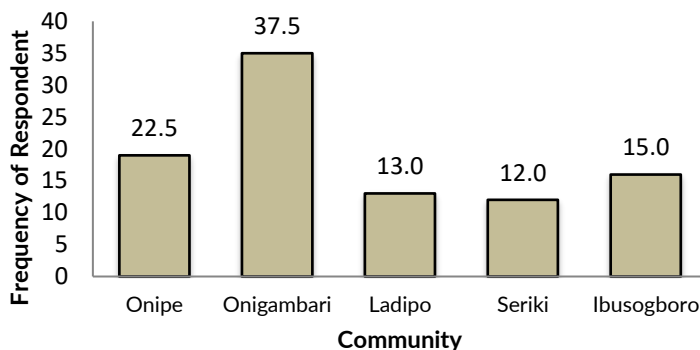


Figure 2. Respondents access to information on plantation development

Figure 2 shows the respondents' access to information in the study area. For any community to get involved in any project, such communities would have information about such projects. This is very important in the development of interest in the project. In the study area, all the communities sampled had access to information on plantation development. Onigambari had the highest access to information with 37.5% of respondents stating in the affirmative while Seriki had the least access with 12.0%. This might be the reason for the interest and participation of a larger percentage in plantation development in the study area.

Table 4 shows the level of participation of respondents in plantation development in the location. It was revealed that a larger percentage (93.9%) of the individuals have participated in plantation development in the reserve area. In addition, most of

the respondents (86.3%) were of the opinion that the plantation development exercise was not a difficult one. Moreover, a large number stated that they would love to engage in plantation development practices with 94.7% of them stating in the affirmative. This corroborated the findings of Rebecca (2018) who stated that youth's involvement in plantation development can go a long way in the expansion of forest areas thereby encouraging sustainable forest management.

Table 4. Level of participation of youth in plantation development in the study area

Level of Participation	Frequency	Percentage
Have you in any way been involved in plantation development in this area?		
Yes	123	93.9
No	8	6.1
Total	131	100
Is plantation development a difficult exercise?		
Yes	19	14.5
No	113	86.3
Total	131	100
Would you love to engage in a plantation development exercise for the sustainability of the reserve?		
Yes	124	94.7
No	7	5.3
Total	131	100

Table 5 (see Appendix) shows the economic benefits of plantation development in the study area. It was revealed that most of the youths have benefitted in no small measure from

plantation development in the study area. These benefits include agricultural improvement (94.7%), medicinal benefits (94.7%), income generation (94.7%), provision of non-timber forest products (93.1%), job opportunities (91.6%), timber production (91.6%), etc. This supported the findings of Powell (2009) that plantations can provide or enhance productivity for rural sustainability. FAO (2010) stated that plantations make up a sustainable source of forest products for the benefit of rural dwellers.

4.4 Relationship between participation level and economic benefits of plantation development in the study area

The results in Table 6 show the relationship between the participation level and the economic benefits of plantation development in the study area. The result revealed that timber exploitation ($\chi^2=22.49$, $p= 0.00$); Job opportunities ($\chi^2=14.72$, $p= 0.07$), Improvement of agricultural production ($\chi^2=19.34$, $p= 0.01$), Medicinal benefit ($\chi^2=18.57$, $p= 0.02$), Income generation ($\chi^2=38.86$, $p= 0.00$) and Provision of non-timber forest products ($\chi^2=47.49$, $p= 0.00$) were dependent on the level of participation in plantation development in the study area and these were highly significant at 5% confidence limit. This corroborated the findings of FAO (2010) who opined that participation in plantation development makes up for fulfilling the needs of current generations without compromising the needs of future generations by ensuring an environmentally and socially friendly source of wood.

Table 6. Relationship between socio-economic benefits and participation level

Socio-economic benefits	Chi-square	P- value	Decision
Timber exploitation	22.49	0.004*	Significant
Job opportunities	14.72	0.065*	Significant
Improvement of agricultural production	19.34	0.013*	Significant
Medicinal Benefit	18.57	0.017*	Significant
Income Generation	38.86	0.00*	Significant
Provision of NTFPs	47.49	0.00*	Significant

*Significant ($P \leq 0.05$)

4.5 Logit regression model for challenges involved in plantation development

$$\text{CIPD} = -36.64 + 19.72 \text{ LAPD} + 19.01 \text{ IKEA} - 1.87 \text{ LLM} + 15.28 \text{ LL} - 3.45 \text{ LSG} + 3.67 \text{ FM} + 1.31 \text{ LIPM} + 0.10 \text{ APM} + 1.01 \text{ UL} + 0.83 \text{ LI} + 1.97 \text{ IHI} \dots \text{Eqn 1}$$

$N = 131$, Final Loss = 22.38, Chi-Square (df, 7) = 35.41

Odd Ratio (Unit Change): Constant (-36.64); LAPD (36.27), IIEA (17.17) LLM (0.15) LL (43.73), LSG (0.03) FM (39.32), LIPM (3.72) APM (1.11), UL (2.76), LI (2.30), IHI (7.17)

Where:

CIPD = Challenges Involved in Plantation Development (dependent variable), LAPD= Level of Awareness of Plantation Development, IKEA= Inadequate information from Extension

Agents, LLM= Limited Local Market for Tree Products, LL = Lack of Labour, LSG = Lack of Sensitization by the Government, FM = Finance for Mobilization, LIPM = Lack of Information by the Policy Maker, APM = Adequate Provision for Machineries, UL = Unavailability of land, LI = Lack of Incentives, IHI = Issue of Herdsmen Invasion

The model presented above for challenges involved in plantation development in Onigambari Forest Reserve gave an overall significant fit to the data judging from χ^2 value that was significant at $P < 0.05$. Lack of Labor (LL) had the highest odds ratio of 43.73 followed by Finance for Mobilization (FM), Level of Awareness of Plantation Development (LAPD), Inadequate Information from Extension Agents (IIEA), Issue of Herdsmen Invasion (IHI). Lack of Information by the Policy Maker (LIPM), Unavailability of Land (UL), and Lack of Incentives (LI) with odd ratios of 39.32, 36.27, 17.17, 7.17, 3.72, 2.76, and 2.30 respectively (Table 7). There was sufficient evidence that the estimated coefficient for the factor was not zero. This implies that the regression parameters in the model were statistically significant. In other words, the higher the value of the odds ratio, the more likely the factors constituted challenges in plantation development in Onigambari Forest Reserve. This supported the findings of Robson, (2019) who stated that the lack of labor for plantation development might be due to the fact that most youths in rural settings are migrating in search of greener pastures such for work, education, etc. Transformations of this kind pose challenges to forestry development as forest development may experience labor shortages and under-managed forests.

Table 7. Logit binary nature of challenges involved in plantation development

Independent Variable	Coefficient	Odds- Ratio
Level of Awareness of Plantation Development	19.72	36.27*
Inadequate Information from Extension Agents	19.01	17.17*
Limited Local Market for Tree Products	-1.87	0.15
Lack of Labour	15.28	43.73*
Lack of Sensitization by the Government	-3.45	0.03
Finance for Mobilization	3.67	39.32*
Lack of Information by the Policy Maker	1.31	3.72*
Adequate Provision for Machinery	0.10	1.11
Unavailability of land	1.01	2.76*
Lack of Incentives	0.83	2.30*
Issue of Herdsmen Invasion	1.97	7.17*
Model χ^2 (df = 11) 35.41, Final Loss = 22.38, P<0.00		

Note: Dependable Variable: Challenges Involved in Plantation Development (Yes = 1; No= 2). *Significant at 5% level of probability

5. CONCLUSION

The study revealed that the youths' involvement in plantation development has great potential in sustainable forest management. It is worth noting, that land and tree tenure is not the only issue that determine the youth's participation in tree planting activities at whatever level. But bad beliefs, taboos and superstitions about planting certain trees and this can undermine participation of youths. However, access to the right information will help overcome lack of experience and this will have a great impact on youth's interest to participate thereby

encouraging them to establish a plantation. It was also shown that youths have a positive interest in plantation development and are more willing to participate. This can be gingered through the numerous benefits that can be derived from the project. Some of the benefits derived from plantation establishment include, improvement of agricultural production, medicinal benefits, income generation, provision of non-timber forest products, job opportunities to mention but a few. This therefore affirms the fact that plantations can provide or enhance productivity of rural sustainability and also plantations can make up a sustainable, energy-efficient, environmentally and socially friendly source of wood, fiber, fuel wood and non-wood forest products. Major challenges associated with plantation development in the study area include a low level of awareness among youth, a limited market, a lack of sensitization, a lack of finance, and a lack of incentives. Therefore, awareness programs should be organized for rural dwellers in and around the study area on the importance and need for sustainable forest management.

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APPENDIX

Table 2: Socio-economic characteristics of respondents

Socio-economic Characteristics	Frequency	Mean age	Percentage
Sex			
Male	77		58.8
Female	54		41.2
Total	131		100
Age			
15-24	27		20.6
25-34	59	30.9	45.0
35-44	45		34.4
Total	131		100
Marital Status			
Married	96		73.3
Single	12		9.2
Divorced	17		13.0
Widowed	6		4.5
Total	131		100
Educational Level			
No Formal Education	63		48.1
Primary	26		19.8
Secondary	17		13.0
Tertiary	25		19.1
Total	131		100
Occupation			
Farming	47		35.9
Public Servant	11		8.4
Forest Guard	10		7.6
Trader	30		22.9
Artisan	21		16.0
Forest Officer	12		9.2
Total	131		100
Nativity			
Indigene	80		61.1
Non-indigene	51		38.9
Total	131		100

Table 3. Perception of youths on plantation development in the study area

Level of Awareness	Frequency	Percentage
Were you being sensitized of what plantation development is all about?		
Yes	125	95.4
No	6	4.6
Total	131	100
Are you conversant with the importance of plantation development?		
Yes	120	91.6
No	11	8.4
Total	131	100
Do you think that plantation development is necessary in your environment?		
Yes	123	93.9
No	8	6.1
Total	131	100
As a youth, are you interested in plantation development?		
Yes	123	93.9
No	8	6.1
Total	131	100

Table 5. Socio-economic benefits of plantation development in the study area

Benefits	Frequency	Percentage
Timber Exploitation		
Yes	120	91.6
No	11	8.4
Total	131	100
Job Opportunities		
Yes	120	91.6
No	11	8.4
Total	131	100
Improvement of Agricultural Production		
Yes	124	94.7
No	7	5.3
Total	131	100
Medicinal Benefits		
Yes	124	94.7
No	7	5.3
Total	131	100
Income Generation		
Yes	124	94.7
No	7	5.3
Total	131	100
Provision of non-timber forest products		
Yes	122	93.1
No	9	6.9
Total	131	100