ECONOMICS OF PRIVATE INVESTMENT IN FOREST PLANTATION DEVELOPMENT IN SOUTHWESTERN NIGERIA

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A thesis in the Department of Social and Environmental Forestry,

Submitted to the Faculty of Renewable Natural Resources in Partial Fulfilment of the Requirements for the Degree of

DOCTOR OF PHILOSOPHY

of the

UNIVERSITY OF IBADAN, NIGERIA

OCTOBER, 2018

ABSTRACT

Forest plantation has the capacity of increasing wood supply and stemming the pressure on natural forest in Nigeria. Nevertheless, the performance of public sector forest plantation development in Nigeria has fallen short of expectations of various stakeholders, hence, the need for investment in Private Forest Plantations Development (PFPD). However, there isinadequate information on the economics of investment's returns from PFPD in Southwestern Nigeria. Therefore, economics of PFPD in Southwestern Nigeria was investigated.

Ogun, Oyo and Ekiti States were purposively selected based on the prevalence of private forest plantation Owners (PFPOs), having done a reconnaissance survey of Southwestern Nigeria. Random sampling technique was used at 50% sampling intensity to select 27, 39 and 81 PFPOs from Ogun, Oyo and Ekiti States, respectively. Structured questionnaire was used to obtain data on demographic characteristics (age, gender, education and occupation); challenges associated with investments;species and size of plantations: small (0.1- 4.99ha), medium (5.0-29.99ha) and large (≥30ha), cost and returns; and willingness of foreststakeholders to participate in PFPD. Data were analysed using descriptive statistics, Net Present Value (NPV), Benefit Cost Ratio (BCR), Internal Rate of Return (IRR), Annual Equivalent Value (AEV), Land Expected Value (LEV), Return on Investment (ROI), Discounted Payback Period (DPBP) and Logistic regression ($\alpha_{0.05}$).

Mean age of PFPOs was 53.5±11.3 years, 88.4% were men, 64.7% had tertiary education and 34.3% were civil servants. Major constraints to PFPD include: inadequate capital (22.5%), ineffective policy and legislation (19.7%), land scarcity and insecurity (15.5%). In Ogun State, 40.9% each had small and medium scale plantations, while 13.6% had large scale plantations. Fifty two percent, 30.8% and 15.9% had small, medium and large scale plantations, respectively in Oyo State. Ekiti State had 43.5%, 30.4% and 21.7% small, medium and large scale plantations, respectively. Fourteen species were identified in the plantations, of which *Tectonia grandis* and *Gmelina arborea* accounted for 55.6% and 19.4%; 54.8% and 33.3%; 39.6% and 22.6%, respectively in Ogun, Oyo and Ekiti States. Nineteen percent, 34.6% and 21.7% of PFPOs planted both *T. grandis* and *G. arborea* while 19.0%, 15.4% and 43.5% planted more than the two species in Ogun, Oyo and Ekiti States, respectively. Small scale *T. grandis* plantation with 12 year rotation had NPV (₦1,096,118.00), BCR(2.62), IRR(35.30%), AEV(₦208,262.42ha^{-1}), LEV(₦1,608,350.84ha^{-1}), ROI (162%) and DPBP (5.6 years). Medium scale mixed

plantation of *T. grandis* and *G. arborea*with 18 year rotation had NPV(₦1,504,841.70), BCR(1.35), IRR (24.43%), AEV (₦316,016.76ha^{-1}), LEV (₦2,186,997.89ha^{-1}), ROI (35%) and DPBP(17.7 years). Large scale *T. grandis* plantation with 16 year rotation had NPV (₦16,581,015.00), BCR (2.04), IRR (29.71%), AEV (₦3,979,443.60ha^{-1}), LEV (₦23,046,894.46ha^{-1}), ROI(104%) and DPBP (15.2 years). Being a male (2.288) had significant positive influence on PFPD, while thewillingness to participate in PFPD increased down the age groups; however this was not statistically significant.

Investment in forest plantation development is profitable based on the economic returns indices. However,multiple land use system may be adopted to increase economic returns and reduce the payback period in private forest plantation development.

Keywords: Private forestry investment, Plantation forestry, Forest stakeholders

Word count: 500

DEDICATION

This thesis is dedicated to the All Sufficient God, for His love, kindness, mercy and abundant blessings, and to my industrious, loving and caring parents Prof. and Mrs. J.O. Fasoro and also to my siblings (Ayodeji and Bolaji) for your moral support.

ACKNOWLEDGEMENT

To God be the glory and honour for giving me this great opportunity to see the end of this programme and making this work a success.I am indeed grateful to Him for giving me wisdom, knowledge, good health, and strength to make this work a reality.

My unalloyed gratitude goes to my Supervisor, Dr O.I. Ajewole for his rare and unflinching support, constructive and meticulous supervision of the work. You are a great mentor. May God continue to bless you with wisdom.

My thanks go to all those who assisted in the administration of the questionnaires and sometimes accompanied me to the forest plantation sites, paramount among these are Chief J.B. Odebiyi, Zonal/Charge Officers and Forest Guards of the State Ministry of Forestry Ogun State and Departments of Forestry Oyo and Ekiti States. May God bless you all.

I am immensely grateful to my parents Prof. and Mrs. Fasoro for affording sound parental, moral and academic upbringing. My sincere appreciation goes to my wonderful siblings Ayodeji and Bolaji Fasoro who assisted at one point or the other in surfing the internet for relevant materials used for this study.

I wish to register my sincere appreciation to my uncles and aunts, Mr. and Mrs. Osesusi, Mr and Mrs. Ayeni, my cousins, Ibidunni, Abiodun, Bayo, Seun, Victor, Tolu and Samuel for their advice and support. I acknowledge with thanks the immense contributions of my wonderful floormates in Balewa hall, in particular Bukola Bamisaye for helping with the analysis of this work, Moturayo, Opeyemi and others. You all made me more serious and focused. I appreciate the encouragement and support of my wonderful and long-time friends Dr. Oluwayemisi Akinmameji and Bisola Olatokun.

I appreciate the encouragement from the Head of Department- Prof. B.O. Agbeja and other Lecturers in the Department which include Prof. Kayode Ogunsanwo, Prof. A.O. Oluwadare, Dr I.O Azeez, Dr. S.O. Jimoh, Dr. Akintunde Alo and Mr. Afred Onafeli.

CERTIFICATION

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ACRONMYS

AfDB	African Development Bank
AEV	Annual Equivalent Value
ANOVA	Analysis of Variance
BCR	Benefit Cost Ratio
CDM	Clean Development Mechanism
FAO	Food and Agriculture Organization
FDI	Foreign Direct Investment
FME	Federal Ministry of Environment
FORMECU	Forestry Management Evaluation and Coordination Unit
FRA	Forest Resources Assessment
GEF	Global Environment Facility
IFAD	International Fund for Agricultural Development
INDUFOR	Industry for Forest
IRR	Internal Rate of Return
ITTO	International Tropical Timber Organisation
LEV	Land Expected Value
MDA	Ministries, Departments and Agencies
NBS	National Bureau of Statistics
NGOs	Non-Governmental Organisations
NPC	Nigeria Population Census
NPV	Net Present Value
NTFPs	Non Timber Forest Products
NWFPs	Non Wood Forest Products
PBP	Pay Back Period
REDD	Reducing Emissions from Deforestation and Degradation
ROI	Rate of Return on Investment
UN	United Nations
UNEP	United Nations Environment Programme
WRM	World Rainforest Movement
WWF	World Wide Fund for Nature/ World Wildlife Fund
R-PP	REDD+ Readiness Preparation Proposal

CHAPTER ONE

INTRODUCTION

1.1 Background of the Study

Rapidly growing demand of wood for domestic forest industries, export, woodfuel together with increasing demand for an array of non-wood forest products (NWFPs), are major factors contributing to reduction of forest cover in African's natural forests (Chamshama and Nwonwu, 2004). In particular, Nigeria's natural forest has been overexploited without adequate conservation and the depletion is as a result of urbanisation, industrialisation and, above all, human population growth.

FAO (2015) revealed that there was a net decrease in global total forest area by 3% between 1990 and 2015, from 4128 million hectares to 3999 million hectares, caused by natural and human-induced deforestation. Although natural forest area declined, forest plantation increased from 167 million hectares to 278 million hectares between 1990 and 2015 (FAO, 2015). This is an indication that forest plantation is increasing globally and stands to compliment natural forest production. In several countries, industrial wood production from forest plantations has significantly increased wood supply, thereby reducing excessive exploitation from the natural forest. For instance, forest plantations in New Zealand met 99% of the country's needs for industrial roundwood in 1997; the corresponding figure in Chile was 84 %, Brazil 62 % and 50% each for Zambia and Zimbabwe (Carle *et al.*, 2002).

Furthermore, FAO (2010) reported that countries in Asia expanded their forest plantation each year by 5 million hectares on the average while some countries in Europe, Latin America, Oceania and the United States, afforestation and reforestation programmes have decreased due to high land prices, limited financial incentives, and unconducive climate for investment. Globally, the estimation of forest plantation area in Africa is 5.8 % (15.4 million ha) and majorityof roundwood from Africa's forests are still generated from natural forests. The report further revealed that investments in forest plantations took place chiefly in

countries with relatively low forest cover (e.g. in Nigeria, South Africa, Morocco, Algeria and the Sudan).

In Nigeria, during the period of 1960 and 1970, agriculture dominated the nation's economy, while wood and wood products earned substantial foreign exchange. WRM (2006) revealed that from 1980 upwards, with the oil boom, inefficient political leadership, population explosion and gross financial mismanagement, agriculture in general was neglected, and forest resources in particular suffered from over-exploitation. During this period, Nigeria turned from an exporter of wood to a net importer of wood and wood products. In 1976, Federal Government of Nigeria banned the exportation of roundwood and semi-finished products due to high rate of forest exploitation (Okali and Eyog-matig, 2004). Nevertheless, due to increase in population, rising standard of living and an increase in the number of wood processing industries in the country, the domestic demand for wood continued to increase.

According to FAO (2003a), the demand for wood raw material by industries in recent times in Nigeria has outstripped the production capacity of the forest. Scandalous exploitation of the forest has been done to meet the increasing demand of the teeming population. Consequently, forest land were degraded and the resource base were depleted while some favoured timber species planted have become scarce in certain ecological zones. Sustainable forest management is not been practised in Nigeria due to crude exploitation of forest products which is done at a large scale while reforestation and afforestation exercise is limited. Thus, there has been a large gap in the supply-demand trend of the wood-based industries for wood raw material because of the inability of the forests to sustain the industries.

Forest plantation development which is an important activity in forestry development has the capacity of increasing wood supply and stemming the pressure in the natural forests in Nigeria. Afforestation and reforestation started in 1914 in Nigeria, and it was directed against desertification (Udofia *et al.*, 2011). However, the oldest plantation recorded was that of Olokemeji Forest Reserve, near Ibadan, which was established in 1929 (Adegbeyin *et al.*, 1988); other plantations were later raised in 1936 in llorín Native Authority Forest Reserve. There are various tree species that were introduced to plantations in Nigeria, only *Pinusspp*, *Tectona grandis* and *Gmelina arborea* were widely cultivated (Oni *et al.*, 2014). In addition, in the mid-forties, large scale planting of species (*Gmelina arborea* and *Tectona grandis*) was undertaken in many parts of the country, especially Enugu and Onitsha (Anambra State),

Umuahia (Imo State), Obubra, Ikom and Ogoja (Cross River State), Owan, Esan and Auchi areas (Edo State) (Adegbeyin *et al*., 1988).

World Bank (1986) reported that in 1978, the Industrial Pulpwood Programme was launched and established at Iwopin, Ogun State with the primary aim of providing raw materials to service the Nigeria pulp and paper mills in Niger and Ogun States. As a compliment to this effort, the Federal government secured a loan from the World Bank in 1979, under Forestry 1 project to establish 25,000 hectares of industrial plantation for the pulp and paper industry. The Forestry I project was a success, which made the World Bank to advance another loan of US $72 million for Forestry II project. The scope of the project was expanded to include: (i) extremely large afforestation in the Northern parts of the country, (ii) encourage community participation in afforestation projects, (iii) institutional strengthening and (iv) capacity building amongst others. In addition, African Development Bank (AfDB) was contacted for a continuation loan to proceed with the projecttowards the end of the World Bank loan in 1987. The loan was granted and became effective from 1989. WRM(2006) reported that by the end of the AfDB assisted portion of the project around 1995/96, the project had established 23,130 hectares of plantation.

The Federal Government created the awareness for afforestation and reforestation in Nigeria through the annual tree planting campaign. However, FAO (2001) observed that after the end of the foreign financial assistance which include World Bank and AfDB, the forestry sector in Nigeria became largely dependent on public funding. Incidentally, it became apparent that public funding of forest projects and programmes in Nigeria has been inadequate and untimely at both Federal and State government levels. Besides, studies have shown that the funded forest plantation projects had been invaded by crude exploitation. The afforestation projects have been destroyed and exported out of the country at a scandalous scale and without any thought of replanting programme. It is apparent that natural and forest plantations managed by government has faced incessant depletion hence the need for private investment in forest plantation.

World Bank (2008) identified private investments in the forestry sector as one of the main financing sources for sustainable forest development in the developing countries. Evans and Turnbull (2004) reported that in many developing countries, the growing conditions for trees are favourable and countries can benefit economically to a large extent in form of increased exports of forest products thereby contributing to the country's economy. In addition, forest

plantations investments contribute to the growth of the local communities through employment opportunities and improvement in their standard of living. However, lack of reliable economic information has been a great bottleneck to potential private investors because little or no data exist to showcase the feasibility of forest plantation investment. Irrespective of the need for economic information of the nature to guide forest plantation establishment, it is one task that forestry professionals and private forest plantation owners in the country fail to undertake. In the absence of such facts, forest plantation investments have so far been undertaken without a critical look at efficiency and profitability issues. Since investing in forest plantations is capital intensive and the maturity period is long, it is essential that information on profitability be made available if the nation is desirous of attracting the private sector into forest plantation development.

Wang *et al,.*(2014) Stated that financial returns of forest plantations are undoubtedlya weighty concern around the world. TheNet Present Value (NPV), Benefit Cost Ratio (BCR), Internal Rate of Return (IRR), Annual Equivalent Value (AEV), Land Expected Value (LEV), Return on Investment (ROI) and Discounted Payback Period (DPBP)are sometimes used as indicators for economic returns assessment in forest plantations. Financial returns assessment of forest plantations helps in evaluating the profitability and selecting the best investment alternatives. The assessment ensure that projects are using scarce capital well and meet the minimum economic standards expected by investors. The assessment can also help identify which benefits are more valuable to citizens, which is useful for forest policy decisions, such as developing forestry programs for local communities, helping produce goods and services efficiently, making payments for environmental services, and helping conserve natural ecosystems and community welfare.

With these aforementioned potentials, the role of forest plantations in sustainable supply of wood, non-wood products and environmental services cannot be overemphasized and thus deserve serious attention. In addition, the study assessed the financial returns of some private forest plantations in order to help forest industry, stakeholders and academics learn more about the opportunities in forest plantation investment and inform relevant policy makers and investors about economically sound forest management in Nigeria.

1.2 Statement of the Problem

Data on the actual extent of forest plantation development in Nigeria in recent time is deficient due to poor record keeping system and the blithe attitude of Nigerians. Where some

information are available, they are not well studied and analysed. As a result, it is difficult to know the extent of forest plantation in southwestern, Nigeria.

Nigeria like most African countries has experienced a remarkable degradation and depletion of its natural forests over the past years. FAO (2003b, 2012) reported that the total forest area in Nigeria has been decreasing at an increasing rate and the demand for wood raw material by industries and citizens in recent times in Nigeria has outstripped the production capacity of natural forest. FAO (2015) reported that between 2010 and 2015, the extent of forest decrease in Nigeria was 5.0%. Meanwhile the population of the country has consistently been on the increase from 57 million in 1990 to 182.2 million in 2015, resulting in a decreased forest per capita of 0.18ha per person in 1990 to 0.04ha per person in 2015. This shows that forests (natural and plantation) managed by governments are not sustainably managed and they are over exploited.

Government's effort to replenish the loss of forest does not match the rate of forest loss in the country. For instance, it can be observed from Table 1.1, that while the rate of forest loss between 1990 and 2000 was 2.7%, the rate of replenishment through plantation development was 2.3%. Similarly the rate of forest loss between 2000 and 2010 was 3.7, while forest replenishment was 0.4% and the rate of forest loss between 2010 and 2015 was 5%, while replenishment was 5.1% (FAO, 2015).

Table 1.1: Forest Loss and Replenishment 1990-2015

	ANNUAL CHANGE RATE		
YEAR	1990-2000 %	2000-2010 %	2010-2015 %
Extent of forest decrease	-2.7	-3.7	-5.0
Other wooded land	-3.4	-5.1	-8.1
Primary forest	-7.2	-23.0	-18.0
Other naturally regenerated forest	-2.4	-3.3	-5.4
Planted forest	2.3	0.4	5.1

SOURCE: FAO (2015)

From the above table, it's evident that government's effort to replenish the loss forest does not match the rate of forest loss. This does not only attest to the little replenishment of the forest done by the government but also indicate that forests managed by government cannot guarantee sustainable production of roundwood in Nigeria.

In Nigeria, there is no systematic research on economic returns of forest plantations owned by the State government and there is non-availability of empirical data on investment analysis (economic and financial analysis) of private investment in forest plantation development. Information on incurred cash flows and impacts related to investments are limited due to poor +record keeping system and these affect assessment of investment analyses of forest plantations. Insufficient information on investment analyses discourage potential private investors and foreign donors because the analyses are used to determine how to maximize the return on capital as measured by market input costs and output prices. Also they are used in comparing projects to know if it's feasible and acceptable. Lack of these information do not attract loan from foreign aid donors who are particular and interested in the profitability and feasibility of the investment and also potential investors who want to determine what their returns are likely to be and where improvement in efficiency could be made to know and propose activities that increase returns.

Furthermore, existence of weak appropriate institutional provisions for private investment in forest plantation development affect private investment in forest plantation development.Inconsistent and unstable policies and regulations, as well as unconducive investment climate, incentives, secure land rights, and adequate infrastructure and technology limit private investment in forest plantation development. For example, tax fluctuations, land insecurity, bad roads and unstable market scare potential investors in investing in forest plantation development. FME (2006) Stated that due to weak institutional capacity, sustainable forest management strategies are not effectively implementedand majority of the States havelittle or no access to forest resources information and data for the development of forest plantations, also the management plans of forests are scattered or not updatedin Nigeria.

All these aforementioned drawbacks give ample cause for private investors to shy away from forest plantations development, despite the apparent advantages of investing in forest plantations such as potential profits and ensuring long-term supplies for downstream industries. Also, few researches have analyzed the financial returns using the empirical data in forest plantation. Nevertheless, it is therefore appropriate to assess private investment in forest plantation development; by assessing the feasibility and acceptability of the investment and also confirm if forest plantation development can serve as a viable compliment to wood production in Nigeria.

1.3 Objectives of the Study

The broad objective was to assess private investment in forest plantation development in selected States in southwestern, Nigeria.

The specific objectives of the study are to:

1. Evaluate the cost and returns associated with private forest plantations development in the study area.
2. Appraise the status and effect of institutional mechanisms (policy, legislation) on private forest plantation developments.
3. Examine challenges associated with private forest plantation development in the study area.
4. Assess the willingness of non-plantation owner forest stakeholders to participate in forest plantation development in the study area.

1.4 Justification of the Study

This research serves as a “benchmarking” exercise that helps identifycomparative advantages among States for forest plantation investment returns. This research provides an update on forest plantation development, including results on forest plantation investment returns, challenges, andas well as other institutional, forestry, and policy factors that affect investments in southwestern, Nigeria. It focuses on a key tables and outcomes, with view to encouraging, persuading and sensitizing intending private investors of timber production on the long term benefit accruable on fast growing tree species establishment.

FAO (2015) Stated thatforests can make significant contributions to the economy and provide multiple products and services that support livelihoods and protect the environment. Unfortunately, government owned forests (natural and plantations)are faced with forest

products scarcity due to the diminishing forest area caused by human activities. Studies have shown that massive forest plantation development will increase timber and non-timber products and reduce the pressure on natural forests (Evans, 1992; Agbeja, 2004; FAO, 2012). Therefore, private investment must be fostered towards forest plantation development. Forest plantation development must involve the participation of all forest stakeholders in order to manage forest resources sustainably.Forest stakeholders must share the responsibility in making management and sustainable development of forest resources work efficiently and effectively.

Elbakidze *et al.,* (2010) reported that participation in forestry management and development include active involvement of various stakeholders in managing forest resources, resolving conflicts over forest uses and monitoring and evaluating the performance of forestry and biodiversity conservation projects. Therefore, participation of forest stakeholders in forest plantation requires elicit information about the feasibility and acceptability of forest plantation investment. Also, enabling environment which include reducing domestic policy and institutional problems (inappropriate regulations that contribute to unduly high costs, unstable market and marketing and lack of incentives) must be guaranteed by the government.

In this regard, Faleyimu *et al.,* (2013) drew attention to the potential of incentives (financial incentives, technical assistance etc.) that could attract stakeholders and private investors to participate in forest plantation development. Roche (1990) remarked that providing incentives for forest plantations development boost the economy of a nation through job creation. The study further reported that in the late 1920's when New Zealand was struck by the worldwide economic depression which resulted in widespread of unemployment. Afforestation was seen by government as constructive relief work. Government invested heavily on plantation establishment to keep the people employed. Therefore, provision of incentives is believed to generate employment, ensure reliable supply of strategic timber resources and alleviate rural poverty. In Nigeria, unemployment and poverty contribute to overexploitation of the forests. Active investment in forest plantations development through the use of incentives will contribute to the economy of the country through job creation and improving the standard of living of many citizens.

In addition, Wang *et al,.*(2014) reported that some researchers have assessed and analyzed investment in forest plantations using the financial indicators. For example, Sedjo (1999)

reported that intensively managed forest plantations in the southern hemisphere are much more profitable than those in the northern hemisphere. Wang *et al.,* (2008) figured out the IRR in the plantations of eucalyptus (*Eucalyptus grandis*) with different clones ranged from 15.4 to 57.1% in southern China.

Despite the fact that good documentation exists on investment in forest plantation development in developed countries,very little or no comprehensive research has been undertaken to evaluate the cost and returns associated with forest plantations development in Nigeria. Research conducted has provided in-depth information on socio- economic impacts of forest plantation, impacts of forest plantation management on forest dwellers, productivity of forest plantation, incentives and policy to promote sustainable forest development and potentials, challenges and policy options for global industrial forest plantation development (Enters *et al.*, 2003, Agbeja, 2004, Schirmer *et al.,* 2005, Barua *et al.,* 2014 and Adejumo, 2017). Literature on investment analysis of private investment in forest plantation development in southwestern, Nigeria is limited and scattered.

It becomes very imperative therefore, to conduct a study that consideredthe economics of private investment in forest plantation development in southwestern Nigeria. This research examined investment analyses of private forest plantation investment and risks associated with private investment. It is believed that if forest plantation establishment and development is well conceived, it will help reduce pressure exerted on natural forests and contribute to economy development of Nigeria. The study also stands to benefit the country in her drive to ensuring self-sufficient in wood production, as it will identify those variables (areas) that require urgent attention of the various stakeholders in the nation's forest plantation sub-sector. This promotion of private investment in forest plantation development is a motive essential to supplement the government's efforts at regenerating the species in Nigeria.

1.5 Scope of the Study

The study was conducted in three States of southwestern, Nigeria in order to provide information on the feasibility of private investments and the willingness of forest stakeholders to investin plantation forest development in Ogun, Oyo and Ekiti States.

CHAPTER TWO
LITERATURE REVIEW

2.1 Private Forest Investments

Public institutions in the developing countries often lack the political will to ensure sustainable forest practices, hence,private investments into the forestry sector are one of the main financing sources for sustainable forest management(World Bank, 2008). FAO (2010) reported that as human population is constantly growing, the demand for forest based products is increasing simultaneously. Consequently, the forest cover is decreasing and natural forests are under pressure. Timber production, fuel wood collection and land use changes in favour of industrialization and agricultural uses have been identified as main drivers of deforestation. Therefore, forest plantations with fast growing tree species are seen as a possible solution to meet the increasing demand of forest products and in addition transform fallow land into productive land.In addition forest plantation development involving multiple land use systemsis encouraged. Where agriculture and animal husbandry (maize, plantain, pepper, tomatoes, pigs, bees, grasscutters etc.) are incorporated into forest plantation developments.

Private investments in forest plantation development include investments by the domestic and foreign forest industry, as well as by local communities and individuals. The purpose and the end-use objective of investments in forest plantation development by private investorsare mainly for industrial (producing wood or fibre for supply to wood processing industry) or non-industrial (fuelwood, soil and water protection). World Bank (Ibid) observed that approximately US$15 billion are yearly invested into forestry in the developing countries by private investors. Meanwhile, Jhingan (2000) Stated that in some developing countries,

private investor tends to avoid investing its capital on high-risk and low-return business such as forest plantation development; thus, there is need for government to provide facilities in attracting the private investors.

Evans (2004) Stated that forest plantations can be a lucrative investment for private investors because the managing costs of forest plantations are often lower than for natural forest. Most times, forest plantations often consist of only one tree species, and if a suitable species is chosen, a high volume per unit can be the yield, which reduces the harvesting costs. Income generated through this investment has the potential to enhance lives in a sustainable framework through wealth creation, job creation, innovations and productive supply of forest resources to industries and individuals. For forest plantation to achieve the aforementioned services, and also become a key growth area of the nation economy, there is need for government support.

2.2 Extent of Private Forest Plantation across the Globe

Summary Report of the 3rd International Congress on Planted Forests (2013)revealed that the global area of forest plantations has considerably increased from 178 million ha in 1990 to 264 million ha in 2010, which corresponds to 7% of total forest area. During 2005 to 2010 the area of planted forests expanded each year by around 5 million ha on average. FAO (2012) revealed that Asia and America have large areas of industrial forest plantations while in some countries in Europe, Latin America, Oceania and the United States afforestation or reforestation has decreased due to high land prices, lack of financial incentives, and unconducive climate for forest plantation development.

Carle *et al.,* (2002) affirmed that Asia accounts for 62% of the total forest plantation area, Europe, 17%; North and Central America, 9%; South America, 6%; Africa, 4%; and Oceania, 2%. The study also established that globally, 48% of the forest plantations are developed to supply raw materials to industries; non-industrial uses of resources from forest plantations accounted for 26%; while about 26% is not Stated. 34% of industrial forest plantations are owned by public sector, 29% are owned by private investors, and 37% not specified while non-industrial forest plantations are 41% owned by public sector, private sector owned 37%, and 22% are not specified.

Unfortunately, Africa has relatively small area of forest plantations compared to the potential due to land availability. Most of Africa's wood is still produced from natural forests. The

Summary Report on planted forest (Ibid) pointed out that investments in forest plantations have occurred mainly in some countries which includeAlgeria, Morocco, Nigeria, South Africa and the Sudan. These countries have relatively low forest cover and most afforestation programmes were created in an effort to secure constant supply of roundwood to industries and also produce fuelwood (charcoal and firewood) while some forest plantations were established to combat desertification. Majority of forest plantations in Africa consist of exotic species chosen for their ability to rapidly produce wood or other economic products.

Study had shown that the quality of management and productivity of forest plantations largely depends on the type of ownership in Africa. Most forest plantations are established and managed by State or Local governments through the public forestry agencies in the country with the exception of South Africa. FAO (2015) confirmed that publicly owned forests were not sustainably managed and they are over exploited due to inadequate governance frameworks, weak forestry departments, inadequate silvicultural management, budgetary constraints, and lack of research. Exceptions to this situation are Côte d'Ivoire and Zimbabwe, where publicly owned forest plantations are found to be well managed.

In South Africa, Swaziland and Zimbabwe, privately owned forest plantations are common. They are generally well managed, display high productivity and aim at profit maximization sometimes integrating wood processing plants in forest plantations contribute to high productivity and returns. The growing demand for roundwood has encouraged afforestation on individual land owned by private households. Farm woodlots, including trees outside forests, are now common in Ghana, Kenya and Uganda, although information on their extent is unreliable. They have become a major source of wood and non-wood forest products thus playing a significant role for the livelihoods of rural communities and national economies.

2.3 Forest plantation Development and Markets for Environmental Services

2.3.1 Payments for Environmental Services

Forest plantations contribute substantially to theeconomic, social and environmental development of countries. Payment for environmental services entails providing compensation to the private forest owners in return for the provision or maintenance of certain environmental services (Gondo, 2010). Payment for environmental services can also be referred to as a financing mechanism that is designed to "capture" the non-market values

of environmental services through some kind of economic transaction, thus creating new markets (Verweij, 2002).

Trees store carbon and when they are destroyed, carbon is released into the atmosphere contributing to greenhouse gases that cause climate change. Consequently, deforestation and forest degradation are significant sources of carbon emissions. Therefore, forests play an important role in carbon sequestration, and by investing in forest plantation development and conservation, countries can benefit from carbon trading. Concern about climate change has led to the development of carbon markets and the growth of carbon offset projects implemented in developing countries that sell emission reductions (carbon credit) on these markets.

In Nigeria, rapid deforestation and forest degradation are threateningthe flow of key environmental goods and services.The environmental goods forest provide include wood, bushmeat and wild fruits, and services include carbon sequestration, biodiversity conservation, soil conservation and watershed protection. Hence, investing in forest plantation development by private plantation investors will provide payment for carbon sequestration by selling carbon credits based on the number of planted trees (Bebbington, 1999). Carbon trading offers opportunities for indigenous companies and in particular private investors.There are two main kinds of carbon markets:

2.3.1.1 The Clean Development Mechanism

The CDM regulated market is governed by rules established under the Kyoto Protocol.Under the Kyoto protocol, the Clean Development Mechanism (CDM) was formulated as a means to form official partnerships for funding reforestation as a way of sequestering carbon dioxide.This is a legally binding treaty under which developed countries, or the industries that they regulate, can purchase carbon credits from developing countries to meet legally binding emissions reduction targets. This agreement heralded the formal start of payment systems for reforestation and afforestation as a means for carbon sequestration (Wiersum 2009).

Abaidoo (2005) Stated that CDM is potentially an important source of extra funding for reforestation projects and to proceed withimplementation of reforestation and afforestation schemes, Nigeria government will need such funds and other donor funding. Nigeria ratified into Kyoto protocol agreement in 1994. Fodeke (2009) Stated that Nigeria is yet to

domesticate the Kyoto protocol five years after it ratified the agreement. Although Nigeria government claimed that the Protocol came into force for the country on the 10th of March 2005, unfortunately stakeholders are yet to partake in the activities and projects.

2.3.1.2 Reducing Emissions from Deforestation and Degradation (REDD)

Angelsen *et al.,* (2012) claimed that Reducing Emissions from Deforestation and forest Degradation (REDD+) has gained significant influence on how forests are viewed and governed in developing countries and REDD+ has been considered as a game changer, shifting forests into the centre of global climate change politics (Buizer*et al.,* 2014). The REDD+ is an off-set mechanism which allows developed countries to purchase carbon emissions and enabled forest-rich developing countries to receive paymentfor conservation. AfDB (2016) reported that Forest Investment Program (FIP) which involve REDD+ only operate in 11 countries in Africa(Burkina Faso, Democratic Republic of Congo, Congo Republic, Ivory Coast, Mozambique, Ghana, Cameroon, Zambia, Tunisia, Uganda and Rwanda).

AfDB (Ibid) further revealed that before the implementation of REDD+ in a country, political and institutional factors (forest laws and control drivers of deforestation and degradation); technical factor (land tenure system and governance capacity) and social and economic factors (needs of local and indigenous communities, capacity building and benefits sharing among multiple stakeholders and government) must be taken into consideration. Wiersum (2009)Stated that regarding the objectives of the climate payments, the difference betweenCDM and REDD+ policy is that, the CDM policy is focused on stimulating reforestation as a means for sequestering carbon dioxide, whereas the REDD+ policy is focused on preventing carbon dioxide emissions from deforestation and forest degradation.

Therefore, REDD^{+} stands for countries efforts to reduce emissions from deforestation and forest degradation, and foster conservation, sustainable management of forests and enhancement of forest carbon stocks. However, unlike the CDM, under which the volume of carbon sequestered is the basis for determining credits, REDD is actually about selling the 'service' of reducing emissions from forest degradation or deforestation (Asare, 2010) and is linked to the effectiveness of slowing deforestation or degradation rates.

2.3.2. State of REDD^{+} Development in Nigeria

REDD^{+} projects are keys to tackling the issue of deforestation and also encourage forest plantation establishment. Forest Carbon Partnership Facility(2015)reported that Nigeria is emitting 320million tons of carbon dioxide per year due to loss of forest cover, second in Africa to South Africa. As a result of this, reforestation and afforestation must be taken in Nigeria because REDD+ projects tackle the issue of deforestation. Developing REDD^{+} projects in Nigeria will bring a lot of environmental benefits for the country and the entire African continent.

FAO (2011) Stated that the nature of REDD+ projects is complex, they take a lot of time to bear fruits. This means government needs to support and do a ground work for REDD+ development project. It is also necessary that government ensure that there is a strategy for REDD+ projects to have positive development impact, rather than simply reducing GHG. Also, any private REDD+ developer will need and endorsement and approval from the government usually through the ministry in charge of the environment or through an inter-ministerial committee.

Nigeria is a UN-REDD partner country and has begun some preliminary work in this regard, albeit at a slow pace, compared to countries with less forest resources like Zambia that are already seeing REDD+ funding inflow. The UN- REDD Nigeria Programme Steering Committee was established in 2013 and is leading the REDD+ strategy in the country. Its implementation time frame is supposed to span until 2017. However, to date, only 42% of the USD 4 million received from UNDP, UNEP and FAO for the development of the strategy and a pilot project in Cross River State has been disbursed. UNEP is currently carrying out a REDD research project in about three hundred (300) sites that were contaminated by oil spills in Ogoniland in Nigeria (Minang *et al.*, 2014).

However, some local NGOs have been campaigning against Nigeria's participation in REDD fearing that REDD+ could become a vehicle for corporate land grabs, that Nigeria's forest dependent poor may be forcefully evicted from their land and denied access to the forests. They feel that forest-dependent communities have not been engaged or incorporated by government in the REDD+ negotiation process. As such, REDD+may not be relevant for forest plantation development in Nigeria.From literature and field work study, all these mechanisms and payments are still at their infancy in Nigeria.

2.4 Factors Affecting Private Forest Plantation Development in Nigeria

The potential of forest plantations has been recognised globally but there are many challenges associated with forest plantation development which in turn affect private investment.World Bank (2008) identified private investments in the forestry sector as one of the main financing sources for sustainable forest development in the developing countries. Forest plantation has the capacity of increasing wood supply and stemming the pressure in the natural forests.

Historically, public-sector (government) had dominated forest plantation development in Nigeria. This pattern has changed in many countries over the past 10 to 20 years for three main reasons. First, devolution of forest management has led to greater involvement of communities and the private sector in forest management. Second, the performance (financially and biologically) of public-sector plantations with few exceptions has been disappointing. Third, shrinking government budgets make it impossible for most forest departments to devote as many resources to forest plantations as they had in the past. Hence, governments are increasingly seeking the involvement of communities and the private sector in plantation development (Enters *et al.,* 2003).

Private investment in forest plantation has a lot of great potential to rescue the forestry sector and in turn contribute to sustainable forestry development in Nigeria. However the following challenges need to be addressed in order to achieve optimum private involvement in forest plantation development in Nigeria.

2.4.1 Capital

The lengthy duration between incurring the costs of establishment and yields which are only expected at the end of the rotation period has been the major obstacle to investment in forest plantation development. Forest plantation development requires huge capital outlay, especially at the initial stages. During the process of production and management, different capital demanding activities are expected to enhance the production of quality timber. These include production of quality seeds and seedlings, herbicides,fertilizers, transportation and felling of trees' costs,machinery, processing and product marketingetc. Therefore, capital has a great impact on forest plantation development (Byron, 2001).

Arnold (1997) revealed that only the private owners that incorporated multiple land use system, engage in other occupation, or have access to soft loans are capable of withstanding the extended payback period between tree planting and harvesting. Furthermore, forest plantation management and development requires optimal silviculture practices that is

interventions must be timely and effectively carried out. Often, many private forest plantation owners can be tempted to defer treatments, due to the limited access to capital and credit for investing in tree planting, and the financial inability to wait for trees to reach the minimum diameters required by industry. This affects the quality of the timber. Also, large State and private owned forest plantations produce large volume of timber and other forest resources at a reduced cost per unit due to availability of capital while small-medium private owned forest plantations with limited capital may produce low quantity and quality timber. This is part of competitive advantage the larger State and private owned forest plantations have over small-medium private owned forest plantations due to economies of scale, thereby reducing the final returns (Maturana *et al.,* 2005)

2.4.2. Markets and Marketing

Arnold (2001), Byron (2001) and Scherr (2004) confirmed that the willingness of private investors to establish and manage forest plantations with timber production as the main objective is influenced by the availability of functional markets. The existence of a functional market is one of the most critical factors in promoting private forest plantations. Therefore, creating a stable commercial market for forest products is very useful particularly in cases where the existing market is uncertain. Foley and Barnard (1984) posited that guaranteeing wood prices is one of the direct strategies for creating a stable market for trees produced in the Philippines.

Low quantity and quality are two main factors that often complicate the markets for small-scale wood production. These complicating factors especially apply to investors with small land areas and poor silvicultural management skills (Arnold 2001 and Byron 2001). The small harvest volumes of small scale forest plantations may increase harvest and logistic costs, especially when the forest plantation sites and markets are located far away. This situation discourages potential buyers. Thus, private investors located very close to the forest plantation sites, markets and possess good infrastructure facilities, have good market conditions (Scherr, Ibid).

Furthermore, the lack of continuous supply from small-scale plantations is a hindrance to industrial operations. The price of wood from private forest plantations can be held low by the availability of cheaper non-wood substitutes or the availability of relatively cheaper wood from natural forests, or by subsidies that are designed to promote agricultural crops or other cash crops (Scherr, Ibid). Low and unstable market prices for wood are major disadvantage

for tree planters. The absence of open market give large scale forest plantation owners' power to control small scale forest plantation owners'production decisions on the type of species to cultivate or when to fell trees.

Private owners with limited access to market information often lack negotiation power on the prices they receive for their products, and they often have little choice but to accept the price dictated by the forestry departments (even if it is well below market rates). Government speculated price is not fixed and private owners have the right to negotiate on the price they are willing to sell without running into losses. Rohadi *et al.,*(2012) revealed that inaccessible markets, poor market and marketing information, and inability to overcome transaction costs contributes to challenges affecting forest plantation development. Furthermore, Perdana *et al.,*(2012) reported that engaging middlemen (timber contractors) in timber price negotiation sometimes reduces the profits of private forest plantation owners, although, Roshetko *et al.,*(2007) observed that the involvement of middlemen is not always negative or damaging because they enhance marketing of wood.

2.4.3 Land Tenure and Insecurity

FME (2006) Stated that the involvement of the private investors and local communities inforest plantation development has been modest butconstrained by land and tree tenure,and the prevailing low tariff for all classes of wood, which is sometimes below economic rates.

There is considerable sensitivity amongst many people in Nigeria over land ownership, land and tree tenure, and permitted land uses. The absence of well-defined property rights in land tenure system has been key obstacles to attracting investment in forest plantations. In Nigeria, an investor may purchase a piece of land from the State government and still be threatened and disturbed by indigenous landowners. So, the indigenous owners may have to be consulted in order to reach and sign agreement. This arrangement has undoubtedly given rise to double payment on the part of investors. Therefore, the resolution of conflicts over land tenure rights and improved law enforcement are pre-requisites for achieving forest plantation development (ITTO, 2009).

Indufor (2013) Stated thatin many Asian and African plantation countries, land is owned mainly by the State, and securing land title for plantations can be difficult. In China, for example, the process of transferring land-tenure licences is bureaucratically complex and usually time-consuming; in Indonesia, lease and concession regulations are often unclear.

Obtaining tenure rights can cause social conflicts and thus induce reputational risks, especially for foreign plantation investors. Auren and Krassowska (2004) also Stated that in Uganda, land availability either for purchase or rent remains beyond the reach of many private investors.

ND-HERO (2006) reported that before the promulgation of the Land Use Decree in 1978 in Nigeria, the land tenure system in Nigeria was communal. Under the communal system, land and its resources were communally owned and therefore, held in exclusive community or family holdings. ND-HERO (Ibid) further revealed that when the land use decree was promulgated in 1978 (reviewed in 1998), it radically changed and undermined the indigenous land tenure system. It not only vested authority over all lands within the territory of each State on the Governor of the State, but also gave the State Governor and Local Government Councils ultimate power of control and management of all lands located in urban and non-urban areas respectively. This has contributed to land tenure insecurity and uncertainty

Globally, the competition for land is increasing, driven mainly by demand for food and other agricultural commodities as well as for fibre, wood and bioenergy. In Indonesia, for example, the competition for land between forest plantations and agriculture is intense. This is particularly so with oil-palm plantations: according to some estimates, such plantations are more than ten times more profitable than forest plantations for pulpwood. Land-use competition pushes up land prices, with the effect that forest plantations shift towards new frontiers (Indufor, Ibid). In Nigeria, the favouring of agricultural production through competing policies decrease natural forest cover and also reduce the rate forest plantation establishment and development.

2.4.4 Risks and Uncertainties

Tree plantations are subjected to a number of risks such as arson, and vandalism arising from conflicts over land ownership and use, climate and weather conditions, diseases, clash and riot between plantation owners and herdsmen causing insecurity of land and investment.

Agee (1993) and Schoennagel *et al.,* (2004) Stated that the intensity and severity of a fire is dependent on the weather, climate, wind, topography, ignition source, and the amount and types of fuels present when the stand ignites. Historically, fire risk has been considered to be outside the control of landowners, but recent evidence indicates that land management can influence fire risk. Proper and adequate silvicultural practices can reduce the effect of fire on

the forest plantations. Yoder (2004), and Curtis *et al.,* (1998) show that management activities in existing forests can reduce the risks to landowners.

Of all the factors causing environmental degradation and depletion of resources, none has as much destructive effects as uncontrolled forest fires. Large tracts of forested land are laid bare within minutes as a result of bush fires, resulting in destruction of unquantifiable volume of forest resources. In short, the devastation of the forest ecosystem by fire is more thorough than that of any other single factor of forest degradation.

Insects also affect the productivity of a forest. However, in normal balanced forest, insects only affect or feed onweak, dying or dead trees and branches. Sometimes, when there is dis-equilibrium, epidemic may occur in the forest. There are various types of parasitic insects and they attack any part of the tree. Therefore minimisation of risk is the responsibility of both State Forest Ministry / Department and forest plantation owners. The State ministry/department should provide management control in regulation of risks through the provision of training in the management of risks such as fire outbreak. Weeding of vulnerable crops or unwanted grass/climbers/weeds before the fire season is also essential.

Another challenge faced by private forest owners is conflict between private forest plantation owners and herdsmen. Fulani herdsmen in search of food (grasses and leaves) for the cattle, lead their cattle to any forest plantation, thereby destroying the plantation especially coppices. Government can help in protecting the plantation from herdsmen by providing a ranch for the cattle or mandating them to have a ranch for their cattle. Government can also help in protecting private forest plantations by providing State forest patrol guards to protect all forest plantations.

2.4.5 Institutional- Policy, Legislation and Administrative Framework for Private Forest Plantation Development

To attract private investors, make forest plantation investment profitable and create a conducive investment climate for adequate investment and market development, government has a significant role to play. It is important that a country is politically stable and must also communicate this to the rest of the world in order to attract private investment. The transparency of a government decreases corruption, which is often interwoven with and prevails over governmental policy. When a country operates transparent policies, she has the capacity of offering ample security to investor and risk in investment is reduced. That is, the

greater the political stability and governmental transparency, the lower the risk (ITTO, Ibid). In addition, Kallio (2013) Stated that distinct, dependable and fixed laws and regulations, in addition providing incentives, land security, conducive investment climate and adequate infrastructure and technology will attract private investment to forest plantation development.

Olajide (2005) observed that there is little or no forest governance in Nigeria but rather forest administration which is devoid of people or users' considerations. The major governance-related obstacles affecting private investment in forest plantation development in Nigeria include ineffective policy, institutional failure, scarcity and insecurity of land, and the lack of trust towards the government. Absence of appropriatedissemination of information, policy, proper decentralization, legislation,transparency, conflict resolution and decision making processes impede private investment in forest plantation development.

Stable policy, legislation and judiciary transparency are the groundwork of favourable investment climate for investors and this also promote effective justice system. IITO (Ibid) claimed that in a favourable investment environment, private property rights and norms of contract protection are guaranteed by judiciary system. The study further revealed that when there is legal support for private property, there will be economic freedom to attract investment.

Many Nigerian leaders have often been accused, and justifiably too, of economic mismanagement, wanton squandering, embezzlement or misappropriation of public funds. As a matter of fact, corruption and unethical behaviours appear to have been institutionalized in Nigeria. Low salaries and insufficient skilled government forest workers contribute to the rate of corruption in the country because the staffs are not motivated to perform their duties diligently. Corruption at different levels of government discourages private investment in forest plantation development. In a situation where private forest owners are subject to exploitation by unscrupulous administration officials citing various rules and laws affect private investment. In some cases, provision of incentives to private investors by government officials gave them the chance to engage in corrupt activities. Inefficient political stability and bad governance has led to unsustainable harvest of forest resources from the natural forests and forest plantations, which drastically reduced stocks. Some of forest policies in the country largely exist on paper. In reality, very little of the required measures are carried out.

Indufor (2012) reported that the key forest plantation countries (China, India, and the Russia Federation) had and still enjoy incentive schemes like tax exemptions and direct or indirect

subsidies for forest plantations development and this is as a result of considerably good governance.The study stressed that good national policies promoting forest plantations are witnessed in Europe (the United Kingdom, Spain and Portugal), South America (Brazil, Chile and Uruguay), and Asia (China and Vietnam). In Africa except South Africa and Uganda, little or no incentives were made available for forest plantation development. The study further reported that there is stable and enforced environmental legislation in Oceania, North America and Europe. Also, environmental liabilities, environmental legislation particularly law enforcement and strict permit processes are stable and firm in Latin American. This guidesforest plantation development and most likely lead to improved environmental performance.

As earlier Stated, insufficient law enforcement is a major problem in Asia and Africa. For example, Uganda has good laws and regulations protecting the forests and trees, but the problem lies in implementation of these laws and regulations. The major elements contributing to this situation are poor funding and limited institutional and human capacity to monitor and guide forests and markets, detect and deter offences, prosecute cases and educate stakeholders. To add to the challenge, some law enforcement officers (e.g. forest guards, magistrates and customs officials) lack the practical ability to identify legal documents (licences and receipts) and marks on timber.

Furthermore, some regulations were established to preserve resources in the natural forests, unfortunately, some limit private investment in forest plantation development. One of such regulation is the collection of 'permit' by forest plantation owners from the State Ministry or Department. Permission is granted so that private owners can harvest, transport, or sell their wood and this process is done to regulate deforestation. Unfortunately, permission seeking processes can be difficult, costly or time-consuming for private forest plantation owners. Indufor (2013a) reported that comprehensive governance reforms are needed in some potential plantation-expansion countries, especially in Africa and Asia, to, for example, streamline and increase the transparency of processes for issuing licences and permits. This would help reduce the risk of corruption and excessive bureaucracy and expedite the execution of investments.

2.4.6. Silvicultural Knowledge and Skills

Kallio (2013) Stated that lack of technical information about forest plantation management is usually noticed in small-medium scale private forest plantation in developing countries. The

study further stressed that there are conflicting opinions between different authors about how knowledge affects tree planting. Despite a large body of traditional knowledge on tree planting, there is a general lack of knowledge and skills related to tree planting and management amongst private forest owners, which is considered to be a major constraint to successful small-scale tree planting (Byron, 2001).

Maturana *et al.,* (2005) also reported that small scale forest plantation owners in Indonesia and other developing countries in the tropics often manage their timber plantations using poor silvicultural practices with low levels of labour inputs, which lead to low quantities and quality of timber. Kallweit (2005) also reported that skills levels in most private plantation business in Uganda are low; specifically, investors lacked appropriate skills and experience in management practices for viable commercial forest plantations development.

One of the primary impediments to improving forest plantation productivity in developing countries is the non-availability of adequate and/or genetically-improved seeds or seeds of appropriate species. Study have shown that forest plantation owners in developing countries prefer planting exotic tree species in their plantations and this because exotic tree species had been well researched and are known to grow quickly. Selection of appropriate tree species is one of the most important silvicultural decisions to be made, and has a strong influence on the success of forest plantation development. The species selected should be suitable for the local environmental conditions, and should also suit private owners' objectives and livelihood strategies and available markets (Scherr, Ibid). Another silvicultural practice to consider is spacing. Spacing should be regular and not irregular on forest plantation sites, species composition is sometimes result of chance rather than a conscious decision, and planters often lack the technical skills necessary to achieve best practice.

Roshetko *et al*., (2007) Stated that the most common management activity is often limited to harvesting of wood, while trees are just let to grow without any silvicultural management between planting and harvesting.Often significant research trials had been established in developing countries, but then the trials had been abandoned or lost, the results had been lost or destroyed, or the results have not been carried through to the field. For example, Krishnapillay (1998) described the 1920s as the era in Malaysia where management was generally not carried out after planting. Also, some private owners know and understand the importance of good silvicultural practises but this knowledge is not applied because of other reasons such ascapital, labour, infrastructures etc. (Byron, 2001)

2.5. Review of Forest Policy and Legislation in line with Private Forestry Development in Nigeria.

FME (2006) Stated that part of the reform agenda of government is the privatization policy by which government's role is reduced in activities that can be performed better by the private sector. Government regarded private sector investment in forest plantation development especially production and processing of wood products as a way of improving the economy through job creation and increasing the supply of timber. In Nigeria, there has been a number of constraints to the active involvement of private sector in financing forest plantation development. These include among others: the poorly coordinated and monitored administrative systems for the harvesting and movement of forest produce; the absence of clear land and tree tenure arrangements, which has been a disincentive to commercial tree growing; the poor quality and occasionally unaffordable seed and seedlings for plantation development; market disincentive for investment and re-investment of profits; and conflicting guiding policies. Consequently, private investment in forest plantation development in Nigeria is directly affected by forest policy, administration and legislation.

2.5.1 Policy

Forest policy is considered to be a negotiated agreement between government and stakeholders (i.e. all those who depend on or benefit from forests or who decide on, control or regulate access to these resources) on the orientations and principles of actions they adopt, in harmony with national socioeconomic and environmental policies, to guide and determine decisions on the sustainable use and conservation of forest and tree resources for the benefit of society (Byron, 2006).

Policy usually comprises two elements: a set of aspirations, goals or objectives; an outline of a course of action to achieve them. The overall objective of Nigeria's National forest policy is to achieve sustainable forest management that would ensure sustainable increases in the economic, social and environmental benefits from forests and trees for the present and future generations including the poor and the vulnerable groups. Policies affecting private investment in forest plantation development includeexport-import policies, tax laws, land tenure etc.Many policies outside the forestry sector also have a significant influence on the

extent to which the private sector can contribute towards production of forest goods and services.

Ruitenbeek & Cartier (1998) Stated thatdirect policy affecting forest plantationis related to land tenure and forest management institutions.Khan (1998) claimed thatland tenure is key factor in the success of private investment in forest plantation development, therefore,private sector interests require a secure interest in the land as a prerequisite to investment. Insecure land tenure and weak forestry institutions are a framework that leads to difficulties for forestry activities. Ruitenbeek and Cartier (Ibid) argued that where government forestry institutions are strong and capable, there are fewer policy distortions in the forestry sector. Weak forestry institutions reinforce the problems associated with forest plantation development. Weak, poorly trained, understaffed and under-funded extension service, bad and corrupt staffs, poor communication between land users, and the absence of site-specific research applicable to specific local conditions make private investment in forest plantation development limited.

2.5.2 Forest Administration

Ball (2010) defined forest administration as decentralisation, or the shifting of responsibility downwards within an organisation. Therefore, forest administration refers to the delegation of responsibility or authority to sustainably manage the forest and its resources. Division of responsibility for forestry in Nigeria starts from the Federal to State and then to Local government.

Institutional weakness of forest services in the public sector have been observed in the country in recent years. Inability to deliver efficiently results that influence forestry development, failure to recognise the needs of those who depend on the forest for their livelihoods, reluctance to react to new demands for representation in decision-making or involvement of the private sector, ineffective means to implement rules and regulations that stimulate sustainable development of forest resources and an inability to recognise that the days of top-down approaches to forest management have effect on forest plantation development.

Moreover, corruption at different levels of government discourages private investment in forest plantation development. In a situation where private forest owners are subject to exploitation by unscrupulous administration officials citing various rules and laws deter

private investment in forest plantation development. Private investors in small-medium scale forest plantation development in the country are poorly educated and may not be familiar with the policy (rules and regulations) guiding forestry development in Nigeria. This makes them vulnerable and susceptible to being cheated or manipulated by some forest officials. Issuing of permits can be used be fraudulent officials to extort money from private owners. They may require "fees" to issue or process the permits (often there is no legal basis for the fees).Furthermore,officials may fraudulently apply natural forest management regulations to private farmlands. All these act as impediment to private investment in forest plantation development.

2.5.3 Legislation

One key instrument for implementing the forest policy is the forest legislation. The primary purpose of legislation is the distribution and enforcement of rights and responsibilities related to forests.Legislation prohibits certain conduct, provides for sanctions and offers a solid foundation for action. For effective, planned and systematic management of forest plantation, a measure of legal control is necessary. Laws may be necessary to protect the forest plantation for proper management, and to protect private owners for efficient profit. In Nigeria, private forest plantation are influenced by laws, which include; purchase of articles e.g. property hammer, license to exploit and several laws guiding land leased by private forest owners.

FAO (2010) defined forest law as set of rules enacted by the legislative authority of a country regulating the access, management, conservation and use of forest resources.Forest law introduced some measures to curtail the commission of forestry offences. As a preventive measure, the law gives any forestry officer, administrative officer or police officer to stop, open, enter and search any forest-produce-laden vehicle, boat or craft, for the purpose of inspection of the produce (Nigeria's Forestry Law, Section 24). However, using forest laws as the basis for policy guidance has some undesired consequences. Not all policy aspects can be covered in sufficient detail in the legislation, and specifications in legal acts are subject to legal procedures.

Thus, all offences and particularly petty forest offences cannot be handled by the court. It is for this reason that forest officers above certain rank have judicial power delegated to them as in the case of custom department.Where it involves payment of fine, it is usually made four times the presumed value of the stolen forest product. Unfortunately, it is this aspect of forest

law that some of forest officers employ to harass people and illegally amass wealth. Uneducated or uninformed private forest owners who do not understand the law are sometimes scared by mere mentioning of law court and may be victim.

2.6 Investment Theory and Decision

To attract private investment to a new business opportunity, be it sustainable forestry, renewable energy or any other emerging market, that sector needs to be made accessible and attractive to professional and established investors. This can be accomplished by: educating capital markets about the investment opportunities in sustainable forestry; packaging and structuring these opportunities in ways that will be easily understood and recognized by private sector investors; and by reducing risks and incremental costs specific to an emerging industry.

In the real world, however, investment decisions are significantly more complex and are affected by a number of intangible factors. These factors (generally referred to as "imperfect" market conditions) include imperfections in (or often the complete absence of) crucial market information, the presence of non-financial costs and benefits and the effects of government intervention. Nonetheless, despite these imperfections, financial criteria are generally the main quantitative tools that are used to assess the relative merits of different investments.

Before investors can be directed towards forestry sector (and within this, towards sustainable forest management), they need to be educated systematically about the opportunity in a credible way. Critical barriers to investment in sustainable forestry include a lack of key knowledge and reliable information. Furthermore, only in rare cases has sustainable forest management or specific opportunities within the sector, been packaged from an investor's perspective, while an analysis of business performance and financial returns of sustainable forestry enterprises is lacking (Chandrasekharan, 1996).

A robust analysis of forest plantation investment projects requires an in-depth assessment of the costs and revenues associated with its establishment. Several characteristics of forest plantation investments strongly influence investors' decision making relative to alternative investment options. The most obvious is the long-time nature of tree growing. A very high proportion of expenditures occur early on, and most of the revenues come only at the end of a rotation. This long gestation period adds greatly to the uncertainty and risk of plantation investment. Investors often experience difficulties in withdrawing from the investment before

the trees are of harvestable age. In addition, there are inevitable uncertainties about future prices of products and inputs and especially about the prices and marketability of the final plantation harvest.

Because of progressive income tax system (in which tax rates escalate with increased income) and the large, but periodic returns from a single tree plantation, individual investors can be hit with the highest marginal taxation rate in the year of harvest unless tax relief is provided. These drawbacks give ample cause for investors to shy away from the plantation sector, despite the apparent advantages of investing in plantations such as potential profits, diversification of investment port-folios and ensuring long term supplies for downstream industries (Enters *et al.,* 2003).

Many developing countries with suitable physical environments for growing forest plantations lack sufficient investment in plantation development. Indufor (2013) identified insecure land tenure, political, social, environmental and reputational risks, and the limited understanding of forest-sector investments among financial institutions as the key barriers to investment in forest plantations in such countries. In addition, the upfront cost of preparing forest plantation investment projects is high due to a lack of adequate information about the forest resource.

2.7 Macroeconomic Policy Effect on Nigerian Forestry Performance.

The Federal Government of Nigeria tries to influence the performance of the national economy through various macroeconomic policies such as changing the level of taxation, government spending, or the supply of money available in the economy. These categories of macro-economic policies affect forestry: monetary and fiscal policies, foreign exchange rate policies, factor price (interest, wage and land rental rates), natural resource, and land use policies. Changes in monetary, fiscal and trade policies affect the performance of the forestry economy through their respective influences on input and output prices, land prices, and exchange rates. Foreign exchange rate policies directly affect forest products prices and costs.

Bandow (1997) Stated that forest sector is heavily influenced by macro-economic policies even though forestry often has little influence over the setting of these nation-wide policies. FME (2006) Stated that both the forest fiscal policies and policies in other sectors of the economy affect sustainable forest management practices. The Nigerian forest revenue system is characterized by low product price levels, and inadequate monitoring, which results in

widespread tax evasion, illegal logging and waste. Irregularities in the prices of timber across the States, economy insecurity and instabilitylimit private investment in forest plantation development. VariousStates in Nigeria operate different types of charges. These charges also vary from State to State per tree depending on the species.

Furthermore, the Timber Export Promotion Decree No. 1 of 1998 prohibits the export of timber (whether processed or not) and wood in the rough form, excluding furniture, furniture components and *Gmelina arborea* in any form. Although there is ban on the exportation of timber from Nigeria to other countries but some people still find a way to export timber, also some non-timber forest products are traded internationally. The exchange rate thus directly influences the price because exchange rate is the relationship between the value of the domestic currency of a country and a foreign currency (i.e the international 'price' of the currency) and can be taken as a measure representing the market equilibrium for the currency (the adjustment between supply and demand of the currency by economic agents) (ITTO, 2009). Inappropriate exchange rate policies can result in domestic currency instability, which increases the risk for private investment in forest plantation development.

Also, factor price policies directly affect forest plantation costs of production. The primary factors of production are land, labour and capital. Land and labour costs make up a substantial cost of establishing forest plantation in Nigeria. Government often enact macro policies that affect land rental rates, wages rate or interest rates throughout the economy. Other factor price policies include minimum wage floors or interest rate of ceilings, and these policies influence some sectors more than others.

IITO (2009) reported that in developing countries in the tropics, the procedures for corporate registration often require a large amount of time and, for certain investments, therefore act as a limiting factor. Cumbersome procedures can encourage illegal practices such as bribery. In Nigeria, if land is leased by companies/organisation for forest plantation establishment, huge money is expended. Various payments are required to be paid every year to the government. Examples of payment made are; Stumpage Permit Class, Sales of forms and registration of vehicle by tree, tree harvest permit, land rental payment etc. these can act as limiting factor to private investment in forest plantation development in Nigeria.

In addition, interest rates on money borrowed affect private investment in forest plantation development.Interest rates are one of the main macroeconomic instruments by which

governments adjust monetary policy. Since interest rates define the cost of capital and its profitability for investors, they are a crucial factor in investment decisions. Thus, a country will be more attractive to investors if it has a low real interest rate (which is the basic interest rate defined by the government based on change to consumer prices, minus inflation). In other words, a high interest rate reduces business attractiveness; as for investors, financial investments with a rate of return lower than the interest rate are not economically feasible (ITTO, 2009). Therefore, interest rates have significant bearing on the appeal of investments in forest plantations because they are a long-term businesses in which capital plays a vital role.

2.8 Incentives for Private Forest Development

Meijerink (1997) defined incentives as policy instruments aimed at increasing the comparative advantage of forest plantations and thus stimulating investments in plantation establishment and management. Jackson (1999) Stated that incentives include a wide range of interventions from free seedlings to the provision of political and macro-economic stability. Incentives include any means that produces encouragement to "do business (i.e. establish plantation). In order to encourage forest plantation activity and management, and to maximize profitability, different incentives such as land, seeds, seedlings, fertilizers or other planting material, extension services, cash handouts, assistance in harvesting, and guaranteed markets should be provided (Jackson, Ibid).

Carnea (1992) Stated that the use of financial incentives is extremely important in order to stimulate and encourage small-scale tree planting. Providing incentives to encourage small scale private forest plantation investors can be very crucial because most small scale private forest plantation investors do not have access to credit or loans for tree planting and management. However, some authors argued that incentives should only be provided if they are well targeted and actually needed. Arnold (1997) criticized loans for forest plantation development as they can cause dependency and be risky if expected out-comes are not reached.

Therefore, incentives can either have a positive effect on forest plantation development, or in a worst case scenario, can lead to unsustainable forest plantations. For example if the investors' only reason for tree planting is to gain the economic incentives (cash) or fertilizers, this is unlikely to lead to good plantation management and quality yields (Haltia and Keipi, 1999; Thacher *et al.,* 1997). Incentives are thus much broader in concepts than subsidies,

which more directly reduce the costs or raise the returns of an activity. Jackson (1999) highlighted different types and effects of incentives in Table 2.2.

Table 2.2: The Types and Effects of Forestry Incentive Instruments

Type of Incentive	Area affected		
	Inputs	Processes	Outputs
Subsidies, grants and loans	Grants to cover planting and replanting costs. Cost-sharing or cost-recovering arrangements.	Grants to cover forest management operations (e.g. thinning). Cost-sharing or cost-recovery arrangements Grants for investment in	Trade finance Conservation easements. Payments for the production of non-market benefits

	Loans for investment in forestry and forest processing facilities	new technology and processes Grants for locating forest or forest industry investments in particular locations	Green fee payments
Tax incentives	Tax reductions or exemptions to offset planting cost Tariff preferences	Tax reductions or exemptions to offset forest management costs Differences in the way forests are taxed Tax reductions or exemptions for locating forest or forest industry investments in particular locations	Tariff preferences Favourable tax treatment of forest production
Provision of goods and services	Extension services (e.g. for planting) Subsidized public roundwood sales. Free or subsidized materials (e.g. fuel, fertilizer, seedlings)	Extension services (e.g. for forest management and processing)	Extension services (e.g. assistance with harvesting and marketing) Trade insurance Subsidized transportation
Provision of public goods	Fire and pest control Infrastructure development	Research and development Technology transfer Publications and information	Marketing board Infrastructure development
Policy support	Land tenure reform Improvement to commercial law	Community forestry Recycling legislation Forest certification	Non-tariff trade policy Improvements to commercial law

Source: Jackson (1999)

Subsidies, grants and loans are direct payments from the government and NGO's to individuals and firms in the forestry sector. They do not include the provision of subsidized goods and services. It involves a grant or gift of money from government to individuals and firms to pay expenses.

Tax incentives include various arrangement whereby individuals and firms in the forestry sector benefits from the way that taxies are levied and collected (e.g. exemption from certain taxes) or more subtle benefits from the way that taxes are calculated (e.g. various different ways in calculating taxes on forest growth or they may be distinguished in terms of when

taxes are due in the life cycle of the forest). Reduction in duty and money levied by government on forest production can attract more private investors. For example tariff paid on roundwood for exportation, amount paid for permits by private forest plantation owners.

Provision of goods and services include situations where government supplies good and services to specific individuals and firms in forestry sector at a reduced cost or, sometimes, for free. Provision of government trained extension agents to disseminate information and new innovation and technology to individuals and firms. Distributing free or subsidized fertilizers and seedlings to individuals and firms attract forest plantation investors.

Provision of public goods include situations where government supplies good and services to the whole of forestry sector either at a reduced cost or, more often, for free. These public goods include basic infrastructures like good transportation system, creating a conducive market and marketing system in the country.

Policy support represents changes in policies, laws and regulations that give an incentive to individuals and firms in forestry sector. In this context, changes in policies are only included where they result in an improvement in the cost and/or benefits faced by individuals and firms in the forestry sector.

In addition, Gregersen and Houghtaling (1978) classify incentives as direct and indirect. The direct incentives include cost sharing (in kind or money), subsidized credit, fiscal incentives, reduction of uncertainty through loan guarantees, insurance, forest protection agreements, provision of land tenure security etc. Indirect incentives include market information, extension and education, research etc. In New Zealand and the United States, government efforts to engage the private sector in tree planting have tended to focus on the provision of physical incentives. One of the earliest incentives was land grants, which encouraged settlement and under certain conditions, tree planting. More recently, China has provided significant land allocations to farmers and investors for tree growing. The provision of free-of-charge seedlings and fertilizer has also been physical incentives. Such free inputs are appealing because they are straight forward and less intimidating especially to small-scale investors.

Direct incentives are most likely to be important in the imitation stage, to raise awareness and to increase the pace and scale of plantation establishment, especially to build up fibre supplies for a nascent processing sector. These should be replaced by variable incentives and

complemented by research and extension during the acceleration stage. If a direct incentive becomes obsolete maturation stage, this is a good sign of its success (Williams, 2001).

2.9 Financing Mechanisms for Private Forest Plantation Development

Most times, small and medium forest plantation use personal or family savings to finance forest activities. Access to alternative sources of finance is thus key to the development of the private investment in forest plantation development. Possible financing mechanisms for private sector in forest plantation development include;microfinance, out-grower schemes, foreign direct investment and remittances. FAO, (2008) Stated that in other regions of the world, particularly high forest cover Latin-American countries, other private sector financing mechanisms have been developed, such as environmental stock exchanges, private equity investment funds and forest-backed securities purchased by institutional investors like pension funds. The study further reported thatWest African financial markets generally are not yet developed enough to offer such products and the forest sector in most countries is not large enough to stimulate such developments.

2.9.1 Microfinance

Microfinance has played a crucial role in financing small enterprise and rural development. It involves the provision of financial services to low-income investors who are normally excluded from the commercial banking sector (FAO, 2011). These financial services include credit, savings and increasingly micro-insurance. Microcredit generally consists of small short-term loans (12 months or less) that are given against some kind of collateral at interest rates higher than commercial bank rates as microfinance institutions have to cover higher operating costs per loan. Regulated formal financial institutions, as well as by NGOs and projects, member-owned organizations and informal financial service providers, such as traditional kinship networks, rotating savingsand credit associations, and moneylendersprovide microfinance services to investors. FAO (2011) Stated that these institutions vary in terms of their mission, with some focusing strongly on their financial viability and others placing greater emphasis on their social missions. The interest rate also vary across institutions. For example, some institutions particularly NGOs, provide loans at subsidized rates while some institutions are commercial entities that need to cover their operating coststhrough revenues from interest on loans. High interest rates may pose a great

challenge and discouragement to small-medium scale private forest plantation investors with no or little alternative source of income.

Many constraints affect free access of private investors especially small-medium scale investors to microfinance. These constraints include, the long gestation periods for plantation activities, lack of clear land tenure and fluctuation in market prices and marketing. Small-medium scale private forest plantation owners may have to wait several years before plantations mature. The long period between initial investment and harvest definitely calls for long-term financing because various optimal silvicultural practices must be carried out to give a productive outcome (timber quality). This long-term financing is mostly not available, and this further increases uncertainty and risk even. High interest rates also become more onerous on longer term loans.

2.9.2 Out-grower Schemes

FAO(2011) asserted that out-grower schemes or contract farming, represent a form of integrated value-chain financing, whereby a buyer higher up the chain provides financing for a producer lower down the value chain. Under such schemes producers allocate land and other resources to the production and management of trees or other agro-forestry products, for a processing company. The processing company provides a guaranteed market and facilitates the investments necessary for plantation. A contractual agreement between the growers and the processing company defines the responsibilities and benefits of each party. Out-grower schemes provide a response to the constraint faced by the forest sector of long gestation periods. They allow smallholders to access finance for investment in plantation and/or to access input supplies, they often provide some technical support for production, and finally they offer smallholders a guaranteed, if not always equitable, market for their production. Financing for investments by the smallholder farmers often comes in the form of loans (cash advance payments, or in-kind loans, with or without interest) that are repaid upon harvest, when the small-holder sells the produce as agreed to the contractor.

FAO (Ibid) claimed Liberia has the longest experience with out-grower schemes with the Firestone out-grower scheme in the rubber sector that has been operational since 1926 and that has attracted its share of criticism. A more recent large scale scheme in Liberia concerns the oil palm sector in which the company, Equatorial Palm Oil, member of the Roundtable on Sustainable Palm Oil, is launching production with smallholders on 169,000 hectares of land.

Other countries such as Côte d'Ivoire, Ghana and Nigeria also have examples of out-grower schemes. In Nigeria, British America Tobacco Company practises this scheme. Farmers are employed to plant tobacco for the company. The company provides a guaranteed market and facilitate investments necessary through provision of incentives.

2.9.3 Foreign Direct Investment

FAO (Ibid) reported that globally, forest financing in past years has been characterized by an increase in FDI into developing countries. FDI made by foreign companies operating in a country, under the right framework and when well-managed can provide employment opportunities, finance (through out-grower schemes or other mechanisms), and transfer of skills and technical know-how to smaller local companies.

The study further revealed that West Africa's level of industrial forestry activities is very low when compared to other regions of the world, notably Asia and Latin America, and it attracts relatively little forestry FDI. Gondo (2010) reported that in recent years, Eastern and Southern Africa have recorded increase in foreign direct investment in forest plantations and the associated wood-processing industries while few West African countriessuch as Liberia, Sierra Leone, Ghana and Côte d'Ivoire with relatively rich forest have an increase in FDI.The study revealed that data on FDI in Africa's forest sector are difficult to come by and alsoindustrial timber production has a poor track record. Overthe past sixty years, there is little evidence that FDI has raised rural populations out of poverty or contributed in other meaningful and sustainable ways to local development. This is attributed to a number of factors that include low pricing of the timber; illegal activities and corruption; weak governance systems; low level of in-country processing; low wages; marginalization of rural communities; and little re-investment in the management of natural forests.

2.9.4 Remittances

Remittances are another important source of financing for small and medium enterprises. Remittances from migrants to their home countries have over the years been of great significance source of funds for developing countries. FAO (Ibid) reported that in 2006, global remittances were estimated at US$300 billion, of which $10.4 billion went to West African countries. In countries such as Sierra Leone, Liberia and Cape Verde remittances account for 12%, 26% and 34% of GDP respectively. IFAD (2007) estimated Nigeria's remittance has 5% of the GDP.World Bank reported remittances to sub-Saharan Africa

amounted to US$19 billion in 2007, an equivalent of 2.5 percent of GDP. The World Bank estimated Nigeria to have received US$ 3.3 billion in 2007, followed by Kenya with US$ 1.3 billion, and Senegal with US$ 0.9 billion. Unfortunately, remittances are declining as a result of the crisis.

IFAD (2007) revealed that most remittances are used by recipients to finance consumption of essential goods and services – food, clothing, lodging, health care and education. FAO (2011) revealed that no specific cases of forestry initiatives having been funded by remittances were found in the literature butthere may thus be some potential for tapping into this source of funds for the financing of forest plantation. Nonetheless, remittances provide an important source of revenue for several recipients in rural communities that are excluded from the banking sector. In Ghana, it was estimated that two thirds of remittances were destined for recipients in rural areas (IFAD, Ibid).International organizations such as IFAD and the AfDB have launched initiatives aimed at increasing the development impact of remittances.In West Africa, the IFAD facility funded a pilot project in Sierra Leone led by the UK African diaspora NGO AFFORD.

According to the World Bank, remittances to sub-Saharan Africa declined between 4.4% and 7.9% in 2009, after a 6.3% increase in 2008 (AfDB, 2010). A fall in remittances will undermine access of small and medium enterprises, including forest based enterprises, to a once reliable source of financing. This leaves the continent with a tremendous challenge of seeking alternative sources of finance in order to help the continent recover from the gloomy economic situation.

2.10 Economics of Plantation Development Investments across the Globe

According to Cubbage *et al*., (2011),the trends in investment returnsduring the period from 2005 to 2011 varied unpredictably by country. In Brazil, the Land Expected Values and Internal Rate of Returns increased consistently throughout the period, which seems to reflect the large domestic and export demands, and the rapidly expanding Brazilian forest products sector. Argentina returns increased from 2005, and peaked in 2008. It was reported that Internal rates of return in Chile decreased slightly during the period, probably reflecting the depressed world economy where they export most of their product. This also applicable to Colombia, although for less apparent reasons. Investment returns in Venezuela seemed to be lower in 2011 than in 2008, but the estimates were difficult to make due to high inflation and large fluctuations in exchange rate, so not much can be concluded from the three-year trends

provided here. The Uruguayan market is almost entirely dependent on exports, which probably caused the decreased returns from 2005 to 2011. New Zealand and China also had slightly lower Internal Rate of Returns in 2011 than 2008. The US South fared the worst with timber investment returns based on current costs and stumpage prices decreasing significantly from 2005 to 2011.

This was due to poor sales and prices of timber during the USA economic recession and enduring housing slump. The US Pacific Northwest actually had stable investment returns, probably due to better saw-timber prices and exports to China in 2011. It is important to know that the timber investment returns for the countries in South America based on 1990 prices were relatively comparable to those cited by Sedjo (2001).

However, the rates of return for the temperate forest regions of the US South and Pacific Northwest, South Africa, and New Zealand declined since Sedjo's research. This does confirm common feelings that timber investment returns in the developed countries studied have been worse in the 2000s than in the 1990s. These returns also were considerably less than the historical USA NCRIEF returns through to 2005 as reported by (Cascio and Clutter 2008).

Cubbage *et al.,* (2011) concluded that the fast growth rates and higher reported timber prices drive the best timber investment returns. Also,land costs are key to determining net returns for new investors. South America had the highest returns for existing investors, without the cost of land, and Brazil was consistently the best and improving during the period from 2005 to 2011. Opportunities for high rates of return and present values also existed for current landowners in each of the other Latin America countries. Existing owners could achieve reasonably attractive plantation investments of about 7% to 12% real Internal Rate of Returns.

CHAPTER THREE

METHODOLOGY

3.1 The Study Area

The study area is south western Nigeria which consists of Lagos, Ogun, Oyo, Osun, Ondo and Ekiti States. It is also known as the South West geopolitical zone of Nigeria. The area lies between longitude 2^0 31^1 and 6^0 00^1 East and Latitude 6^0 21^1 and 8^0 37^1N (Agboola, 1997) with a total land area of 77,818 km^2. The population as at 2006 was 27, 721, 832 (NPC, 2006). The study was carried out in Ogun, Oyo, EkitiStates, based on reconnaissance survey of all the States in southwest, which revealed that Ogun, Oyo and Ekiti States have substantial number of private forest plantation investors. The actual extent of forest plantation in these States cannot be obtained from the Ministry of Forestry and Departments of Forestry respectively.

The total land area of Ogun State is 16,980.55km^2. In the State, forest reserves occupy about 15.9% of the land area (273,162ha). The projected population density was 4,412,299 in 2011 (NBS, 2012). It has a total annual rainfall of over 1500mm and average temperature ranges between 21.8^0C to 33.2^0C throughout the year. The climate is tropical in nature and characterized by wet and dry seasons. About 10% of the forest reserve (27,740ha) has been converted to forest plantations and this comprises 18% of total forest plantations in Nigeria (Sanwo *et al.,* 2006).

Oyo State covers approximately an area of 28,454km^2. The State is located in latitude between 6º55' and 8º45'N and between longitude 2º50' and 3º56'E in southwestern Nigeria. The projected population of the State in 2011 was 6,596,392 in 2011 (NBS, 2012). Average daily temperature ranges between 25^0C and 35^0C, almost throughout the year while the annual rainfall ranges from 1000 mm to 1500 mm with well drained and rich ferruginous tropical soils which favours production of crops. The forest tree plantations occupies 6,743ha accounting for 2,169,567m^3 by volume (Ezebilo, 2004).

Ekiti State has an area of 7, 500km^2 of which only 297.2km^2 is constituted forest representing 4% of the total land area. The State is situated between longitude $4^0 5^1$ and $5^0 45^1$E and latitudes $7^0 15^1$ and $8^0 5^1$N. The mean annual temperature ranges between 22.5^{0}C to 28^{0}C while mean annual temperature ranges between 1,500mm to 2,000mm. The State's vegetation consists of tropical forest in the south, while guinea savannah predominates in the northern peripheries.The projected population of the State in 2011 was 2,794,575 (NBS, 2012).

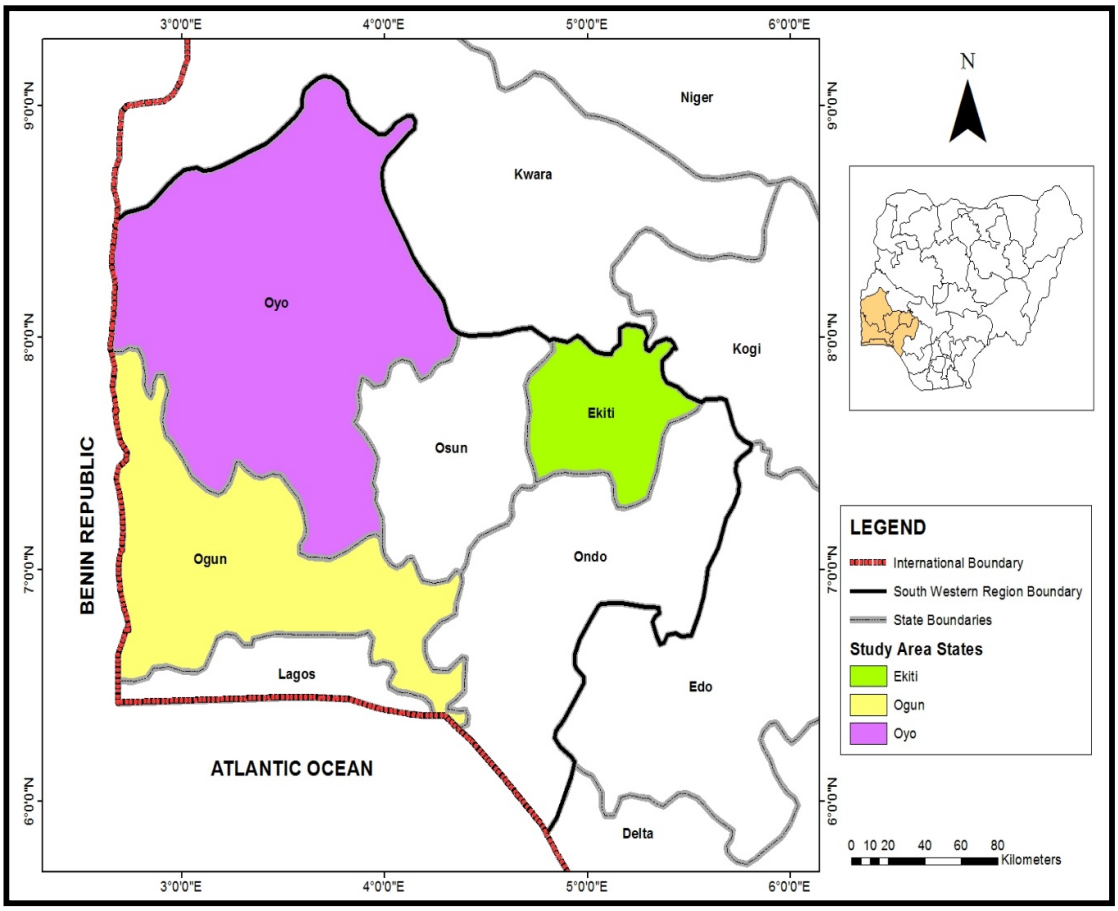

Figure 1: Map of the study area

Source: Ministry of Land and Survey of Ogun, Oyo and Ekiti States, 2017

3.2 Sampling and Data Collection

Reconnaissance survey carried out in Ekiti and Oyo States' Departments of Forestry and the Ministry of Forestry in Ogun State in April 2016 revealed that there are 53, 78 and 162 private forest owners in Ogun, Oyo and Ekiti States respectively. At 50% intensity, structured questionnaire was administered to 27, 39 and 81 randomly selected forest plantation owners in Oyo, Ogun and Ekiti States respectively to elicit primary data needed for the study. Seventy-one private forest plantation owners were investigated but 5 private forest plantation owners kept well- coordinated Statement of cash flow used in calculating financial analysis of the investments. Furthermore, a set of questionnaire was administered on stakeholders who do not have forest plantation while another set was administered on Permanent Secretary/Director of Forestry in the Ministries. Purposive sampling was used to select non-plantation owner forest stakeholders in the study area because there were no sampling frame in the States.

3.3 Analytical Procedure

Analysis was carried out by critically assessing the cost and returns associated with private forest plantation development in the study area. Major elements examined include the Net Present Value (NPV), Benefit Cost Ratio (BCR), Internal Rate of Return (IRR), Annual Equivalent Value (AEV), Land Expectation Value (LEV), Return on Investment (ROI), and Discounted Pay Back Period (PBP) of the investment. Logistic regression was used to analyse the influence of demographic variables on willingness of forest stakeholders who do not have forest plantation to participate in forest plantation development.

3.4 Specification of Financial Analysis Model

3.4.1 The Net Present Value (NPV)

Zinkhan and Cubbage (2003) Stated that NPV converts a series of periodic income flows to a single number that can be used to compare mutually exclusive investment alternatives over the same investment horizon at a given discount rate (cost of capital).NPV is essentially the difference between the sum of discounted benefit and the sum of the discounted cost. For single investment decisions, positive NPVs indicate that the project is feasible (Cubbage *et*

al., 2013). The project with the highest positive NPV is usually considered most feasible and recommended. In the economic sense, it is the NPV that gives an indication of the investment activity to satisfy the given rate of discount (interest on capital) and still yields surplus income(Klemperer, 1996).

NPV can be written in equation form as:

$$NPV=\sum_{t=0}^{t=n}\frac{R_t}{(1+r)^t}-\sum_{t=0}^{t=n}\frac{C_t}{(1+r)^t}\ldots\ldots\ldots\ldots Eqn.1$$

Where

NPV = Net Present Value

R_t = revenues in each year n,

C_t = costs in each year n,

r = discount rate,

n = an index for years and

t = number of years of discounting.

3.4.2 Benefit - Cost Ratio

The benefit cost ratio is useful in allocating a fixed sum of money between different investment alternatives. The benefit cost ratio is used to compare total discounted benefits with total discounted costs (Cubbage, Ibid). If the benefit cost ratio for an investment project is one or greater, the project is feasible and acceptable. The criterion can be written in an equation form as

$$B/C = \frac{\sum_{t=0}^{t=n}\frac{Bt}{(1+r)^t}}{\sum_{t=0}^{t=n}\frac{Ct}{(1+r)^t}} \ldots\ldots\ldots \quad \ldots\ldots \quad Eqn \quad .. 2$$

Bt = Benefits (revenue) in each project year

Ct = Costs in each project year

n = Duration of the project in years

r = Discount rate

t = Number of years of discounting

3.4.3. Internal Rate of Return (IRR)

This is the discount rate at which net present value of the project equals zero (NPV = 0). The Internal Rate of Return (IRR) is also defined as the discount rate that makes the present value of project revenues equal the present value of project costs (Zinkhan and Cubbage, 2003). For individual investments, the IRR is usually compared to any alternative rate of return (Cubbage, Ibid). It is often times referred to in forestry as financial yield or economic rate of returns. The IRR is widely used and widely preferred because it is a better reflection of the productivity of capital in an investment (Cubbage *et al.,* 2014)

It can be expressed as follows:

$$IRR = \sum_{t=0}^{t=n} \frac{R_t}{(1+r)^t} - \sum_{t=0}^{t=n} \frac{C_t}{(1+r)^t} = 0 \ldots\ldots Eqn.3$$

IRR can be obtained either by calculation or by iterations which involve the use of different discount rates by trial and error. Two interest rates, one at which the NPV is positive, and the other one at which NPV is negative, need to be selected to calculate IRR. The discount rate between the two NPV which is equal to zero is the IRR.

IRR can be approximated by using the following formula:

IRR = Discount rate resulting in the last positive NPV

$+\left[Difference\ between\ the\ two\ discount\ rates\ X\ \frac{positive\ NPV}{increamental\ NPV}\right]$.....Eqn 4

3.4.4 Annual Equivalent Value

.AEV is useful for comparison to other investments that have an annual return, such as agricultural crops. Annual equivalent value is an indicator that expresses NPV in annual equivalents distributed equally over the years of the lifespan of the investment. Since AEV is calculated based on NPV, it is positive when NPV is positive and negative when NPV is negative. Annual equivalent value is useful in an agroforestry context because it allows for comparing alternatives on an annual basis, which is particularly helpful when comparing long-term tree investment with annual agricultural crop production (Straka *et al.,* 2001). The formula for calculating AEV is as follows:

$$\text{AEV} = \text{NPV}\left[\frac{r(1+r)^t}{(1+r)^t - 1}\right] \ldots\ldots\ldots\ldots\ldots\ldots\ldots\ldots\ldots\ldots \text{Eqn 5}$$

3.4.5 Land Expectation Value

Bullard and Straka (2011) Stated that Land Expectation Value (LEV) is a financial tool used as an estimate of the value of a tract of land for growing timber and when calculating LEV the land cost is not included.Thus, the LEV can also be used to establish the value of a specific land parcel based on costs and revenues associated with both tree and agricultural production. In this case, the LEV is interpreted as the maximum amount of money a landuser can pay for the land and still earn the minimum acceptable rate of the return on the investment. LEV for timber production is calculated assuming the land will be used to produce a perpetual series of even-aged or uneven aged stands; each stand in the perpetual series is assumed to have the same revenues and costs that are projected for the first rotation or the first cutting cycle. Zinkhan and Cubbage (2003) revealed that LEV is applied just like NPV in making investment decisions, with positive LEVs inferring investment acceptability and negative LEVs suggesting project rejection.

$$\text{LEV} = \frac{NPV\ (1+r)^t}{(1+r)^t - 1} \quad \text{.....Eqn 6}$$

3.4.6. Return on Investment or Rate of Return on Investment

The return on investment formula is mechanically similar to other rate of change formulas. It measures percentage return on a particular investment.

$$ROI = \frac{\text{TR}-\text{TC}}{TC} \times 100\% \text{ ..... Eqn 7}$$

TC = Total Revenue

TR = Total Cost

3.4.7 Payback Period

Payback period refers to the period of time it takes for an investment to “pay back” its initial costs i.e. period of time required to recoup the funds expended in an investment, or to reach the break-even point(Bullard and Straka, 2011). It is alsoa very commonly used criterion in project analysis. Payback Period is simplythe length of time it takes to recover the cost of a project, without accounting for the time value of money. This meansPayback Period doesn’t

consider the time value of money, it ignores the timing of cash flows, and it ignores cash flows that occur beyond the Payback Period. The formula to calculate payback period of a project depends on whether the cash flow per period from the project is even or uneven. In case they are even, the formula to calculate payback period is:

$$Payback\ Period = \frac{Initial\ Investment}{Cash\ Inflow\ per\ period}$$

When cash inflows are uneven, we need to calculate the cumulative net cash flow for each period and then use the following formula for payback period:

$$Discounted\ Payback\ Period = A + \frac{B}{C}$$

A is the last period with a negative cumulative cash flow;
B is the absolute value of cumulative cash flow at the end of the period A;
C is the total cash flow during the period after A

3.4.8 Logistic Regression Analysis

Logistic regression was developed by statistician David Cox in 1958. The binary logistic model is used to estimate the probability of a binary response based on one or more predictor (or independent) variables (features). As such it is not a classification method. It could be called a qualitative response/discrete choice model in the terminology of economics. Logistic regression measures the relationship between the categorical dependent variable and one or more independent variables by estimating probabilities using a logistic function, which is the cumulative logistic distribution.

Logistic regression was carried out to determine factors influencing non-plantation owner forest stakeholders' willingness to participate in forest plantation development in southwestern, Nigeria.

$$Y = \frac{\exp(b0 + b1\ X\ 1 + \ldots\ldots\ldots bn\ Xn)}{1 + \exp(b0 + b1X1\ldots\ldots\ldots + bnXn)} \quad \ldots\ldots\ldots\ldots\ldots\text{Eqn 7}$$

Where Y = dependent variable (willingness of non-plantation owner forest stakeholders to participate in forest plantation development

X = Independent variable (gender, age, educational background, occupation and State)

X_1 = State of non-plantation owner forest stakeholders (1= Oyo, 0= otherwise)

X_2 = State of non-plantation owner forest stakeholders (1= Ogun, 0 = otherwise)

X_3 = Gender of non-plantation owner forest stakeholders (1= male, 0= otherwise)

X_4 = Primary educational background of non-plantation owner forest stakeholders (1= primary, 0 = otherwise)

X_5= Secondary educational background of non-plantation owner forest stakeholders (1 = secondary, 0 = otherwise)

X_6= Tertiary educational background of non-plantation owner forest stakeholders (1 = secondary, 0 = otherwise)

X_7= Age of non-plantation owner forest stakeholders

X_8= Occupation of non-plantation owner forest stakeholders (1 = marketers, 0 = otherwise)

X_9= Occupation of non-plantation owner forest stakeholders (1 = lecturers and researchers, 0 = otherwise)

X_{10} = Occupation of non-plantation owner forest stakeholders (1 = MDAs, 0 = otherwise)

B_0 = constant

e = exponential

CHAPTER FOUR

RESULTS AND DISCUSSION

4.1 Private Forest Plantation Owners

4.1.1 Demographic Characteristics of the Private Forest Plantation Owners

The demographic characteristics of private forest plantation owners such as age, gender, occupation and educational status and area of specialization are presented in Table 4.1. The ages of private forest plantation owners ranged from 30 to above 80 years of age with a mean age of 53.5±11.3 years. In Ogun, Oyo and Ekiti States, 22.7%, 30.8%,and 39.1% of private forest plantation owners were in the 40-49 years category respectively, followed by 18.2% in Ogun, 26.9% Oyo and 34.8% in Ekiti State respectively that correspond to 50-59 years of age. This revealed that most of the private forest plantation owners were in the active, dynamic, hale and hearty period of their lives. This observation is similar to the findings of Adejumo (2017) that in southwestern Nigeria, 34.33% of people involved in forest development were between 41-50 years of age.

It can be observed that in Ogun, Oyo and Ekiti States, 90.9%, 73.1% and 95.7% of the private forest plantation owners were men while 9.1%, 26.9% d 4.3% were women respectively. This confirms the report of Nordlund and Westin (2011) that 76% of the private forest owners in Sweden were men. The belief that forestry is labour and time intensive which may be too tedious for females to manage, has perhaps also made the populace to believe that forest plantation investment should be of activities for men than women.In Nigeria, most capital intensive and arduous jobs tend to be male-dominated and since men have been more involved in forestry activities, it is only expected that more men will naturally also think of investing in private forest plantation development.Adejumo (2017) claimed that in forestry development, women are actively involved in collection of NTFPs and after harvesting period that is the processing and selling of timber and timber products.

Data as shown on Table 4.1 revealed 72.7%, 82.6% and 34.6% of private forest plantation owners in Ogun, Ekiti Oyo States had tertiary education respectively. Although, the percentage of private forest plantation owners in Oyo State was low compared to the other two States, though the intensity of private owners with tertiary education involved in forest plantation development was high within the State. The table also revealed that 40.9%, 23.1% and 21.7% of private forest plantation owners' area of specialization were Renewable Natural Resourcesin Ogun, Oyo and Ekiti States respectively.

Education is known to facilitate peoples understanding and the use of improved technology and practices. The involvement of literate people in forest plantation development may be because of their vast knowledge about climate change and the effects of their activities, the importance of conservation and management of forest natural resources and the desire to increase their income before and after retirement from service. Therefore, the level of investment in forest plantation development can be influenced by the education qualification ofprivate forest plantation owners.

Fortney *et al.,* (2011) Stated that in recent studies, landowners with a higher level of education and income are more likely to participate in forest plantation development. Wossink and Wenum, (2003) also reported that educated landowners are more likely to accept new methods of management, to try new ideas and to be more willing to join the sustainable development of forest.

Table 4.1: Distribution of Private Forest Plantation Owners by State and Socioeconomic Characteristics

Demographic characteristics		State			Total
		Ogun	Oyo	Ekiti	
		%	%	%	%
		n=22	n=26	n=23	n=71
Age	≤49	22.7	30.8	52.1	35.2
	50-59	18.2	26.9	34.8	26.8
	60-69	4.5	15.4	0	7.0
	≥70	18.2	19.2	4.3	14.1
	No response	36.4	7.7	8.7	16.9
Gender	Male	90.9	73.1	95.7	88.4
	Female	9.1	26.9	4.3	11.6
Educational status	No formal education	0	33.3	0	11.3
	Primary	0	3.8	8.7	4.2
	Secondary	22.7	23.1	8.7	18.3
	Tertiary	72.7	34.6	82.6	62.0
	No response	4.5	7.7	0	4.2
Area of specialization	Commercial/Business	4.5	0	13.0	5.6
	Social science	9.1	3.8	4.3	5.6
	Arts	0	3.8	4.3	2.8
	Pure science	9.1	0	21.7	9.9
	Renewable natural resources	40.9	6	21.7	28.2
	Education	9.1	3.8	4.3	5.6
	No response	27.3	65.4	30.4	42.3

Source: Field Survey, 2016

4.1.2 Major Occupation of the Private Forest Plantation Owners' in the Study Area

The results in Table 4.2 show that high percentage of private forest plantation owners in Ogun State (36.4%) were predominantly civil servants, followed by the consultants (27.3%) and farmers (22.7%). In Ekiti State, a large percentage of plantation owners were civil servants (43.5%), followed by farmers(17.4%), businessmen (13%). It was observed that in Oyo State, (26.9%) were farmers, 23.8% were civil servants while 15.4% were timber contractors. The study further revealed other occupations of private forest plantation ownersin States include: legal practitioners (1.4%), plank sellers (2.8%), wood exporters (2.8%), pensioners' (2.8%) etc.

This study shows clearly that most of those engaged in forest plantation development in Ogun and Ekiti States were civil servants. This may be because they are driven by the desire to increase their income before and after retirement from service. Investment in forest plantation development can guarantee income generation in the nearest future. Also the level of private owners' education and the understanding of sustainable management of forest and forest–products contribute to private investment. In Oyo State, large proportion of private forest plantation owners are farmer with no formal education. Also, quite a number of the private forest plantation owners were timber contractor which means their experiences, knowledge and the financial benefits they believe they can get in the sales of timber instigated their decision to invest in forest plantation development.

Table 4.2: Distribution of Private Forest Plantation Owners byMajor Occupation

Major occupation	State			Total
	Ogun	Oyo	Ekiti	
	%	%	%	%
	n=22	n=26	n=23	n=71
Civil servant	36.4	23.1	43.5	33.8
Business	22.7	15.4	13.0	16.9
Pensioner	4.5	3.8	0	2.8
Farming	4.5	26.9	17.4	16.9
Consultant	27.3	0	0	8.5
Cooperation organization	0	7.7	4.3	4.2
Timber contractor	4.5	15.4	0	7.0
Legal practitioner	0	0	4.3	1.4
Applicant	0	0	4.3	1.4
General contractor	0	0	4.3	1.4
Plank seller	0	7.7	0	2.8
Wood exporter	0	0	8.7	2.8

Source: Field Survey, 2016

4.1.3 Private Forest Ownership Structure in the Study Area

The results in Table 4.3 show that 77.3% of the forest plantations established in Ogun State were owned by individual, 18.1% owned by corporate organizations. In Oyo State, 76.9% of the forest plantations established were owned by individuals, 22.5% were owned by company, 11.5% owned by family. Furthermore, 87.0% of forest plantations established in Ekiti State were owned by individuals, Non-governmental organisation, family and university owned 4.3% each respectively.

The study revealed that significant shares of the private forest plantations established in Southwestern, Nigeria are owned by individuals while few are owned by companies. This is similar to the findings of Glen (2002) which Stated that 87.1% of the forest area in Canada is owned by private individuals, few companies or communities.

Table 4.3: Distribution of Private Forest Plantations by State and Ownership

Ownership structure	State			Total
	Ogun	Oyo	Ekiti	
	%	%	%	%
	n=22	n=26	n=23	n=71
Individual	77.3	76.9	87.0	80.3
Corporate organization	18.1	22.5	0	9.8
NGO	0	0	4.3	1.4
Family	0	11.5	4.3	5.6
University farm	0	0	4.3	1.4
Non response	4.5	0	0	1.4

Source: Field Survey, 2016

4.1.4 Land Acquisition Structure in the Study Area

The results presented in Table 4.4 indicate that majority of private forest plantation owners in Ogun (86.4%), Ekiti (47.8%) purchased land for forest plantation development. Even in Oyo State, land purchase accounted for 34.6%, coming closely behind land acquisition by inheritance (46.2%). Land acquisition by inheritance in Ekiti State accounted for 43.5% and land acquisition by lease accounted for 19.2% and 8.7% in Oyo and Ekiti States respectively.

Faleyimu and Oyebade(2012) affirmed that land acquisition in the Southwestern Nigeria is mostly through inheritance and owned by families. Therefore, acquiring very large hectares of land for forest plantation development by private investors could be relatively difficult unless the family is willing to sell to interested buyers. Although, FGN (1978) Stated that all land in the territory of each State (except land vested in the Federal Government or Agencies) is vested in the Governor of the State, who holds such land in trust for the people and would henceforth be responsible for the allocation of land in all urban areas to individuals resident in the State and to organisations for residential, agricultural, commercial and other purposes while similar powers with respect to non-urban areas are conferred on Local Government. Nevertheless, people (indigenes) of the States still exercise power and authority over land.

Table 4.4 Distribution of Private Forest Plantation by State and Land Acquisition Structure

Land Acquisition Structure	State			Total
	Ogun	Oyo	Ekiti	
	%	%	%	%
	n=22	n=26	n=23	n=71
Inherited	0	46.2	43.5	31.0
Purchased	86.4	34.6	47.8	54.9
Leased	0	19.2	8.7	9.9
No response	13.6	0	0	4.2

Source: Field Survey, 2016

4.1.5 Year of Forest Plantation Establishment

The oldest private forest plantation investigated in Ogun, Oyo and Ekiti States were established in 1999, 1947 and 1982 respectively. This is an indication that private forest plantation development have been in existence for a very long time. However, results in Table 4.5 show high percentage of private forest plantation owners(31.8% and 34.8%) established their forest plantation between year 2000 and 2004 in Ogun and Ekiti States respectively, while six private forest plantation owners (23.1%) which accounted for high percentage of private forest plantation owners in Oyo State established forest plantation between year 2005 and 2009.

The study revealed the year most of the private forest plantations in the States were established and this could be an indication of increasing interest of the private sector in forest plantation establishment in the States that year. The increasing private forest plantations has a great potential of combating overexploitation of resources in natural forests as well as increasing supply of roundwood in Nigeria.

Table 4.5: Distribution of Private Forest Plantation by State and Year of Establishment

Year of Establishment	State			Total
	Ogun	Oyo	Ekiti	
	%	%	%	%
	n=22	n=26	n=23	n=71
<1989	0	11.5	8.7	7.0
1990-1994	0	19.2	0	7.0
1995-1999	4.5	0	8.7	4.2
2000-2004	31.8	19.2	34.8	28.2
2005-2009	27.3	23.1	8.9	19.7
2010-2014	22.7	15.4	26.1	21.1
2015-2016	13.6	7.7	13.0	11.3
No response	0	3.8	0	1.4

Source: Field Survey, 2016

4.1.6 Sizes of Private Forest Plantations in the Study Area

Rinehart (2006) divides U.S. private forestland ownerships into Large and Small. Large scale forest plantations are greater than or equal to 5,000 acres, while small scale is made up of forest plantation that are less than 5,000 acres. Glen (2002) also classified forested property owner into three classes based on the amount of forest area owned by the individuals. The classes were between 0.5 ha and 3.99 hectares (small), between 4 hectares and 19.99 hectares (medium), and 20 hectares and above (large).

This study for the purpose of easy grouping of forest plantation sizes, adopted and modified Glen (2002) classification of private forest plantations into, between 0.5 ha and 3.99 ha as small; between 4 ha and19.99 ha as medium and 20 ha and above as large. Thus, forest plantations of less than 5 ha (0.1 - 4.99), between 5 ha and 29.99; and 30 ha and above were classified as small, medium and large forest plantations respectively, in the study area.

Table 4.6 showed that in Ogun State, 40.9% of private forest plantation owners had small sized forest plantations, ditto for medium sized plantations, while 13.6% had large sized plantations. In Oyo State, 50.0% of theprivate forest plantation owners had small sized forest plantations, 30.4% of private forest plantation owners had medium sized forest plantations, while 15.4% of the private forest plantation owners had large sized forest plantations. Similarly in Ekiti State, 43.5% of private forest plantation owners had small sized forest plantations, 30.4% had medium sized forest plantations and 21.7% of private forest plantation owners had large sized plantation.

It can be observed that the trend is similar in all the three States where most of the private forest plantation have small sized plantation, followed by medium and then large size plantation. This means any interested individual can invest in small scale forest plantation instead of thinking of a large scale forest plantation development which may be very costly and thus discouraging. Furthermore, the biggest forest plantation in Ogun, Oyo and Ekiti

States were 324, 710 and 91 respectively while the smallest forest plantation in Ogun was 0.405hectares, ditto for Oyo and Ekiti States.

In this regard, Sanwo *et.al*. (2006) opined that large-scale investments in forest plantation projects are yet to take root in Nigeria. Sanwo *et.al*. (Ibid) remarked that it is important to involve private investors in tree planting ventures in the country because of the economic and financial benefits. Trees have all round utility and yield consistent financial returns from as early as the end of third to fifth year of its growth when it can be harvested for various uses.

Table 4.6: Distribution of Private Forest Plantationsby States and Sizes

Size	State			Total
	Ogun	Oyo	Ekiti	
	%	%	%	%
	n=22	n=26	n=23	n=71
Small	40.9	50.0	43.5	45.1
Medium	40.9	30.8	30.4	33.8
Large	13.6	15.4	21.7	16.9
No response	4.5	3.8	4.3	4.2
Smallest plantation	0.4	0.4	0.4	
Biggest plantation	324	710	91	

Source: Field Survey, 2016

4.1.7 Annual Income of Private Owners from their Major Occupation and size of Forest Plantation Planted

Results in Figure 2 show that five (15.6%) and three (12.5%) of private forest plantation owners earning between ₦100,000-400,000 per annum established small and medium scale forest plantations respectively in the study area. Five (15.6%) and two (8.3%) of private forest plantation owners earning ₦500,000-800,000 per annum established small and medium scale forest plantation respectively while four (12.5%), two (8.3%) and two (16.7%) of private forest plantation owners earning ₦900,000 and above established low, medium and large scale forest plantation in the study area.

Most of the private forest plantation owners (64.8%) were not willing to disclose their annual income. Therefore, it can inferred that the annual income of private forest plantation owners has no control over the size of forest plantations established in the study area.

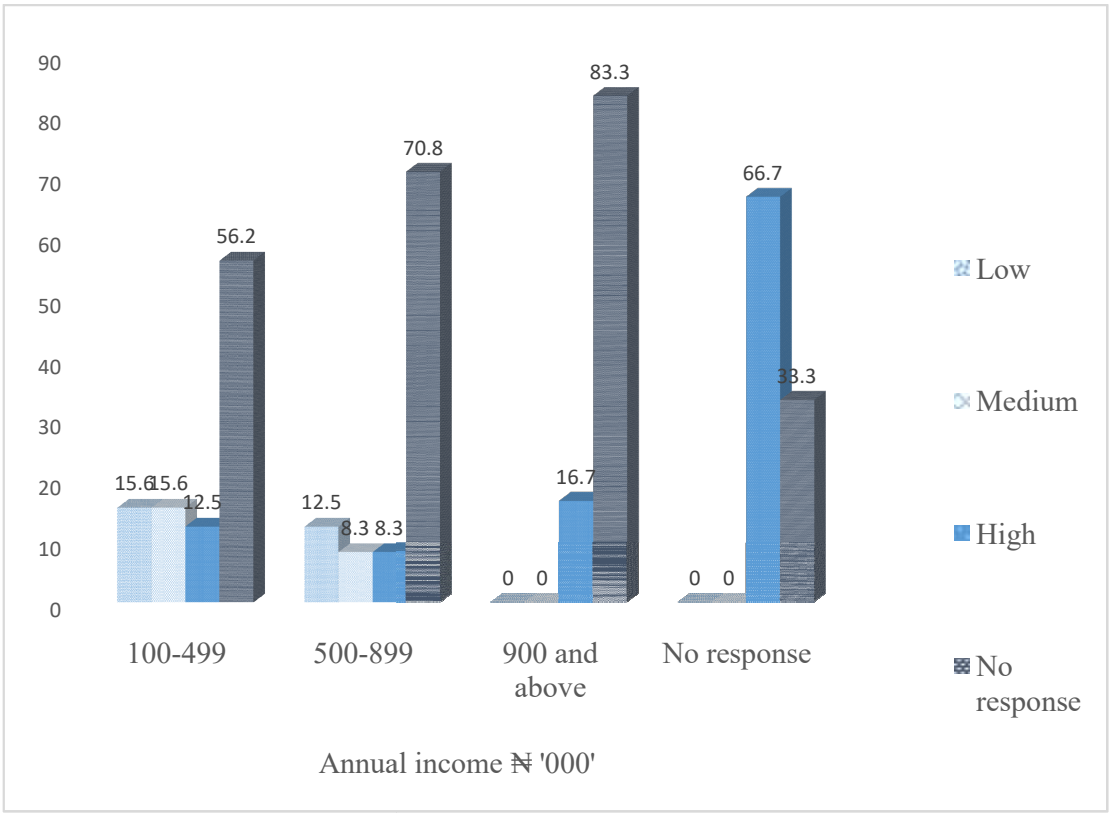

Figure 2: Distribution of Private Forest Owners' by Annual Income and the Size of Forest Plantation Established

4.1.8 Species Planted in Private Forest Plantations in the Study Area

Results in Table 4.7 revealed that in Ogun, Oyo and Ekiti States, 54.5%, 46.2% and 30.4%private forest plantation owners planted *Tectona grandis* while 4.5%, 3.8% and 4.3% planted *Gmelina arborea* alone on theforestland. The results also showed that, 18.2%, 38.9%, 21.1% of private forest plantation owners in Ogun, Oyo and Ekiti States respectively planted both *Tectona grandis and Gmelina arborea* on their land. Furthermore, 4.5% of private forest plantation owners in Ogun State planted*Tectona grandis*, *Cordia alliodora*, *Mansonia* and Mahogany, 7.7% of private forest plantation owners in Oyo State planted *Gmelina arborea*, Eucalyptus and Cassia while 8.7% of the private forest plantation owners planted *Tectona grandis*, *Gmelina arborea* and *Terminalia spp* in Ekiti State. This shows that private forest plantation owners are involved in planting both indigenous and exotic tree species.

Corroborating these findings, Oni *et al*., (2014) Stated that there are many exotic economic tree species in Nigeria, but the two which dominate various forest plantations in Nigeria, the widely known and cultivated are *Tectona grandis* and *Gmelinaarborea*. Also, Onyekwelu (2001) highlighted why higher percentages of exotic tree species are established in forest plantations in Nigeria. The reasons include: ease of establishment, faster growth rate, they are economic and valuable tree species, short gestation period, not like indigenous tree species that can take thirty to fifty years to reach the maturity age. The study further reported that in Nigeria, exotic species (especially *G. arborea and Tectona grandis*) dominated from the 1960s till date and out of the total 224,524.00 ha of plantations established in Nigeria by 1996, over 80% are exotics.

Table 4.7 Distribution of Species Planted by Private Forest Plantation Owners in the Study Area

Species	State			Total
	Ogun	Oyo	Ekiti	
	%	%	%	%
	n=22	n=26	n=23	n=71
Tectona grandis	54.5	46.2	30.4	43.7
Gmelinaarborea	4.5	3.8	4.3	4.2
Terminalia superba	0	0	4.3	1.4
Tectona grandis and *Gmelinaarborea*	18.2	38.5	21.7	26.8
Tectona grandis, Gmelina, Triplochiton scleroxylon and Terminalia superba	4.8	0	0	1.4
Tectona grandis, Cordia alliodora , Mansonia altissima altissima and Mahogany	4.5	0	0	1.4
Tectona grandis, Mansonia altissima, Mahogany khaya and Cedrela odorata	4.5	0	0	1.4
Tectona grandis, Gmelina and Pinus caribaea	0	0	0	1.4
Gmelina, Eucalyptus and Cassia spp	0	7.7	0	2.8
Tectona grandis, Gmelina and Terminalia superba	0	0	8.7	2.8
Tectona grandis and Terminalia superba	0	0	4.3	1.4
Tectona grandis, Gmeliina, Terminalia superba, Moringa oleifera and Pinus caribaea	0	0	4.3	1.4
Tectona grandis, Triplochiton scleroxylon, Terminalia superba,Mansonia altissima	0	0	4.3	1.4
Tectona grandis, Gmelina,Khaya, Terminalia superba, Mahogany, Moringa oleifera, Irvingia gabonensis	0	0	4.3	1.4
Tectona grandis, Gmelina, Moringa oleifera and Irvingia gabonensis	0	0	4.3	1.4
Tectona grandis,Gmelina and Cassia spp	0	3.8	0	1.4
Tectona grandis, Gmelina, Terminalia superba and Pinus caribaea	0	0	4.3	1.4
Tectona grandis and Terminalia superba	0	0	4.3	1.4
No response	4.5	0	0	1.4

Source: Field Survey, 2016

4.1.9 Agroforestry Practices in the Study Area

Results in Figure 3 show that in Ogun State, 30% of the private forest plantation owners practice agroforestry while 70% ofprivate forest plantation owners do not have any agricultural crop in their forest plantation. In Oyo State 52% cultivated agricultural crops alongside trees while 48% did not practise agroforestry. In Ekiti State, 60.9% of private forest plantation owners practice agroforestry while 39.1% solely plant trees and did not incorporate agricultural crops.

Kent and Ammour (2012) reported that incorporating crops to forest plantation have the potential of presenting short-term economic benefits through crop yields, while timber harvest benefits can be expected over medium to long time horizons. Therefore, agroforestry practices generate additional revenue for private forest plantation owners.

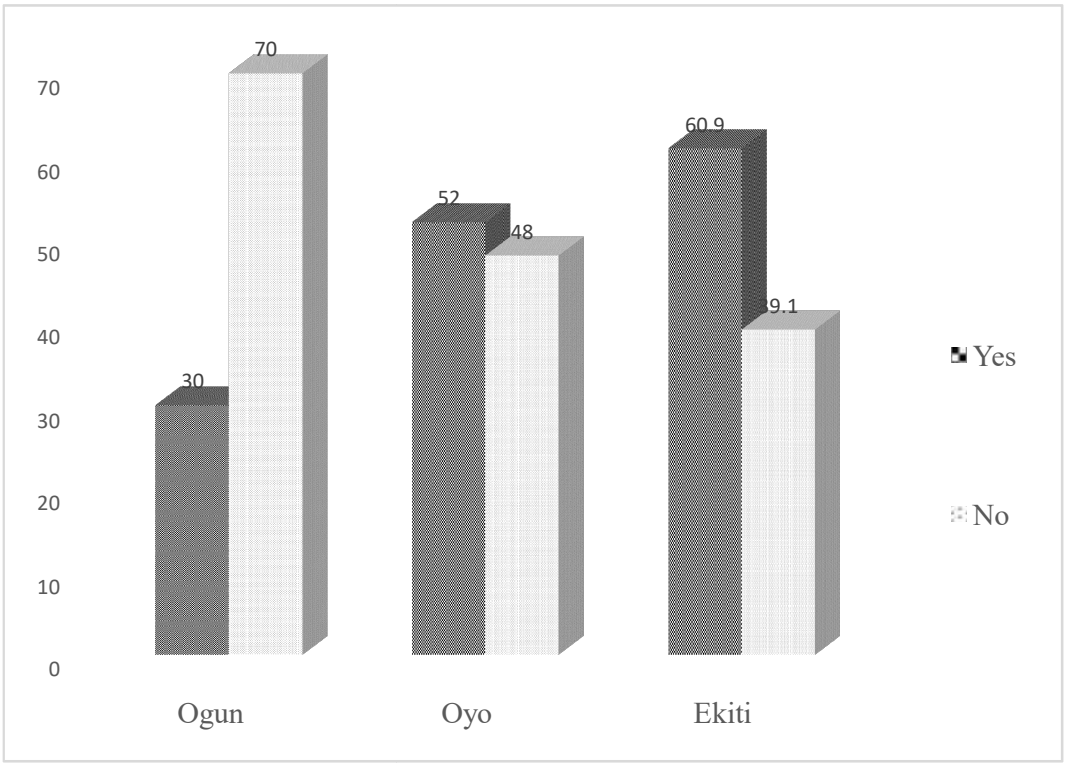

Figure: 3 Distribution of Agroforestry Practices in the Study Area

4.1.10 Crops Planted on Forestland

Table 4.8 shows that about 13 different varieties of crops were cultivated by private forest plantation owners. Crops cultivated include maize, cassava, palm, pawpaw, banana, plantain, pineapple, soyabeans, tomatoes, okro, cocoyam, pepper and yam. The table reveals that in Ogun, Oyo and Ekiti States, 16.7%, 8.3% and 7.7% of the private forest plantation owners planted maize solely on the forest land. Also, 8.3% of private forest plantation owners planted cassava, 16.7% of private forest plantation owners planted palm solely on the forest land in Oyo State.Results reveals that Oyo State has high percentage of the private forest plantation owners (25%) who cultivated maize and cassava on the forest land, 23.1% of private forest plantation owners in Ekiti State cultivated yam and cassava. In Ogun State, private forest plantation owners practicing agroforestry (83.5%) planted more than two crops on the forest plantation land.

Agroforestry systems provide diversity and the prospect of income stability. Planting crops on forest land is a way of complete utilization of forest soil. It improves the standard of living of private forest plantation owners by providing food for household and also generates income when some of the crops are sold. Midgley *et al.,* (2007)Stated that it is very important for private forest plantation owners to consider the choice of crops, the timing of essential operations and the demand for labour. There is need to understand interrelationships and linkages between trees and crops so that there won't be competition for nutrients and soil moisture. Increase in competition between trees and agricultural crops may reduce tree growth and crops yield. Therefore, private owners must have appropriate knowledge of agroforestry ecology; if not the production in agroforestry systems may fall below expectation.

Table 4.8: Distribution of Crops Planted on Forest Plantation Land by State

Crop	State			Total
	Ogun	Oyo	Ekiti	
	%	%	%	%
	n=6	n=12	n=13	n=31
Maize	16.7	8.3	7.7	9.7
Cassava	0	8.3	0	3.2
Palm	0	16.7	0	6.5
Maize and cassava	16.7	25.0	7.7	16.0
Pawpaw, banana and plantain	16.7	0	0	3.2
Pawpaw, banana, plantain and pineapple	16.7	0	0	3.2
Maize, cassava and pepper	16.7	0	0	3.2
Cassava, banana and plantain	16.7	0	0	3.2
Banana, plantain and soyabeans	0	8.3	0	3.2
Yam, cassava and tomatoes	0	8.3	0	3.2
Maize, cassava, okro, cocoyam and tomatoes	0	8.3	0	3.2
Yam, banana and plantain	0	0	7.7	3.2
Yam and cassava	0	0	23.1	9.8
Yam, cassava, banana and plantain	0	0	7.7	3.2
Maize, banana and plantain	0	0	7.7	3.2
Yam, maize	0	0	7.7	3.2
Yam, cassava and cocoyam	0	0	7.7	3.2
Banana, plantain and cocoyam	0	0	15.4	6.4
Banana, plantain, pepper and maize	0	8.3	0	3.2
Maize, cassava, pepper and okro	0	7.7	0	3.2
Maize, cassava, banana, plantain, soyabeans and palm	0	8.3	0	3.2

Source: Field Survey, 2016

4.1.11 Total Number of Private Forest Plantation Owners who planted a Particular Crop in the Study Area

Three (18.75%), seven (25%), four (13.33%) private forest plantation owners planted maize, ditto cassavain Ogun and Oyo States respectively while four (13.3%) and six (20%) planted maize and cassava respectively in Ekiti State. Three (18.75%), two (7.14%) and five (16.67%) private forest plantation owners planted banana, ditto plantainin Ogun, Oyo and Ekiti States respectively. Seven (23.33%) private forest plantation owners in Ekiti State planted yam on forestland.

As earlier Stated, 30% of the private forest plantation owners planted crops while 70% of private forest plantation owners do not have any agricultural crop in their forest plantations. Private forest plantation owners who planted crops revealed they incorporated crops to improve their standard of living and provide food for the family.

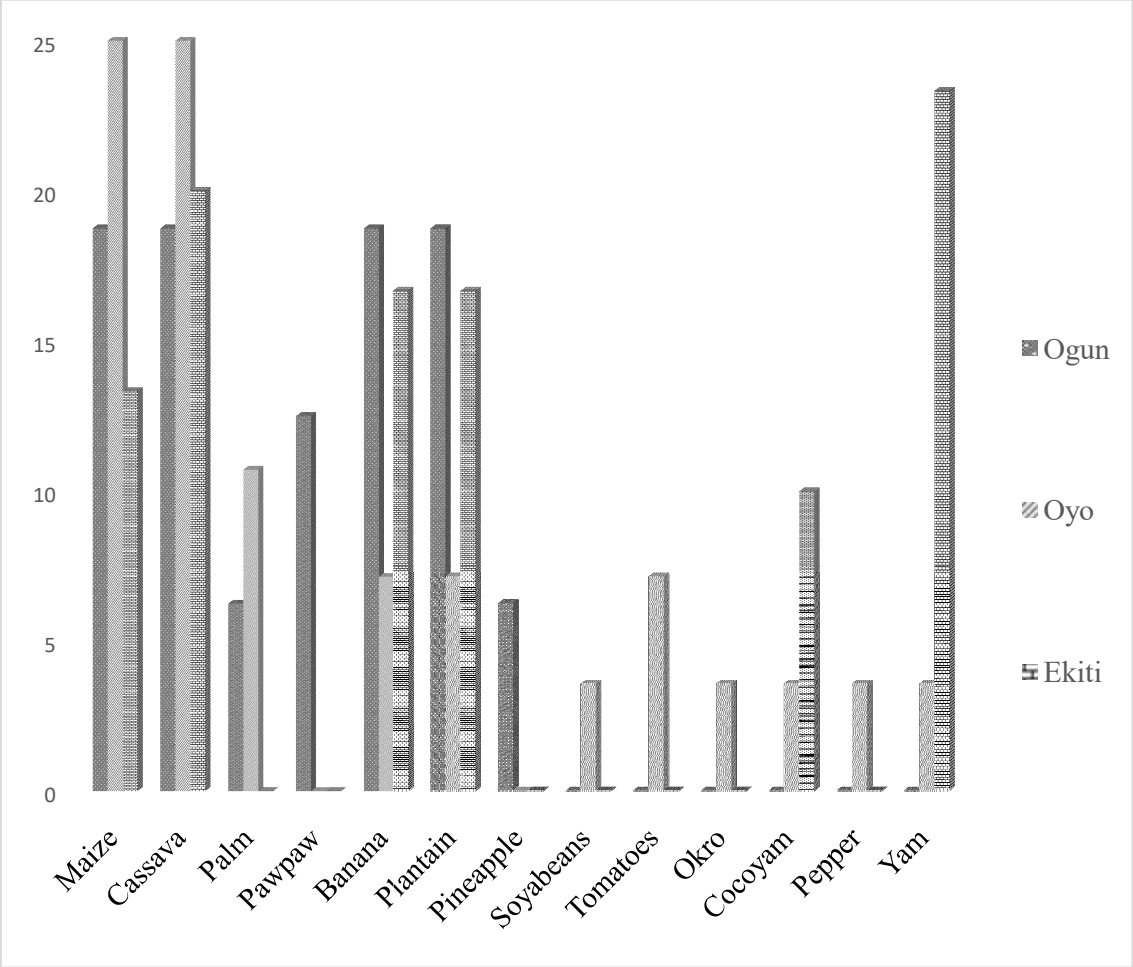

Figure 4: Distribution of Total Number of Private Forest Plantation Owner who planted a particular Crop in the Study Area

4.1.12 Purpose of Forest Plantation Establishment

Timber production was the major purpose for forest plantation development in the study area. It accounted for 72.7%, 65.4% and 65.2% of the private forest plantation owners in Ogun, Oyo and Ekiti States respectively.The most important product after timber was pole production. Although only one private forest plantation owner in Ekiti State established plantation for the sole purpose of producing pole, 19.2% and 17.4% of private forest plantation owners respectively in Oyo and Ekiti States established forest plantationsfor the purpose of producing both timber and pole. Furthermore, 13.6% of private forest plantation owners in Ogun State revealed that timber production and recreation was the reason for forest plantation establishment, while 4.3% of the private forest plantation owners in Ekiti State established plantation for timber, pole and recreation purpose. In addition, 8.7% of private forest plantation owners in Ekiti State established the forest plantation in order to produce timber and non-timber forest products, 7.7% of private forest plantation owners in Oyo State established forest plantation to produce timber, pole and non-timber forest products, while 7.7% ofprivate forest plantation owners in Oyo State established forest plantation to produce pole and non-timber forest products.

This is consistent with the report of FAO (2003a) that the demand for wood raw material by industries in recent times in Nigeria has outstripped the production capacity of the forest. Sutton (1991) also Stated that the importance of forest plantations in meeting the wood needs of societies will continue to increase. The study revealed that the major purpose of forest plantation development was timber production so as to supply raw materials to the industries and companies and also for exportation. Therefore, the purpose of establishing forest plantation in Nigeria may continue to be for timber production in order to meet the demand by industries and the society at large.

Table 4.9: Distribution of Private Forest Plantation Owners by State and Purpose of Establishment

Purpose of establishment	State			Total
	Ogun	Oyo	Ekiti	
	%	%	%	%
	n=22	n=26	n=23	n=71
Timber	72.7	65.4	65.2	67.6
Pole	0	0	4.3	1.4
Timber and pole	13.6	19.2	17.4	16.9
Timber, pole and recreation	0	0	4.3	1.4
Timber and recreation	4.5	0	8.7	4.2
Timber, pole and non-timber	4.5	0	0	1.4
Pole and non-timber	0	7.7	0	2.8
Pole and non-timber	0	7.7	0	2.8

Source: Field Survey, 2016

4.1.13: Funding ofPrivate Forest Plantations Development in the Study Area

Observations from Table 4.10 showed that 95.0%, 84.6% and 87.0% of private forest plantation owners in Ogun, Oyo and Ekiti States respectively, used their personal savings to establish and manage the forest plantations. There are some private forest plantation owners in Oyo State (3.8%) and Ekiti State (4.3%) who used their personal savings and loans from social, financial institutions (co-operatives society) while 5.0% of private forest plantation owners in Ogun State used personal savings and donations from friends and dignitaries to establish the plantation. The results further reveal that 1.4% private forest plantation owners received grants from foreign body but the grant received was actually for the establishment and development of a poultry and agricultural farm. So, left over money from the grant and his personal savings was used to establish forest plantation. .

The results are insights to the existing sources of fund for forest plantation development in Nigeria. The high proportion of private forest plantation owners who revealed to have used their personal money with no financial assistance from government, commercial banks or foreign financial bodies shows that private owners in southwestern, Nigeria has not benefitted from the numerous private forest plantation development funds and investments meant for forest plantation development. This is because money and grants provided by international environmental and any other development institutions to support forest plantation development projects are lacking and the few grants accessible are available to agriculture (cash and arable crops farming) in Nigeria. Examples of these donor organizations include World Bank, Regional Development Banks, UN organisations, ITTO, FAO, GEF, multilateral grant aid institutions, and others.

Castrén et al (2014) reported that the total private sector plantation investments in developing countries are estimated at US$1,763 million in 2011, excluding investments in Reducing Emissions from Deforestation and Forest Degradation (REDD) and landscape restoration. The study further revealed that Latin America account for a large majority of the global total amount—US$1,464 million (83%) while investments in Asia and Oceania are estimated at US$279 million (16%). Estimated annual average private investments in forest plantations in Africa are very small in comparison, at about US$20 million (1%) of the total value and this is due to risks associated with investment in some Africa countries.

Table 4.10: Distribution of Private Forest Plantation Owners Source of Funding by State

Sources of fund	State			Total
	Ogun	Oyo	Ekiti	
	%	%	%	%
	n=22	n=26	n=23	n=71
Personal savings	86.4	84.6	87.0	85.9
Company or NGO's money	0	7.7	4.3	4.2
Personal savings,loans from social financial institutes	0	3.8	4.3	2.8
Personal savings, donations from friends and dignitaries	4.5	0	0	1.4
Loans from social financial institutes, loan from friends and relations	0	3.8	0	1.4
Grants from foreign bodies and personal savings	0	0	4.3	1.4
No response	9.1	0	0	2.8

Source: Field Survey, 2016

4.1.14 Financial Analysis of Forest Plantations in the Study Area

Kippers (2004) revealed that small and medium business owners know their business like nobody else. They put their heart, soul and time into making their business successful but the area in which they lacked expertise is the financial aspect of record keeping. Mungal and Garbharran (2014) also provided sufficient evidence testifying that a greater portion of owners are operating a business without formal financial records in place using South Africa as a case study.

All these Statements are true because going by the list of private forest plantation owners provided by the forestry departments and ministry in southwestern, Nigeria, and the numbers of well detailed cash flow gathered from private owners, it's obvious that most private owners do not keep records on money spent and the revenue generated from their investment.

Oral interview with private forest plantation owners in the study area revealed yields and productivity of the forest plantations are uncertain, costs and prices vary substantially in short and long time periods, supply and demand are extremely difficult to estimate. Therefore, keeping up to date cash flows may be difficult. Also, many private forest plantation owners see cash at hand as growth and profitability of the business.Another reason some private owners gave was that the inflow of money needed to manage the forest plantation cannot be predicted because there is no specific money set aside for the development of the forest plantation. Some private forest owners in the study area disclosed that optimal silvicultural practises are not carried out as they only tend the forest plantation when there is enough money e.g. weeding and pruning are suspended until there is money. On the other hand, forest plantations established by companies or organisations are mostly planned, budgeted and enjoyed all the activities needed for the development of the plantation, for example British American Tobacco Plantations (BAT).

Cubbage *et al.* (2013) Stated that financial and economic analysis include defining the project objectives, collecting data for analysis, the estimation of inputs for activities, costs, and prices, the development of cash flow tables, the use of profitability indicators to estimate the financial or economic returns, the actual implementation of the project, and monitoring and evaluation. As Stated earlier, cash flow of investment were missing in many forest plantations in the study area.59.1% ,80.8% and 65.2% of private forest owners in Ogun, Oyo and Ekiti States respectively do not keep records of the activities done in the plantation and

this is mostly because they tend to plant and manage the plantation at their own pace with no target of production and no specific period of rotation.

Inflation may affect timber prices because of the long rotation period of timber. As years goes by, the cost of silvicultural practices (tending and maintenance) reduces, also the prices of timber and labour are not equal throughout the production period. Therefore, it is difficult to calculate them precisely due to various limitations of long rotation period. Hence, some prices for timber, silvicultural and administrative cost were projected. In addition, Cubbage *et al* (2013) reported that prices in financial analyses are based on current market prices, historical data, or future projections and changes. The study further stressed that when using this financial prices for forestry project, the changes should be small enough (marginal) that they do not distort current market costs and prices.

Table 4.11: Distribution of Private Forest Plantation Owners Recording Keeping of Activities in Forest Plantationsby State

Record keeping	State			Total
	Ogun	Oyo	Ekiti	
	%	%	%	%
	n=22	n=26	n=23	n=71
Yes	13.6	3.8	4.3	7.0
No	59.1	80.8	65.2	69.0
No response	27.3	15.4	30.4	23.9

Source: Field Survey, 2016

4.1.15. Chief Bisi Rodipe Forest Plantation

The forest plantation covers land area of 0.405 hectares, located in Ijari, Ijebu North East Local Government Area, OgunState. It was established in the year 2008 and the only species planted is teak (*Tectona grandis*). The plantation was established for the purpose of pole production, aesthetic view, fuel wood and seeds. The harvesting cost, transportation cost and revenue generated were projected for a 12 year rotation period. The base year for Bisi-Rodipe plantation was 2008, World Bank (2016) recorded the lending rate of 2008 in Nigeria as 15.48%.

Table 4.12: Chief Bisi Rodipe Forest Plantation's Cash Flow for a 12 year Rotation

Year	Items	Cost (₦)	Revenue (₦)	B/C	D.F(15.48%)	D.C	D.R	NPV (15.48%)	NPV (36%)
1	Land Land clearings Seedlings Planting Transportation	240,000 35,000 35,000 14,000 7,000		-331000	1	331000	-	-331000	331000
2	Tending &maintenance	70,000	-	-70000	0.74	51800	-	-51800	37800
3	Tending &maintenance	70,000	-	-70000	0.64	44800	-	-44800	28000
4	Tending &maintenance Fuelwood	70,000	5,000	-65000	0.55	38500	2750	-35750	18850
5	Tending &maintenance Fuelwood	70,000	7,000	-63000	0.48	33600	3360	-30240	13860
6	Tending, maintenance and harvesting cost Fuelwood&pole	90,100	793,900	703800	0.41	36941	325499	288558	112608
7	Tending, maintenance and harvesting cost Fuelwood&pole	85,000	610,000	525000	0.35	29750	213500	183750	63000
8	Tending, maintenance and harvesting cost Fuelwood&pole	94,000	964,000	870000	0.30	28200	289200	261000	78300
9	Tending, maintenance and harvesting cost Fuelwood&pole	88,000	732,000	644000	0.26	22880	190320	167440	38640
10	Tending, maintenance and harvesting cost Fuelwood&pole	97,000	1,085,000	988000	0.23	22310	249550	227240	49400
11	Tending, maintenance and harvesting cost Fuelwood&pole	100,000	1,205,000	1105000	0.20	20000	241000	221000	33150
12	Tending, maintenance and harvesting cost Fuelwood&pole	108,000	1,524,000	1416000	0.17	18360	259080	240720	28320
Total						678141	1774259	1096118	-26092

Source: Field Survey, 2016

*B/C (Benefit-Cost), DF (Discounted factor), D.R (Discounted revenue), D.C (Discounted cost) and NPV (Net Present Value)

4.1.15.1. Net Present Value (NPV)

$$NPV = \sum_{t=0}^{t=n} \frac{R_t}{(1+r)^t} - \sum_{t=0}^{t=n} \frac{C_t}{(1+r)^t}$$

NPV = 1774259- 678141

= ₦ 1,096,118.00

4.1.15.2 Benefit Cost Ratio (B/C)

$$B/C = \frac{\sum_{t=0}^{t=n} \frac{Bt}{(1+r)^t}}{\sum_{t=0}^{t=n} \frac{Ct}{(1+r)^t}}$$

$= \frac{1774259}{678141} = 2.62$

4.1.15.3 Internal Rate of Return (IRR)

IRR = Discount rate resulting in the last positive NPV

$+\left[Difference\ between\ discount\ rates\ X\ \frac{positive\ NPV}{increamental\ NPV}\right]$

To calculate IRR, NPV must be negative. Since the NPV for this investment is positive, there is need to increase the discount factor to get negative NPV. Therefore, at 36% discount factor, NPV= -26092 and the last positive NPV = 11246 at 35% discount factor. The difference between the two discount rates is 36 – 35 = 1

$$IRR = 35 + \left[1\ X\ \frac{11246}{26092 + 11246}\right]$$

IRR = 35 + [1 x 0.301]
= 35 + [0.301]
= 35.30%

4.1.15.4 Annual Equivalent Value

$AEV = NPV\left[\frac{r(1+r)^t}{(1+r)^t-1}\right]$

$= 1096118\left[\frac{0.16(1+0.16)^{12}}{(1+0.16)^{12}-1}\right]$

= 1096118 x 0.19

= ₦208262.42ha^{-1}

4.1.15.5 Land Expectation Values

$$LEV = \frac{NPV\ (1+r)^t}{(1+r)^t - 1}$$

The land was bought at ₦240000

NPV without the rent = 1589708 - 253590 = 1336118

$$LEV = \frac{1336118\ X\ 5.9}{4.9}$$

= ₦ 1,608,795.14ha^{-1}

4.1.15.6 Return on Investment or Rate of Return on Investment

$$ROI = \frac{Net\ Present\ value}{Present\ value\ of\ cost} \text{ x } 100$$

$$\frac{1096118}{678141} \text{x } 100$$

= 1.62 x 100

162%

4.1.15.7 Payback Period

Discounted Payback Period

$$Discounted\ Payback\ Period = A + \frac{B}{C}$$

Where,
A = Last period with a negative discounted cumulative cash flow;

B = Absolute value of discounted cumulative cash flow at the end of the period A;
C = Discounted cash flow during the period after A.

$$5+ \left[\frac{168410}{288189}\right]$$

= 5 + 0.58

= 5.58
≈ 5 years 7months

4.1.16. Mr Awoniyi's Forest Plantation

The size of the forest plantation is 50 hectares and it is located in Kila Area, Odogbolu Local Government Area, OgunState. It was established in the year 2004 and exotic and few indigenous tree species were planted; teak (*Tectona grandis*), *Gmelina arborea*, Obeche (*Triplochiton scleroxylon*) and Afara (*Terminalia spp*). The sole purpose of plantation establishment is timber production. The plantation has not been harvested, so the revenue from the investment, harvesting and transportation cost for a 15 year rotation period were projected. The base year for Awoniyi's plantation was 2004, World Bank (2016) recorded the lending rate of 2004 in Nigeria as 19.18%

It is important to note that in a hectare of land, 1600 seedlings are used.

1 Hectare = 100 m x 100 m

Escapement = 2.5m x 2.5m (Standard spacing)

Total number of seedlings per hectare is derived as follows:

$$\frac{1\ hectare}{spacing\ for\ planting\ teak\ seedlings}$$

$$\frac{100m\ x\ 100m}{2.5m\ x\ 2.5m}$$

=1600 seedlings

Total number of seedlings per hectare = 1600 seedlings. 1600 seedlings represent the full stock per hectare of land.

Hence,

1600 seedlings x 50 hectares = 80,000 trees.

Presently the cost of a tree between 0.6m to 0.8m girths is ₦7000. Therefore, the cost of 80,000 trees is ₦ 560,000,000 if there are no natural disasters. Also the cost of harvesting and transporting a tree is ₦ 500. The total cost of harvesting and transporting 80,000 stands is equal to ₦ 40,000,000.

Table 4.13a: Mr Awoniyi Forest Plantation's Cash Flow for a 15 year Rotation

Year	Items	Cost (₦)	Revenue (₦)	NPV	r (19.18 %)	D.C	D.R	DNPV (19.18%)	DNPV (39%)
1	Land	3,087,500		-3559500	1	3759500	200000	-3559500	-3559500
	Land preparation	300,000							
	Planting activities	100,000							
	Planting exercise	72,000							
	Tending& maintenance	150,000							
	Monitoring&supervision	50,000							
	Arable crops		200,000						
	Total	**3759500**							
2	Land preparation	300,000		-550000	0.70	490000	105000	-385000	-286000
	Planting activities	100,000							
	Planting exercise	60,000							
	Tending& maintenance	170,000							
	Monitoring supervision	70,000							
	Arable crops		150,000						
	Total	**700000**							
3	Tending &maintenance	190000		-140000	0.59	230100	147500	-82600	-51800
	Monitoring&supervision	200000							
	Arable crops		250,000						
	Total	**390000**							
4	Tending &maintenance	80,000		-60000	0.50	90000	60000	-30000	-16200
	Monitoring&supervision	100,000							
	Arable crops and Animal rearing		120,000						
	Total	**180000**							
5	Monitoring&supervision	50,000		25000	0.42	21000	31500	+10500	4750
	Arable crops and Animal rearing		75,000						
6	Monitoring&supervision	50,000		70000	0.35	17500	42000	+24500	9800
	Arable crops and Animal rearing		120,000						

Table 4.13b: Mr Awoniyi Forest Plantation's Cash Flow for a 15 year Rotation

Year	Items	Cost (₦)	Revenue (₦)	NPV	r (19.18 %)	D.C	D.R	DNPV (19.18%)	DNPV (39%)
7	Monitoring&supervision	60,000		80000	0.30	18000	42000	+24000	8000
	Arable crops and Animal rearing		140,000						
8	Monitoring&supervision	80,000		105000	0.25	20000	46250	+26250	7350
	Arable crops and Animal rearing		185,000						
9	Monitoring&supervision	80,000		60000	0.21	16800	29400	+12600	3000
	Arable crops and Animal rearing		140,000						
10	Monitoring&supervision	80,000		45000	0.18	14400	22500	+8100	1800
	Arable crops and Animal rearing		125,000						
11	Monitoring&supervision	30,000		-30000	0.15	4500	-	-4500	-900
12	Monitoring&supervision	30,000		-30000	0.12	3600	-	-3600	-600
13	Monitoring&supervision	30,000		-30000	0.10	3000	-	-3000	-300
14	Monitoring&supervision	30,000		-30000	0.09	2700	-	-2700	-270
15	Harvesting and transportation cost	40,000,000		52000000	0.07	2800000	39200000	+36400000	3640000
	Timber		560,000,000						
Total						7491100	39926150	32435050	-310270

Source: Field Survey, 2016

*NPV (Net Present Value), D.R (Discounted revenue), D.C (Discounted cost), DNPV (Discounted Net Present Value) and r (Discounted rate

4.1.16.1 Net Present Value

NPV = 39926150 - 7491100

= ₦32435050

4.1.16.2 Benefit Cost Ratio

BCR $= \frac{39926150}{7491100}$ = 5.33

4.1.16.3 Internal Rate of Return

To calculate IRR, NPV must be negative. Since the NPV for this investment is positive, there is need to increase the discount factor to get negative NPV. Therefore, at 39% discount factor, NPV= -310270 and the last positive NPV = 200120 at 38% discount factor. The difference between the two discount rates is 39 – 38 = 1

IRR $= 38 + \left[39 - 38\ X\ \frac{200120}{310270+200120}\right]$

IRR = 38+ [1 x 0.39]

= 38 + 0.39

= 38.39%

4.1.16.4 Annual Equivalent Value

AEV $= 32435050[\frac{0.19(1+0.19)^{15}}{(1+0.19)^{15}-1}]$

= 32435050 x 0.21

= ₦6811360.50ha^{-1}

4.1.16.5 Land Expectation Values

Land rent is 3087500

NPV without rent = 35523550

LEV = 35523550 x 13.59

12.59

= ₦38344578.28ha^{-1}

4.1.16.6 Rate of Return on Investment

ROI = $\frac{Net\ Present\ Value}{Present\ value\ of\ cost}$ x 100

= $\frac{32435050}{7491100}$ x 100

= 4.33 x 100

433%

4.1.16.7 Payback Period

$$Discounted\ Payback\ Period = A + \frac{B}{C}$$

14 + $\frac{2942150}{36400000}$

14 + 0.081

≈14 years 1 month

4.1.17. Chief Odebiyi's Forest Plantation

The forest plantation covers a land area of 75 hectares, located in Alamala, Ogun State. It was established in the year of 2001 and the species planted are teak (*Tectona grandis*) and *Gmelina arborea*. The plantation was established for the purpose of timber production, aesthetic and amelioration of the environment. The base year for Odebiyi's plantation was 2001, World Bank (2016) recorded the lending rate of 2001 in Nigeria as 23.44%

The revenue, harvesting and transportation cost generated were projected for a 16 year rotation period. Selective harvesting has been done in the plantation and final harvest is projected to happen in the 16th year. Cost of a tree (girth between 0.6m-0.8m) is ₦7000 while the cost of tree between 0.9m-1m girths is ₦8000. The harvesting and transportation cost for each tree was ₦ 500. First harvest was done in 2013 (13th year), where 100 stands were fell and the revenue generated was ₦700,000, the second harvest was in 2014 (14th year), a total number of 280 stands were harvested, revenue generated was ₦1,960,000 and the third harvest was in 2015 (15th year), few stands that have attained 0.9 to 1m girth were fell and sold at ₦8000 and approximately 2200 stands were sold. Revenue generated was ₦16,500,000. Projected revenue for the final harvest is ₦880650000.

Table 4.14a Chief Odebiyi Forest Plantation's Cash Flow for a 16 year Rotation

Year	Items	Cost (₦)	Revenue (₦)	NPV	r (23.44 %)	D.C	D.R	DNPV (23.44%)	DNPV (30%)
1	Land	2,250,000		-10612500	1	10612500		10612500	10612500
	Survey, demarcation, land clearing and preparation, seedlings, pegs and pegging, planting.	8,362,500							
	Total	**10612500**							
2	Cleaning, application of fertilizer, beating up Planting activities Planting exercise Tending& maintenance Monitoring supervision	1,200,000		-1200000	0.66	792000		792000	709200
3	Cleaning, beating up Tending& maintenance Monitoring supervision	1050000		-1050000	0.54	567000		567000	478800
4	Tending& maintenance Monitoring supervision	975000		-975000	0.44	429000		429000	340275
5	Monitoring&supervision	1050000		-1050000	0.36	378000		378000	282450
6	Monitoring&supervision	1125000		-1125000	0.29	326250		326250	232875
7	Monitoring&supervision	1200000		-1200000	0.23	276000		276000	190800
8	Monitoring&supervision	1200000		-1200000	0.19	228000		228000	146400
9	Monitoring&supervision	750000		-750000	0.16	120000		120000	70500
10	Monitoring&supervision	375000		-375000	0.13	48750		48750	27000
11	Monitoring&supervision	375000		-375000	0.10	37500		37500	20625

Table 4.14b: Chief Odebiyi Forest Plantation's Cash Flow for a 16 year Rotation

Year	Items	Cost (₦)	Revenue (₦)	NPV	r (23.44 %)	D.C	D.R	DNPV (23.44%)	DNPV (30%)
12	Monitoring&supervision	375000		-375000	0.083	31125		31125	15750
13	Harvesting and transportation cost	50000		+650000	0.068	3400	47600	44200	21450
	Timber		700000						
14	Harvesting and transportation cost	140000		+1820000	0.055	7700	107800	100100	45500
	Timber		1960000						
15	Harvesting and transportation cost	1100000		+15400000	0.045	49500	742500	693000	292600
	Timber		16500000						
16	Harvesting and transportation cost	58710000		+821940000	0.036	2113560	31703400	29589840	12329100
	Timber		880650000						
Total						16020285	32601300	16581015	-481425

Source: Field Survey, 2016

4.1.17.1 Net Present Value

NPV = 32601300-16020285

= ₦ 16,581,015.00

4.1.17.2 Benefit Cost Ratio

BCR $= \frac{32601300}{16020285}$ = 2.04%

4.1.17.3 Internal Rate of Return

To calculate IRR, NPV must be negative. Since the NPV for this investment is positive, there is need to increase the discount factor to get negative NPV. Therefore, at 30% discount factor, NPV= - 481425 and the last positive NPV = 1181165 at 29% discount factor. The difference between the two discount rates is 30 – 29 = 1

IRR = $29 + \left[1\ X\ \frac{1181165}{481425+11811}\right]$

IRR = 29 + [1 x 0.71]

= 23.44 + 0.71

= 29.71%

4.1.17.4 Annual Equivalent Value

$16581015[\frac{0.23(1+0.23)^{16}}{(1+0.23)^{16}-1}]$

= 16581015x 0.24

= ₦3,979,443.60ha^{-1}

4.1.17.5 Land Expectation Values

Land rent is ₦2,250,000

NPV without rent = 36217600 – 14010300

= 22,207,300

LEV = $\frac{22207300 \times 27.45}{26.45}$

= ₦23,046,895.46ha^{-1}

4.1.17.6 Return on Investment or Rate of Return on Investment

ROI = $\frac{Net\ Present\ Value}{Present\ value\ of\ cost}$ x 100

$\frac{16581015}{16020285}$X 100

1.04 x 100

=104%

4.1.17.7 Payback Period

$$Discounted\ Payback\ Period = A + \frac{B}{C}$$

$$15 + \frac{6569588}{29589840}$$

15 + 0.222

≈15years 2months

4.1.18 Chief Bisi Egbeyemi's Forest Plantation

The size of the forest plantation is 30 hectares and it is located inIka village, along Iworoko Rd., Ado Local.Government.Area, Ekiti State. It was established in the year of 2001 and exotic and few indigenous tree species were planted; teak (*Tectona grandis*), *Gmelina arborea, Terminalia spp*. The purpose of plantation establishment is timber/pole production and recreation and tourism. The plantation has not been harvested so the revenue from the investment, harvesting and transportation cost for a 15 year rotation period were projected. The base year for Egbeyemi's plantation was 2001, World Bank (2016) recorded the lending rate of 2001 in Nigeria as 23.44%

In Ekiti State, the cost of a tree (girth between 0.6-0.8) is ₦5000
The number of stands expected to be harvested at the end of 15 year rotation is 1600 x 30 = 48000 stands. Therefore, the projected revenue is 48000 x 5000 = ₦ 240,000,000

Table 4.15a: Chief Bisi Egbeyemi's Forest Plantation's Cash Flow for a 15 year Rotation

Year	Items	Cost (₦)	Revenue (₦)	NPV	r (23.44 %)	D.C	D.R	DNPV (23.44%)	DNPV (28%)
1	Land Survey, demarcation, land clearing and preparation, seedlings, pegs and pegging, planting.	2525000		-2525000	1	2525000		2525000	2525000
2	Cleaning, application of fertilizer, beating up Planting activities Planting exercise Tending& maintenance Monitoring supervision	1375000		-1375000	0.66	907500		907500	838750
3	Cleaning, beating up Tending& maintenance Monitoring supervision	1475000		-1475000	0.54	796500		796500	708000
4	Tending& maintenance Monitoring supervision	1575000		-1575000	0.44	693000		693000	582750
5	Monitoring&supervision	1575000		-1575000	0.36	567000		567000	456750
6	Monitoring&supervision	1575000		-1575000	0.29	456750		456750	362250
7	Monitoring&supervision	1575000		-1575000	0.23	362250		362250	283500

Table 4.15b: Chief Bisi Egbeyemi Forest Plantation's Cash Flow for a 15 year Rotation Plantation

Year	Items	Cost (₦)	Revenue (₦)	NPV	r (23.44 %)	D.C	D.R	DNPV (23.44%)	DNPV (28%)
8	Monitoring&supervision	1575000		-1575000	0.19	299250		299250	220500
9	Monitoring&supervision	1575000		-1575000	0.16	252000		252000	173250
10	Monitoring&supervision	1575000		-1575000	0.13	204750		204750	133875
11	Monitoring&supervision	105000		-105000	0.10	10500		10500	6930
12	Monitoring&supervision	105000		-105000	0.083	8715		8715	5460
13	Monitoring&supervision	105000		-105000	0.068	7140		7140	4200
14	Monitoring&supervision	105000		-105000	0.055	5775		5775	3360
15	Harvesting and transportation cost	9600000		+230400000	0.045	432000	10800000	10368000	5760000
	Timber		240000000						
Total						7528130	10800000	4363450	-544575

Source: Field Survey, 2016

4.1.18.1 Net Present Value

NPV= 10800000 - 7528130

= ₦ 3,271,870.00

4.1.18.2 Benefit Cost Ratio

BCR: $= \frac{10800000}{7528130}$ = 1.43

4.1.18.3 Internal Rate of Return

To calculate IRR, NPV must be negative. Since the NPV for this investment is positive, there is need to increase the discount factor to get negative NPV. Therefore, at 28% discount factor, NPV= -544575 and the last positive NPV = 10605 at 27% discount factor. The difference between the two discount rates is 28 – 27 = 1

IRR = $27 + \left[1\ X\ \frac{10605}{544575+10605}\right]$

IRR = 27+ [1 x 0.02]

= 27 + 0.02

= 27.02%

4.1.18.4 Annual Equivalent Value

$3271870[\frac{0.23(1+0.23)^{15}}{(1+0.23)^{15}-1}]$

= 3271870x 0.24

= ₦785,248.00ha^{-1}

4.1.18.5 Land Expectation Values

Land rent is ₦1000000

NPV without rent = 10800000 – 6096130

= 4703870

LEV = $\frac{4703870 \times 22.3}{21.3}$

= ₦4,924,708.97ha^{-1}

4.1.18.6 Return on Investment or Rate of Return on Investment

ROI = $\frac{Net\ Present\ Value}{Present\ value\ of\ cost}$ x 100

$\frac{3271870}{7528130}$x 100

0.43 x 100

43.46%

4.1.18.7 Payback Period

$$Discounted\ Payback\ Period = A + \frac{B}{C}$$

$$4 + \frac{128000}{693000}$$

4+ 0.18

≈4years 2months

4.1.19 Mr Ademola's Forest Plantation

The size of the forest plantation is 20 hectares and it is located in Erin Omu, Kajola Local Government Area, OyoState. It was established in the year of 1999. The species planted are teak (*Tectona grandis*) and *Gmelina arborea*. The purpose of plantation establishment is timber production. The plantation has not been harvested, so the revenue from the investment, harvesting and transportation cost for 18 year rotation period were projected.
The base year for Ademola's plantation was 1999, World Bank (2016) recorded the lending rate of 1999 in Nigeria as 20.29%.

In OyoState, the cost of a tree (girth from 0.8 and above) is ₦8000
The number of stands expected to be harvested at the end of 18 year rotation is 1200 x 20 = 24000 stands. Therefore, the projected revenue is 24000 x 8000 = ₦ 192,000,000

Table 4.16a: Mr. Ademola's Forest Plantation's Cash Flow for 18 year Rotation Plantation

Year	Items	Cost (₦)	Revenue (₦)	NPV	r (23.44 %)	D.C	D.R	DNPV (23.44%)	DNPV (25%)
1	Land Survey, demarcation, land clearing and preparation, seedlings, pegs and pegging, planting.	2830000		-2830000	1	2830000		2830000	2830000
2	Cleaning, application of fertilizer, beating up Planting activities Planting exercise Tending& maintenance Monitoring supervision	559070		-559070	0.69	385758.3		385758.3	357804.8
3	Cleaning, beating up Tending& maintenance Monitoring supervision	320000		-320000	0.58	185600		185600	163200
4	Tending& maintenance Monitoring supervision	280000		-280000	0.48	134400		134400	114800
5	Monitoring&supervision	280000		-280000	0.40	112000		112000	92400
6	Monitoring&supervision	280000		-280000	0.33	92400		92400	72800
7	Monitoring&supervision	120000		-120000	0.28	33600		33600	25200

Table 4.16b: Mr. Ademola's Forest Plantation's Cash Flow for 18 year Rotation Plantation

Year	Items	Cost (₦)	Revenue (₦)	NPV	r (23.44 %)	D.C	D.R	DNPV (23.44%)	DNPV (25%)
8	Monitoring&supervision	120000		-120000	0.23	27600		27600	20400
9	Monitoring&supervision	120000		-120000	0.19	22800		22800	15600
10	Monitoring&supervision	100000		-100000	0.16	16000		16000	11000
11	Monitoring&supervision	100000		-100000	0.13	13000		13000	8600
12	Monitoring&supervision	100000		-100000	0.11	11000		11000	6900
13	Monitoring&supervision	100000		-100000	0.09	9000		9000	5500
14	Monitoring&supervision	100000		-100000	0.07	7000		7000	4400
15	Monitoring&supervision	100000		-100000	0.06	6000		6000	3500
16	Monitoring&supervision	100000		-100000	0.05	5000		5000	2800
17	Monitoring&supervision	100000		-100000	0.04	4000		4000	2300
18	Harvesting and transportation cost	12000000		+18000000	0.03	360000	5760000	5400000	3240000
	Timber		192000000						
Total						4255158.3	5760000	1504841.7	-497204.8

Source: Field Survey, 2016

4.1.19.1 Net Present Value

NPV = 5760000 – 4255158.3

= ₦1,504,841.70

4.1.19.2 Benefit Cost Ratio

BCR: $= \frac{5760000}{4255158.3}$ = 1.35

4.1.19.3 Internal Rate of Return

To calculate IRR, NPV must be negative. Since the NPV for this investment is positive, there is need to increase the discount factor to get negative NPV. Therefore, at 25% discount factor, NPV= -497204.8 and the last positive NPV = 17204.5 at 24% discount factor. The difference between the two discount rates is 25 – 24 = 1

IRR = $24 + \left[1\ X\ \frac{17204.5}{497204.8+172\quad .5}\right]$

IRR = 24+ [1 x 0.03]

= 24+0.03

= 24.03%

4.1.19.4 Annual Equivalent Value

$= 1504841.7[\frac{0.2(1+0.2)^{18}}{(1+0.2)^{18}-1}]$

= 1504841.7 x 0.21

= ₦316,016.76ha^{-1}

4.1.19.5 Land Expectation Values

Land rent is 600000

NPV without rent = 5760000 – 3655158.3

= 2,104,841.7

LEV = $\frac{2104841.7 \text{ x } 26.62}{25.62}$

= ₦2,186,997.89ha^{-1}

4.1.19.6 Return on Investment or Rate of Return on Investment

$$\text{ROI} = \frac{Net\ Present\ Value}{Present\ value\ of\ cost} \text{ x } 100$$

$$= \frac{1504841.7}{4255158.3} \text{ x } 100$$

$$= 0.35 \text{ x } 100$$

$$= 35\%$$

4.1.19.7 Payback Period

$$Discounted\ Payback\ Period = A + \frac{B}{C}$$

$$17 + \frac{3635158.3}{5400000}$$

$$17 + 0.67$$

$$\approx 17 \text{ years } 8\text{months}$$

4.1.20 Summary of Investment Analysis of all Forest Plantations

The results of investment analysis showed all positive NPV, AEV, LEV value and BCR is greater than one which means forest plantations investment is a profitable and feasible business regardless of the size of plantation and can be recommended to potential investors. DPBP of three out of five private forest plantations in the study area were high because huge capital were expended at the initial stage of investments and little or no revenue were generated until towards the end of year of rotation. Hence, initial outlay will never be fully paid until the end of rotation when the investment will yield returns. Therefore, multiple land use system should be incorporated to increase revenue.

Table 4.17 also revealed the results of investment calculated per hectare for the five forest plantations in the study area. Results show that NPV, AEV and LEV per hectare for Bisi-Rodipe,s plantation were ₦2,740,295.00, ₦520,656.05 and ₦4,021,987.86, Awoniyi's forest plantation were ₦648,701.00, ₦136,227.21, ₦766,880.79, Odebiyi's forest plantation were ₦221080.20, ₦53059.25, ₦310845.94, Egbeyemi's forest plantation were ₦109062.34, ₦26174.96, ₦149080.91 and Ademola's forest plantation were ₦75242.08, ₦15800.84, ₦109349.89 respectively. Furthermore, the values of BCR, IRR, ROIand PBP calculated for the five private forest plantations were the same with the actual hectares of the forest plantations. That is, the BCR, IRR, ROI and PBP of Bisi-Rodipe's 0.4ha forest plantation (2.62, 35.30%, 162%, 5.58years) were the same with the values when it's one hectare.

Per hectare analysis of the investment does not give consistent trend because returns differ at different forest plantations and this is due to disparity in prices of timber which determines the return of investments at different private forest plantations. The values per hectare of the investment can be used to calculate any number of hectares and can also be used to compare the profitability of each investment across the States.

Table 4.17: Summary Table of Investment Analysis and Cost Benefit Analysis of Per Hectare for all the Forest Plantations

Name of plantation	Year	Location	Size (ha)	NPV (₦)	BCR	IRR (%)	AEV (₦)	LEV (₦)	ROI (%)	DPBP (year)	Size (1ha)	NPV (₦)	AEV (₦)	LEV (₦)
Bisi Rodipe	2008	Ijari, Ijebu Ode, Ogun	0.41	1096118.00	2.62	35.30	208262.42	1608350.84	162	5.58	1	2740295.00	520656.05	4021987.86
Awoniyi	2004	Kila,Odogbolu, Ogun	50	32435050.00	5.33	38.39	6811360.50	38343578.28	433	14.01	1	648701.00	136227.21	766880.79
Odebiyi	2001	Alamala, Ogun	75	16581015.00	2.04	29.71	3979443.60	23046894.46	104	15.02	1	221080.20	53059.25	310845.94
Bisi Egbeyemi	2001	Ika village, Iworoko, Ekiti	30	3271870.00	1.43	27.02	1047228.00	4924708.97	43	4.18	1	109062.34	26174.96	149080.91
Ademola	1999	Kajola, Oyo	20	1504841.70	1.35	24.43	316016.76	2186997.89	35	17.67	1	75242.08	15800.84	109349.89

Source: Field Survey, 2016

4.1.21: Component Cost Return Analysis for the Investments

Component cost and return were calculated for all the private forest plantation investments. The initial cost of land purchase and preparation, cost of seedlings, fertilizer application, tending, monitoring and supervision undertaken during the year in which the forest plantations were established as well as harvesting cost and returns from investments at rotation were analysed.

The results in Table 4.18 revealed that in Chief Bisi-Rodipe's 0.4ha forest plantation,cost of landpurchase, clearing, seedlings, planting and transportation represented 18.85%, 2.75%, 2.75%, 1.09% and 0.55% of the total cost expended on investment respectively. Furthermore, tending and harvesting cost represented 60.39% and 13.51% of the total cost expended on investment respectively. This shows that tending takes the largest percentage of cost expended on the investment. Table 4.19 also revealed that fuelwood and pole were the main purpose of forest plantation establishment in Chief Bisi-Rodipe's forest plantation and they represented 2.93% and 96.97% of returns generated respectively.

Table 4.20 shows that cost of land purchase, land preparation, seedling production and planting exercise represented 6.79%, 1.32%, 0.44% and 0.29% of the total cost expended on investment in Mr Awoniyi's 50ha forest plantation respectively. Also, 1.30% of the total cost was spent on tending, 2.09% of the total cost was spent on monitoring and supervision and 87.97% of the total cost was spent on harvesting. Study revealed that the private forest plantation owner incorporated multiple land use system. Hence, Table 4.21 shows that crop production (0.24%), animal production (0.05%) and timber production (99.78%) represented return generated from the investment. The study revealed harvesting generated the highest percentage of cost expended on investment while timber production generated the highest returns.

Observations from Table 4.22 show that in Chief Odebiyi's 75ha forest plantation; land purchase, land preparation,planting exerciseand cleaning represented 2.80%, 10.42%, 1.49% and 1.31% of the total cost expended on forest plantation establishment respectively. Tending (1.21%), monitoring and supervision (8.03%) and harvesting cost represented 74.72% of the cost expended on forest plantation establishment. The study revealed that timber production was the sole purpose of forest plantation establishment and it represented 100% of the total return generated from the investment.

Data as shown on Table 4.24 revealed that in Chief Bisi Egbeyemi's 30ha forest plantation, land purchase, land preparation, planting exercise and cleaning represented 3.79%, 5.77%, 5.20% and

5.58% of the total cost expended on investment. Tending, monitoring and supervision and harvesting cost also represented 5.96%, 37.34% and 36.34% of the total cost expended on investment respectively. The sole purpose of production was timber production and it represented 100% of the total return generated from the investment.

Observations from Table 4.26 show that in Ademola's 20ha forest plantation; land purchase, land preparation, planting exercise and cleaning represented 3.39%, 12.59%, 3.16% and 1.81% of the total cost of investment. Tending and maintenance, monitoring and supervision and harvesting cost represent 1.58%, 9.68% and 67.76% of the total cost of investment respectively. Timber production was the sole purpose of forest plantation establishment and it represented 100% of the total return on investment.

The component cost benefit revealed that harvesting cost assumed the highest percentage of the cost expended on investments in four private forest plantations in the study area while timber production generated the highest percentage of return from the investments in the five private forest plantations.

Table 4.18: Distribution of Component Cost Analysis(₦ '000')for Chief Bisi-Rodipe's Forest Plantation

	ITEMS													
	Total Cost = 1273100													
	Size = 0.4ha													
Year	Land		Land Clearing		Seedling		Planting		Transportation		Tending		Harvesting Cost	
	Cost	%	Cost	%	Cost	%	Cost	%	Cost	%	Cost	%	Cost	%
1	240	18.85	35	2.75	35	2.75	14	1.09	7	0.55	-	-	-	-
2	-	-	-	-	-	-	-	-	-	-	70	5.49	-	-
3	-	-	-	-	-	-	-	-	-	-	70	5.49	-	-
4	-	-	-	-	-	-	-	-	-	-	70	5.49	-	-
5	-	-	-	-	-	-	-	-	-	-	70	5.49	-	-
6	-	-	-	-	-	-	-	-	-	-	70	5.49	20	1.57
7	-	-	-	-	-	-	-	-	-	-	70	5.49	15	1.18
8	-	-	-	-	-	-	-	-	-	-	70	5.49	24	1.89
9	-	-	-	-	-	-	-	-	-	-	70	5.49	18	1.41
10	-	-	-	-	-	-	-	-	-	-	70	5.49	27	2.12
11	-	-	-	-	-	-	-	-	-	-	70	5.49	30	2.36
12	-	-	-	-	-	-	-	-	-	-	70	5.49	38	2.98
Total		18.85		2.75		2.75		1.09		0.55		60.39		13.51

Source: Field Survey, 2016

Table 4.19: Distribution of Component Return Analysis for Chief Bisi-Rodipe's Forest Plantation

Items				
Total Revenue = 6925900				
Size = 0.4ha				
Year	Fuelwood		Pole	
	Revenue (₦)	%	Revenue (₦)	%
1	-	-	-	-
2	-	-	-	-
3	-	-	-	-
4	5000	0.07	-	-
5	7000	0.01	-	-
6	10000	0.14	783900	11.32
7	25000	0.36	585000	8.45
8	28000	0.40	936000	13.51
9	30000	0.43	702000	10.14
10	32000	0.46	1053000	15.20
11	35000	0.51	1170000	16.89
12	38000	0.55	1486000	21.46
Total	210000	2.93	6715900	96.97

Source: Field Survey, 2016

Table 4.20: Distribution of Component Cost Analysis (₦ '000')for Mr Awoniyi's Forest Plantation

	ITEMS													
	Total Cost = 45469500													
	Size = 50ha													
Year	Land		Land Preparation		Seedling Production		Planting Exercise		Tending		Monitoring and Supervision		Harvesting Cost	
	Cost	%	Cost	%	Cost	%	Cost	%	Cost	%	Cost	%	Cost	%
1	3087	6.79	300	0.66	100	0.22	72	0.16	150	0.33	50	0.11	-	-
2	-	-	300	0.66	100	0.22	60	0.13	170	0.37	70	0.15	-	-
3	-	-	-	-	-	-	-	-	190	0.42	80	0.18	-	-
4	-	-	-	-	-	-	-	-	200	0.18	100	0.22	-	-
5	-	-	-	-	-	-	-	-	-	-	50	0.11	-	-
6	-	-	-	-	-	-	-	-	-	-	50	0.11	-	-
7	-	-	-	-	-	-	-	-	-	-	60	0.13	-	-
8	-	-	-	-	-	-	-	-	-	-	80	0.18	-	-
9	-	-	-	-	-	-	-	-	-	-	80	0.18	-	-
10	-	-	-	-	-	-	-	-	-	-	80	0.18	-	-
11	-	-	-	-	-	-	-	-	-	-	30	0.07	-	-
12	-	-	-	-	-	-	-	-	-	-	30	0.07	-	-
13	-	-	-	-	-	-	-	-	-	-	30	0.07	-	-
14	-	-	-	-	-	-	-	-	-	-	30	0.07	-	-
15	-	-	-	-	-	-	-	-	-	-	-	-	40000	87.97
Total		6.79		1.32		0.44		0.29		1.30		2.09		87.97

Source: Field Survey, 2016

Table 4.21: Distribution of Component Return Analysis for Mr Awoniyi's Forest Plantation

Items Total Revenue = 561255000 Size = 50ha						
Year	Crop		Animal		Timber	
	Revenue (₦)	%	Revenue (₦)	%	Revenue (₦)	%
1	-	-	-	-	-	-
2	200000	0.04	-	-	-	-
3	150000	0.03	-	-	-	-
4	250000	0.05	-	-	-	-
5	100000	0.02	20000	0.004	-	-
6	50000	0.01	25000	0.005	-	-
7	80000	0.02	30000	0.007	-	-
8	100000	0.02	40000	0.007	-	-
9	150000	0.03	35000	0.006	-	-
10	80000	0.01	60000	0.01	-	-
11	50000	0.01	75000	0.01	-	-
12	-	-	-	-	-	-
13	-	-	-	-	-	-
14	-	-	-	-	-	-
15	-	-	-	-	560000000	99.78
Total					560000000	99.78

Source: Field Survey, 2016

Table 4.22: Distribution of Component Cost Analysis (₦ '000')for Chief Odebiyi's Forest Plantation

Year	ITEMS Total Cost = 80287500 Size = 75ha Land		Land Preparation and Planting		Planting Exercise		Cleaning, fertilizer application & Beating up		Tending		Monitoring & supervision		Harvesting Cost	
	Cost	%	Cost	%	Cost	%	Cost	%	Cost	%	Cost	%	Cost	%
1	2250	2.80	83625	10.42	-	-	-	-	-	-	-	-	-	-
2	-	-	-	-	1200	1.49	-	-	-	-	-	-	-	-
3	-	-	-	-	-	-	1050	1.31	-	-	-	-	-	-
4	-	-	-	-	-	-	-	-	975	1.21	-	-	-	-
5	-	-	-	-	-	-	-	-	-	-	1050	1.31	-	-
6	-	-	-	-	-	-	-	-	-	-	1125	1.40	-	-
7	-	-	-	-	-	-	-	-	-	-	1200	1.49	-	-
8	-	-	-	-	-	-	-	-	-	-	1200	1.49	-	-
9	-	-	-	-	-	-	-	-	-	-	750	0.93	-	-
10	-	-	-	-	-	-	-	-	-	-	375	0.47	-	-
11	-	-	-	-	-	-	-	-	-	-	375	0.47	-	-
12	-	-	-	-	-	-	-	-	-	-	375	0.47	-	-
13	-	-	-	-	-	-	-	-	-	-	-	-	50	0.06
14	-	-	-	-	-	-	-	-	-	-	-	-	140	0.17
15	-	-	-	-	-	-	-	-	-	-	-	-	1100	1.37
16	-	-	-	-	-	-	-	-	-	-	-	-	58710	73.12
Total		2.80		10.42		1.49		1.31		1.21		8.03		74.72

Source: Field Survey, 2016

Table 4.23: Distribution of Component Return Analysis for Chief Odebiyi's Forest Plantation

ITEM Total Revenue = 899810000 Size = 75ha		
Year	Revenue	
	Revenue (₦)	%
1	-	-
2	-	-
3	-	-
4	-	-
5	-	-
6	-	-
7	-	-
8	-	-
9	-	-
10	-	-
11	-	-
12	-	-
13	700000	0.08
14	1960000	0.22
15	16500000	1.83
16	880650000	97.87

Source: Field Survey, 2016

Table 4.24: Distribution of Component Cost Analysis (₦ '000')for Egbeyemi's Forest Plantation

Year	ITEMS Total Cost = **26420000** Size = 30ha Land		Land Preparation		Planting Exercise		Cleaning, fertilizer application & Beating up		Tending		Monitoring & supervision		Harvesting Cost	
	Cost	%	Cost	%	Cost	%	Cost	%	Cost	%	Cost	%	Cost	%
1	1000	3.79	1525	5.77	-	-	-	-	-	-	-	-	-	-
2	-	-	-	-	1375	5.20	-	-	-	-	-	-	-	-
3	-	-	-	-	-	-	1475	5.58	-	-	-	-	-	-
4	-	-	-	-	-	-	-	-	1575	5.96	-	-	-	-
5	-	-	-	-	-	-	-	-	-	-	1575	5.96	-	-
6	-	-	-	-	-	-	-	-	-	-	1575	5.96	-	-
7	-	-	-	-	-	-	-	-	-	-	1575	5.96	-	-
8	-	-	-	-	-	-	-	-	-	-	1575	5.96	-	-
9	-	-	-	-	-	-	-	-	-	-	1575	5.96	-	-
10	-	-	-	-	-	-	-	-	-	-	1575	5.96	-	-
11	-	-	-	-	-	-	-	-	-	-	105	0.39	-	-
12	-	-	-	-	-	-	-	-	-	-	105	0.39	-	-
13	-	-	-	-	-	-	-	-	-	-	105	0.39	-	-
14	-	-	-	-	-	-	-	-	-	-	105	0.39	-	-
15	-	-	-	-	-	-	-	-	-	-	-	-	9600	36.34
Total		3.79		5.77		5.20		5.58		5.96		37.32		36.34

Source: Field Survey, 2016

Table 4.25: Distribution of Component Return Analysis for Egbeyemi's Forest Plantation

Year	ITEM Total Revenue = 240000000 Size = 30ha Revenue Revenue (₦)	%

1	-	-
2	-	-
3	-	-
4	-	-
5	-	-
6	-	-
7	-	-
8	-	-
9	-	-
10	-	-
11	-	-
12	-	-
13	-	-
14	-	-
15	240000000	100

Source: Field Survey, 2016

Table 4.26: Distribution of Component Cost Analysis (₦ '000')for Mr Ademola's Forest Plantation

	ITEMS Total Cost = **17709070** Size = 20ha						
Year	Land	Land Preparation	Planting Exercise	Cleaning, fertilizer application & Beating	Tending	Monitoring & supervision	Harvesting Cost

	Cost	%	Cost	%	Cost	%	up Cost	%	Cost	%	Cost	%	Cost	%
1	600	3.39	2230	12.59	-	-	-	-	-	-	-	-	-	-
2	-	-	-	-	559070	3.16	-	-	-	-	-	-	-	-
3	-	-	-	-	-	-	320	1.81	-	-	-	-	-	-
4	-	-	-	-	-	-	-	-	280	1.58	-	-	-	-
5	-	-	-	-	-	-	-	-	-	-	280	1.58	-	-
6	-	-	-	-	-	-	-	-	-	-	280	1.58	-	-
7	-	-	-	-	-	-	-	-	-	-	120	0.68	-	-
8	-	-	-	-	-	-	-	-	-	-	120	0.68	-	-
9	-	-	-	-	-	-	-	-	-	-	120	0.68	-	-
10	-	-	-	-	-	-	-	-	-	-	100	0.56	-	-
11	-	-	-	-	-	-	-	-	-	-	100	0.56	-	-
12	-	-	-	-	-	-	-	-	-	-	100	0.56	-	-
13	-	-	-	-	-	-	-	-	-	-	100	0.56	-	-
14	-	-	-	-	-	-	-	-	-	-	100	0.56	-	-
15	-	-	-	-	-	-	-	-	-	-	100	0.56	-	-
16	-	-	-	-	-	-	-	-	-	-	100	0.56	-	-
17	-	-	-	-	-	-	-	-	-	-	100	0.56	-	-
18	-	-	-	-	-	-	-	-	-	-	-	-	12000	67.76
Total		3.39		12.59		3.16		1.81		1.58		9.68		67.76

Source: Field Survey, 2016

Table 4.27: Distribution of Component Return Analysis for Mr Ademola's Forest Plantation

ITEM		
Total Revenue = 192000000		
Size = 20ha		
Year	Revenue	
	Revenue (₦)	%

1	-	-
2	-	-
3	-	-
4	-	-
5	-	-
6	-	-
7	-	-
8	-	-
9	-	-
10	-	-
11	-	-
12	-	-
13	-	-
14	-	-
15	-	-
16	-	-
17	-	-
18	192000000	100

Source: Field Survey, 2016

4.1.22: Private Forest Owners' Views on Permission Prior to Exploitation from the Forest Plantations

The results in Figure 5 shows the confirmations made by private forest owners on money paid to the State Forestry Department through extraction permit before exploiting from the forest plantations. The results reveal that in Ogun State only one out of 22 private forest plantation owners (4.4%)obtained permit to exploit the forest plantation, eight private forest plantation owners (36.4%) admitted they do not obtain permit before exploiting their plantations while thirteen

(59.1%) did not respond to the question. The plantation owners who did not obtain permit argued that there is no benefit or help rendered by the government to them. The situation is different in Oyo and Ekiti States where 38.5% and 43.5% of private forest owners obtained permit from government for exploitation respectively. 23.1% and 17.4% do not obtain permit, 38.5% and 39.1% did not respond to the question in Oyo and Ekiti States respectively.

FAO (2001) observed that there are no clear mechanisms for setting forest charges in many States' Forestry Services in Nigeria. Charges are set administratively with no stated period of review. Permit is therefore one of forest regulations made by the State Executive Council with the aid of technical advice from the Forestry Departments. Permit is significant in regulating the rate of exploitation on private forestland. State Forestry Department/Ministry issues numerous permits. Majority of these permits are granted to private individuals or companies who desire to carry out any activity in natural forest or forest plantations owned by the State government but mainforestry permit issued to private forest plantation owners is the permit to exploit timber from forest plantation.

This observation agrees withthe report of Tomich and Lewis (2001) that forest plantation owners must have pemits (a letter issued by government) before they can harvest trees. According to USDA (2015), permit means authorization in writing by a forest officer. Certainly, exploitation from the forest ought not to be derived without proper permission as this is necessary to ensure sustainability. The study upholds the existence of permission to exploit forest products in private forest plantations and also unfolds the porosity of the plantations in Ogun State as most of theprivate forest plantation owners indicated that they do not obtain any permit before exploitation.

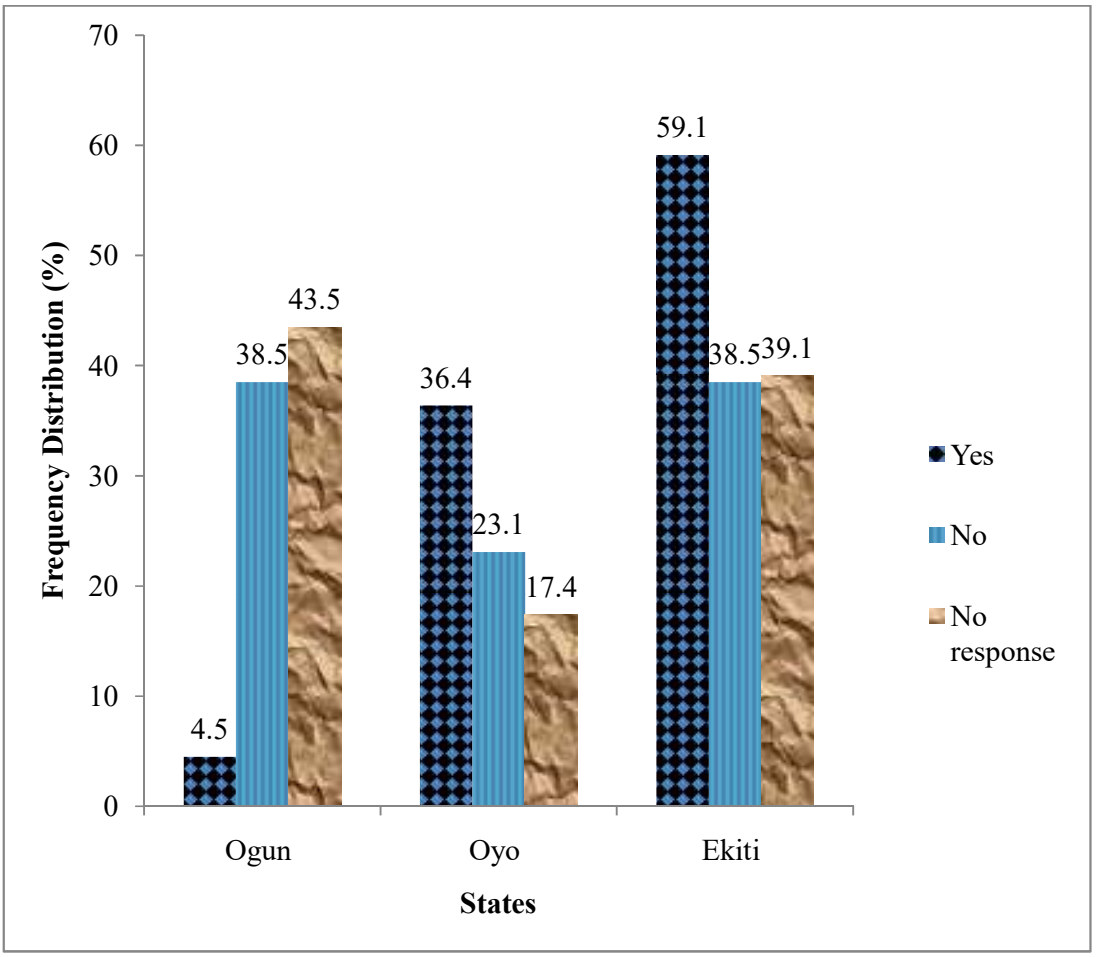

Figure 5 **Frequency Distribution of Forest Owners' Collection of Permit to Exploit their Plantation.**

4.1.23: Private Forest Owners' Association

It can be observed in Figure 6 that Ogun andOyo States, 72.7% and 84.6% of private forest plantation owners respectively confirmed there is no association or organization coordinating private forest plantation owners' activities in the States.78.3% of private forest plantation owners in Ekiti State confirmed that there is an association called Ekiti State Tree Growers This association is made up of several forest stakeholders such as forestry lecturers, staffs of department of forestry, timber contractors, politicians, sawmillers etc. This association has contributed to the development of forest plantation in the State. Technical advice and information such as market and marketing of products are disseminated among themselves in the association.

Practically, some private forest plantation owners lack knowledge and experience of forest management. Some owners seek the assistance of forestry professionals to establish and manage their plantations. Thecoming together of all concerned parties is therefore an instrument for supporting sustainable management of private forests.

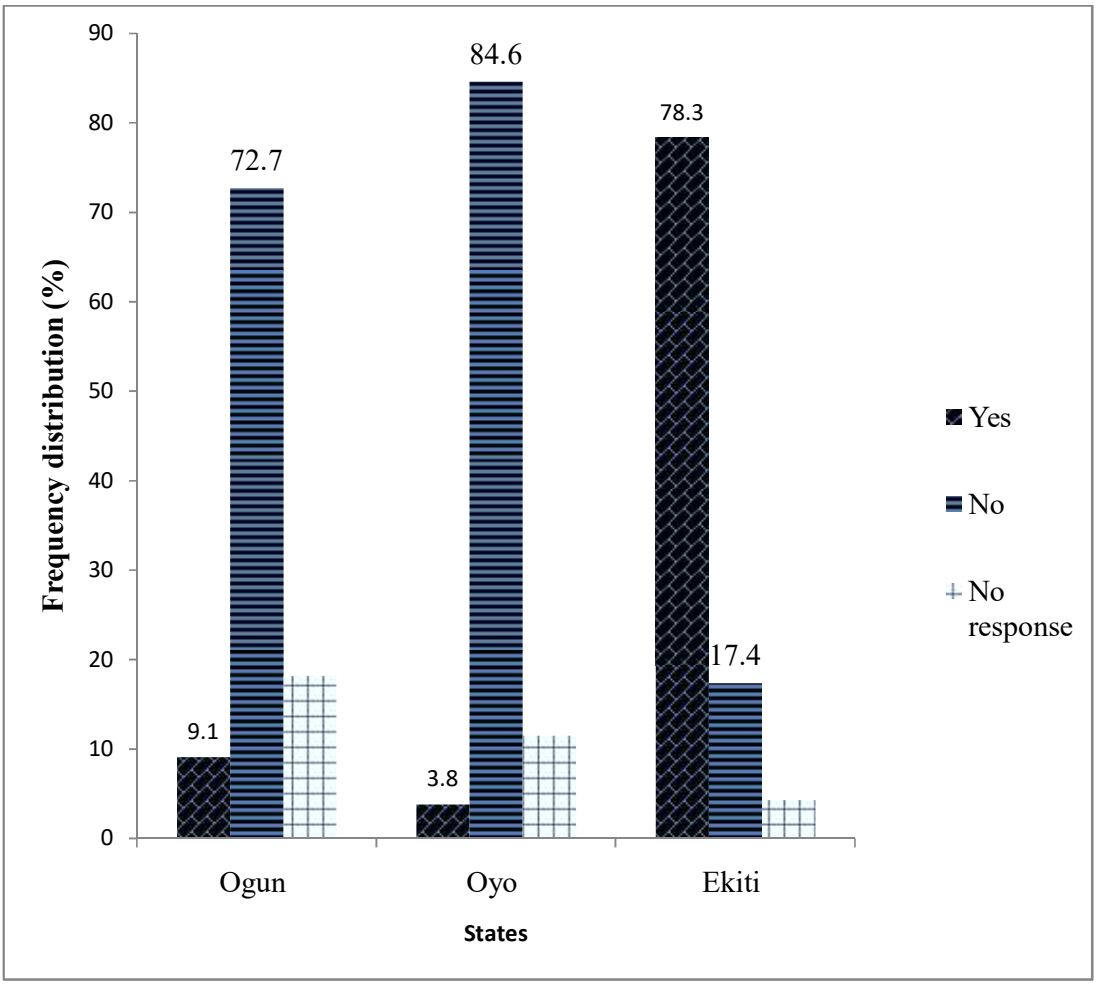

Figure 6 **Frequency Distribution of Private Owners' Association and Membership in the Study area**

4.1.24 Public Support forPrivate Forest PlantationDevelopment

Results in Figure 7 show that noprivate forest plantation owners from Ogun Statereceived any form of incentive from the Government (Federal or State Government). However, only 7.7% and 13.0% of private forest plantation owners claimed to have received one form of incentive or the other from the Governmentin Oyo and Ekiti States respectively.

Enters *et al.*, (2004) Stated that from a financial perspective, forest plantations are long-term investments with incurring cost of establishment occurring in the first several years of the production cycle while the major share of the yield and revenue is expected at the end of rotation period, which in most cases for indigenous species is between 20 and 40 years, but fast-growing exotic species may be harvested in slightly less than 10 years depending on the proposed products. Therefore, soft loans, tree seedlings, technical advice and tax relief should be provided to encourage the small-medium private forest plantation owners.

Further investigation revealed that Ogun and EkitiStates Government sometimes give seedlings to the private forest plantation owners. 5.6% private forest plantation owners in the aforementioned States claimed they do not bother to collect seedlings when distributed by the State government because the number of seedlings given to individual private forest plantation owners are very small.

In Ogun, Oyo and Ekiti States, 81.8%, 92.3% and 87.0%respectively revealed technical advice on proper management of forest plantations is limited and forest plantation owners lack proper silvicultural management skills. At the production stage involving the plantation establishment and management by private forest plantation owners, poor silvicultural practices were used (thinning, pruning, and spacing) and these poor lead to production of low quality and quantityof timber.

Observation revealed that there are forest plantations in the study area that are not managed properly (lack of tending), trees were planted and abandoned to develop by themselves after few years of cultivation. Plates 1, 2, and 3 show three forest plantations that lack proper silvicultural management while Plate 4 shows a well-managed forest plantation. Oral interview with some private owners revealed that some forest plantations were established to secure and protect the land from land grabbers and sometimes government. This is a good initiative but it is necessary for private owners toproperly manage the plantation in order to increase profit from the investments.

In addition, while there is an increased awareness of the environmental importance of trees in Nigeria, there are insufficient public support incentives to pursue and encourage more private investors to tree planting and sustainable forestry management (FAO, 2001). The Summary Report

of the 3rdInternational Congress on Planted forest (2013) Stated that to encourage private investments in forest plantation development, there is need for supportive financial incentive packages that will commensurate with capital expenditure requirements for the establishment and long-term management of forest plantations because public support incentives to private owners will promote sustainable, profitable and quality tree plantation development.

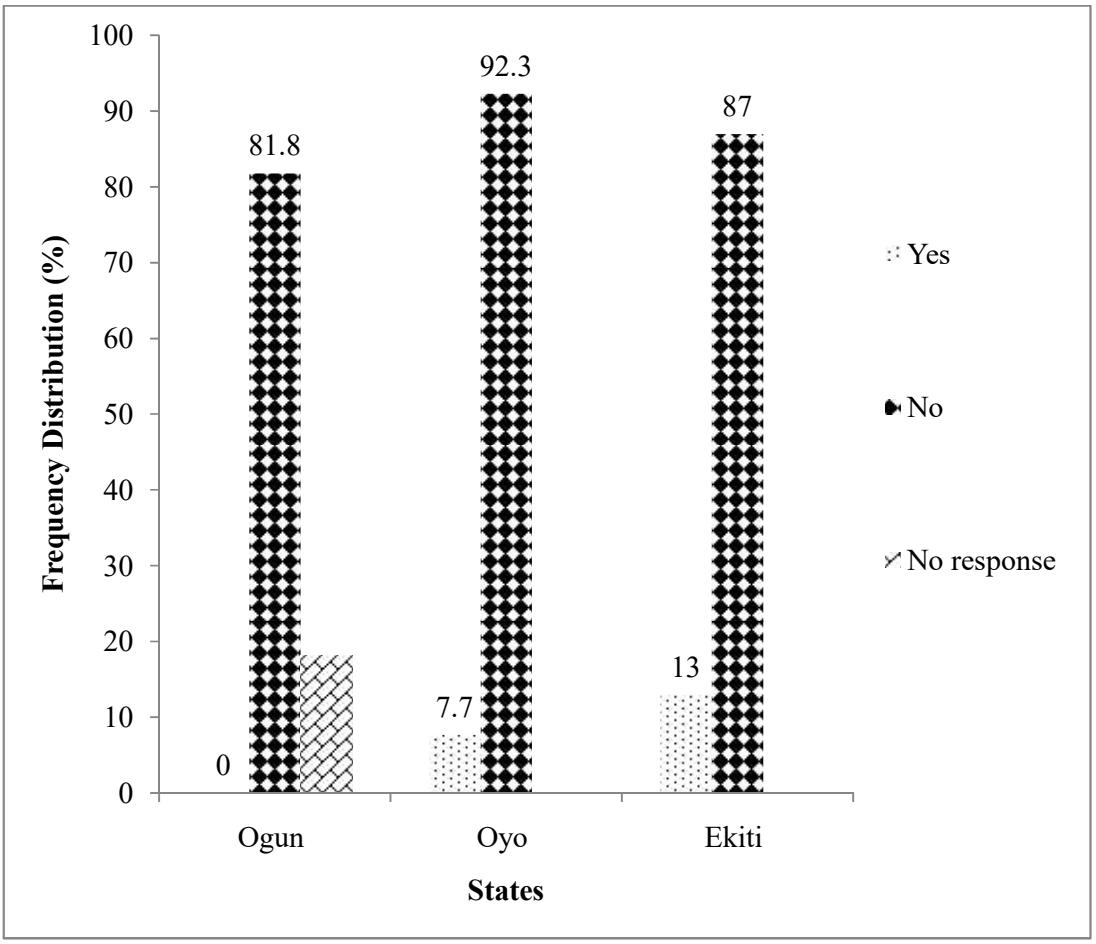

Figure 7 **Frequency Distribution of Support Incentives for Development of Forest Plantation**

Plate 1: Abandoned Forest Plantation in Efon Alaye, Ekiti State

Plate 2: **Lack of Proper Spacing and Management of Forest Plantation in Saki, Oyo State**

Plate 3: Abandoned Forest Plantation in Orisaleye, BabaAgba, Akinyele, Oyo State

Plate 4: Well Managed Forest Plantation in Iludun Ekiti, Ekiti State

4.1.25 Challenges Associated with Private Forest Plantations Development Investment

Dragana (2010) categorized forest plantation investment risk into environmental, social, management and financial. Environmental risks include forest fires, erosion, pest diseases, etc. Social risks refer to land tenure, conflicts, governance, and illegal logging. Management risks are related to operational efficiency, management capacity, existing infrastructure, etc. Active management has important role in minimising social and environmental risks. Financial risks associated with timberland investing are market price, demand and supply, and illiquidity risk. All these risks limit private investment in forest plantation development.

From Figure 8, it can be observed that 31.8%, 30.8% and 4.3% private forest plantation owners from Ogun, Oyo and Ekiti Stateрespectively identified inadequate capital as a major challenge to private forest development. The results further reveal that 9.1% and 15.4% private forest plantation owners in Ogun and Oyo States identified illegal felling and clash with herdsmen as another challenge. In Oyo and Ekiti States, 15.4% and 30.4% private forest plantation owners respectively identified unfavourable market and marketing conditions as the major challenge. Also in Ogun, Oyo and Ekiti States, 4.5%, 7.7% and 13.0% of private forest plantation owners remarked that lack of extension services has been a challenge. Private forest plantation owners in Ogun (22.7%), Oyo (11.5%) and Ekiti States (26.1%) identified policy and legislature as challenge. The results further show that in Ogun, Oyo and Ekiti States,22.7%, 11.5% and 13.% ofprivate forest plantation owners identified land availability and security as a challengeaffecting private investment in forest plantation development.

These findings are in conformity with the report of FME (2006) which stated that the involvement of the private sector and local communities in industrial plantation development has been modest but constrained by funding, land and tree tenure, governance, political and economic instability.

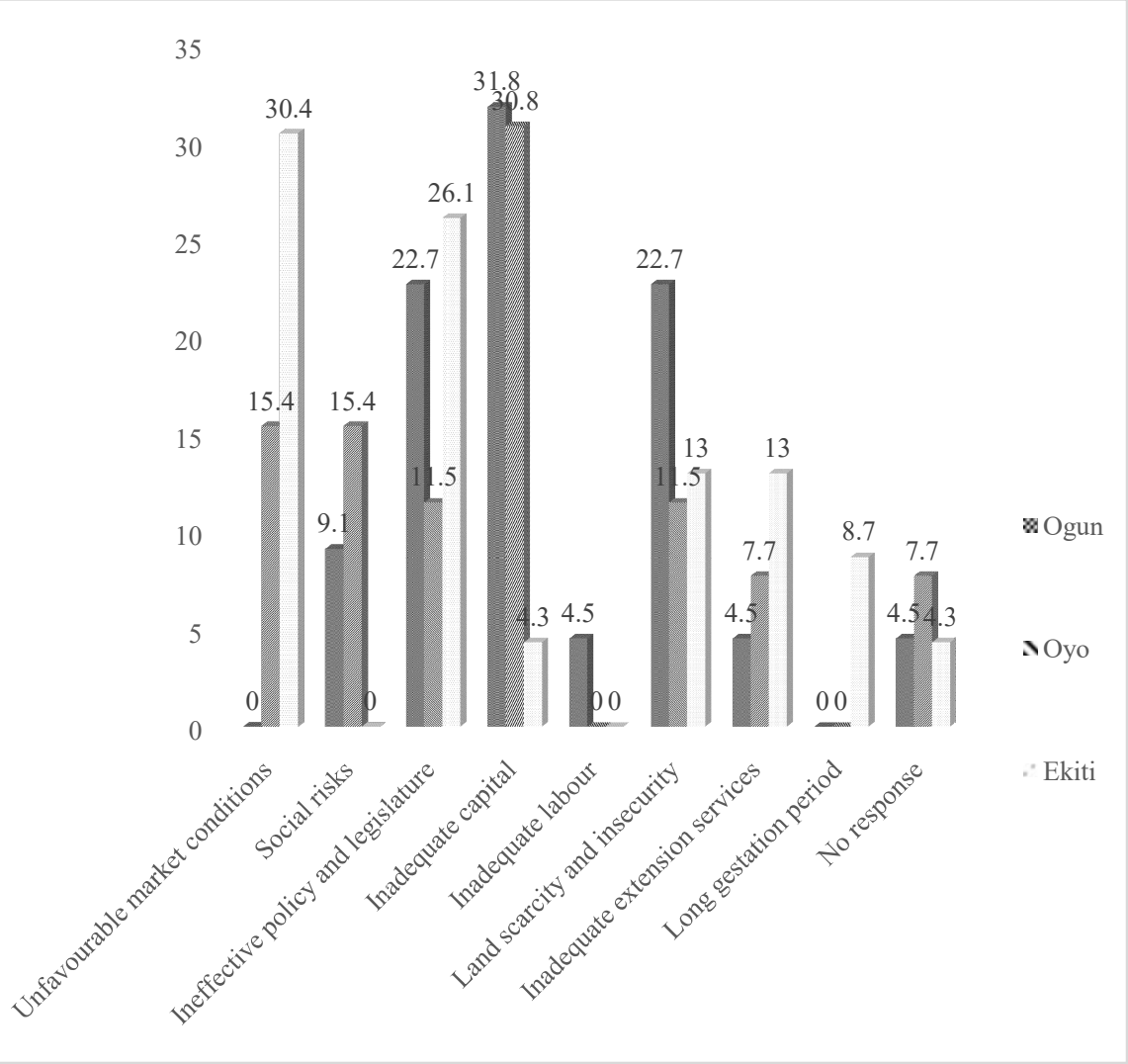

Figure 8: Distribution of Challenges Experienced by Private Forest Plantation Owners by State

4.2 Willingness of Non-Plantation Owner Forest Stakeholders to Participate in Forest Plantation Development

It is expected that due to the level of information at the disposal of forest stakeholders and the fact that forestry is their main source of income, they should be involved in forest plantation development. So it become necessary to advance reasons for their non-involvement and willingness to be involved in private forest plantation development.

These stakeholders comprise: forestry professionals in the Ministries, Departments and Agencies (MDA), Lecturers and Researchers in Forestry Departments in Tertiary Institutions and Research Institutes and individuals such as timber contractors, plank sellers, charcoal sellers, fuel wood sellers, non-timber forest products seller, furniture makers and craft makers.

The reasons for selecting these categories of stakeholders are because some are directly involve in exploitation, processing and marketing of forest resources, some with research-extension while others are saddled with the official responsibilities of monitoring exploitation and enforcement of regulation in sustainable forest management.

4.2.1 Non-Plantation Owner Forest Stakeholder Types

Results in Table 4.2.1.1 reveal the frequency distribution of non-plantation owner forest stakeholders who have stakes in forestry but do not have private plantations in the study area. The study shows that a total number of 65 non-plantation owner forest stakeholders(8.5%) were lecturers and researchers, 16.3% of thenon-plantation owner forest stakeholders were officials of MDAs (124), 13.2% of the non-plantation owner forest stakeholders are fuelwood sellers, 11.5% were timber contractors (88), 25.6% of the non-plantation owner forest stakeholders were plank sellers (195), 9.0% of non-plantation owner forest stakeholders were NTFPs sellers (69), ditto charcoal sellers (69), 4.1% ofnon-plantation owner forest stakeholders were furniture makers, while 2.8% of non-plantation owner forest stakeholders were craft makers (21).

Table 4.28: Frequency Distribution of Categories of Non- Plantation Owner Forest Stakeholders

	Frequency	Percent
Lecturers and Researchers in Forestry	65	8.5
Forestry professionals in MDAs	124	16.3
Fuelwood Sellers	101	13.2
Timber Contractors	88	11.5
Plank Sellers	195	25.6
Charcoal Sellers	69	9.0
NTFPs Sellers	69	9.0
Furniture Makers	31	4.1
Craft Makers	21	2.8
Total	763	100.0

Source: Field Survey, 2016

4.2.2 Reasons for not participating in Private Forest Plantation Development

Findings from Figure 9 reveal that in Oyo, Ogun and Ekiti States respectively, 7.7%, 5.0% and 9.8% of non-plantation owner forest stakeholders identified lack of sufficient capital while 3.2%, 3.3% and 1.1% claimed land insecurity and availability as the reason for not participating in forest plantation development. In Ekiti State, 0.4% and 3.4% of non-plantation owner forest stakeholders revealed that government policy and long gestation period of trees discourage them from participating in forest plantation development. Furthermore, 4.3% non-plantation owner forest stakeholders in Oyo State identified that long gestation period as the major reason for not participating in forest plantation development.

Figure 9 revealed most of the non-plantation owner forest stakeholders in Oyo, Ogun and Ekiti States, 23.7%, 33.1% and 30.5% respectively identified inadequate capital, land insecurity and availability as the reasons for not participating in forest plantation development. 20.2%, 18.2% and 20.7% of non-plantation owner forest stakeholders in Oyo, Ogun and Ekiti States respectively revealed they are not interested in establishing forest plantation.

Study revealed that most of the non-plantation owner forest stakeholders in the study area identified lack of capital, land security and availability as the major reasons for not participating in forest plantation development. This is because there is limited access to financial incentives for forest plantation developmentin the States. Generally, the cost of establishing forest plantation is huge and optimal silviculture requires that interventions be timely and effectively carried out. Hence, adequate capital for forest plantation development is essential. Also, unclear land tenure, land insecurity, overlapping rights and the possibility of contested or revoked licences have been key obstacles to stakeholders' participation in forest plantation development in Nigeria (FME, 2006). High percentage of non-plantation owner forest stakeholders also revealed they are not interested in establishing forest plantation because the investment doesn't generate instant revenue.

Many good opportunities in Nigeria are being by-passed not because of the investment itself, but because of the poor business environment in the country as a whole. Policy-related risks dominate forestry, land insecurity and unavailability and lack of incentives cripple stakeholders' interest to invest, innovate and increase productivity. Singh (2010) reported that private sector's participation in forestry activities is determined by policies at the central and State levels. Stable policies will attract many private investors to forest plantation development.

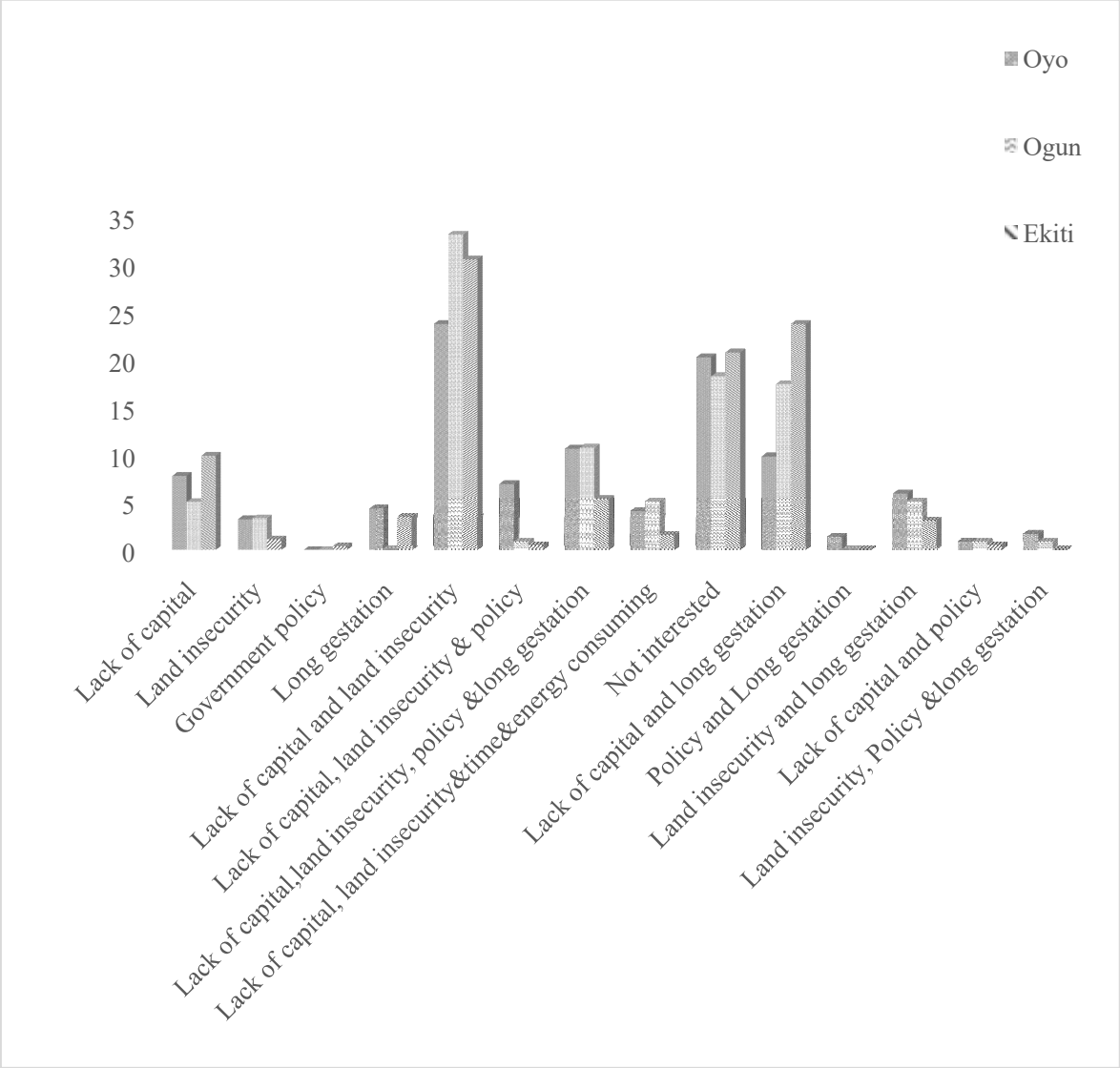

Figure 9: Distribution of Non-Plantation Owner Forest Stakeholders by States andReasons for not participating in Private Forest Plantation Development

4.2.3 Stakeholders'Rating of Participation in Private Forest Plantations Development

Figure 10 shows that 96.4% of non-plantation owner forest stakeholders in Oyo, 93.1%in Ogun and 84.8% in Ekiti States rated the level of stakeholders participation in forest plantation development as low while 3.6%, 6.7% and 15.6% of non-plantation owner forest stakeholders in Oyo, Ogun and Ekiti States rated participation level of stakeholders as high. Thenon-plantation owner forest stakeholders revealed that stakeholders are aware of the importance and contributions of forest plantation development to the country butthe attitude of stakeholders to actually invest in developing forest plantations is quite low.

Roe *et al.,* (2009) and Elbakidze, *et al.*, (2010) Stated that participation in forestry development include active involvement of various stakeholders in managing forest resources, resolving conflicts over forest uses and monitoring and evaluating the performance of forestry and biodiversity conservation projects The study revealed that most of stakeholders are forest users and do not participatein the development of forest plantations.

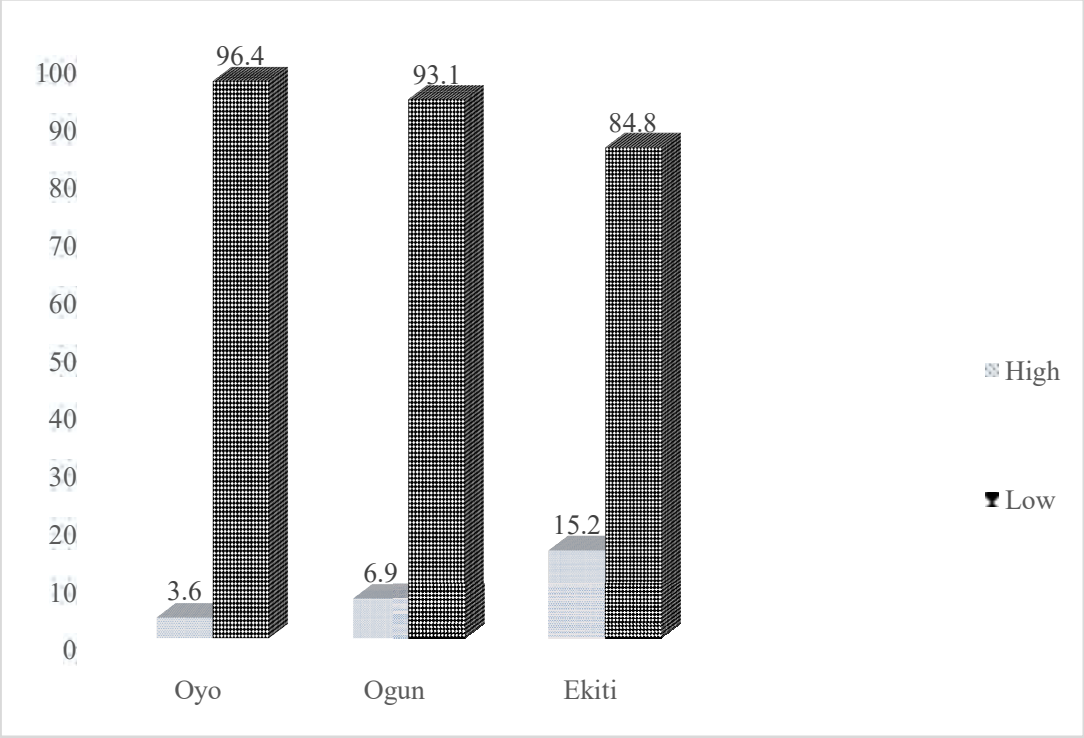

Figure 10: Distribution of Non-Plantation Owner Forest Stakeholders' by States and Rating of Participation in Private Forest Plantation Development

4.2.4 Motivating Factors for Private Involvement in Forest Plantation Development

Non-plantation owner forest stakeholders suggested ways to encourage stakeholders' investment in forestry development. Figure 11 indicates that most of non-plantation owner forest stakeholders in Oyo (76.1%), Ogun (82.5%) and Ekiti (80.9) States revealed that incentives can stimulate investments in plantation establishment and management. Incentive includes provision of free seedlings, soft loans, grant and extension. Furthermore, 22.3%, 13.6% and 14.2% non-plantation owner forest stakeholders in Oyo, Ogun and Ekiti States respectively proposed provision of incentives and institutional stability (policy, legislation and administrative framework) will motivate stakeholders to invest in forest plantation development. These are important elements in supporting forest plantations development.

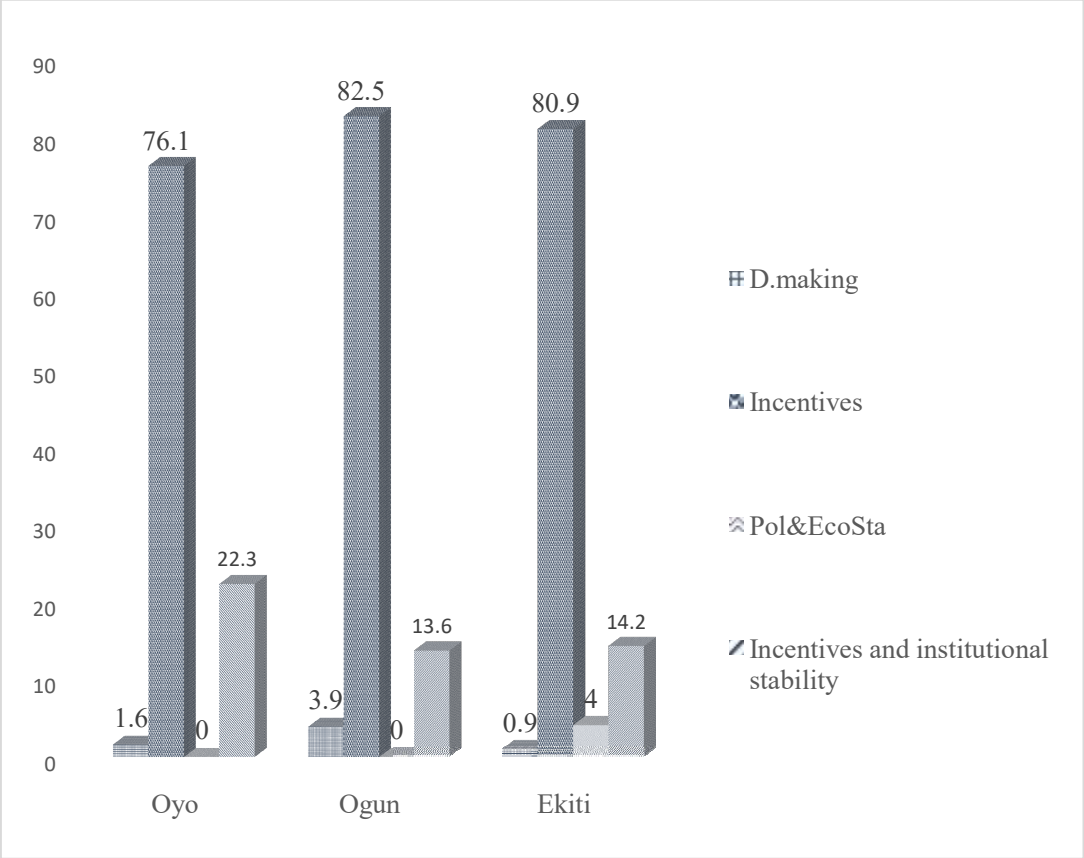

Figure 11: Distribution of Non-Plantation Owner Forest Stakeholders by States andPotential Motivating Factors for Involvement in Forest Plantations Development

Stakeholders' Willingness to Participate in Forest Plantation Development if Financial Incentives are provided.

Logistic regression analysis was carried out to determine the influence of some socio economic variables on willingness of non-forest plantation owners' to participate in forest plantation development. The independent variables include states, gender, age, educational background and occupation of non-forest plantation owners. There were three States (Oyo, Ogun and Ekiti), however two dummies were used (Oyo and Ogun States) while Ekiti State represented the autonomous value. With regards to gender variable, female was used for autonomous value. Educational status was grouped into four (no formal education, primary, secondary and tertiary education) but three (primary, secondary and tertiary education)were used in the model with the variable no formal education standing as the autonomous variable. Furthermore, non-forest plantation owners' occupation was grouped into four (marketers, lecturers and researchers, MDAs and artisans), however three (marketers, lecturers/researchers and MDAs) were used while artisans represented the autonomous variable.

Table 4.29shows the results of the logistic regression analysis. The probability of non-plantation owner forest stakeholders from Oyo State (-1.368)to participate in forest plantation development is less than that of non-plantation owner forest stakeholders from Ekiti State which has the autonomous value of 1.657 similarly for Ogun Statewhich has -1.272. The probability of male participating in forest plantation development is 2.288 higher than that of the female (1.657). Educational background, age and occupation of non-plantation owner forest stakeholders were not significantly influence bywillingness to participate in private forest plantation development.

Males were more likely to be willing to participate in private forest plantation development than females. The willingness to participate in private forest plantation development increased down the age groups. Those who had tertiary education were more willing to participate than those who had no formal education. MDAs staff were more willing than marketers to engage in private forest plantation.

Table 4.29: Willingness of Non-Plantation Owner Forest Stakeholders' Participation in Forest Plantation Development in Southwestern, Nigeria

Variables	B	S.E	Wald	df	Sig.	Exp(B)
Oyo	-1.368	0.483	8.037	1	0.005	0.255
Ogun	-1.272	0.558	5.192	1	0.023	0.280
Male	2.288	0.548	17.408	1	0.000	9.858
Primary Education	0.022	0.678	0.001	1	0.974	1.022
Secondary education	-0.161	0.664	0.059	1	0.808	0.851
Tertiary Education	0.885	1.879	0.222	1	0.638	2.423
Age	0.007	0.020	0.126	1	0.723	1.007
Marketers	1.010	0.892	1.284	1	0.257	2.747
Lecturers and Researchers	1.000	2.089	0.229	1	0.632	2.718
MDAs	1.078	2.151	0.251	1	0.616	2.939
Constant	1.657	1.563	1.125	1	0.289	5.245

*Significant at $p<0.05$, B= Regression coefficient, S.E= Standard error, Wald= Test statistic, df= Degree of freedom, Exp(B) = Exponential of B coefficient

Source: Field Survey, 2016

4.3 Roles of State Ministries and Departments of Forestry in Private Forest Plantation Development in Southwestern, Nigeria.

The area of concern in this section is to identify and discuss the role of State government in private forest plantations development in Southwestern, Nigeria. Possible roles of Government in private forestry development include provision of soft loans, seedlings, technical assistance, creation of market and marketing platform for forest products and also provision of extension services to the private forest owners through dissemination of innovation and information. It is therefore important to know if the States MDAs are performing their roles effectively to private forest plantation owners.

Interviews were granted to the Permanent Secretaries/Directors of Forestry in the relevant MDAs. The content analysis of the information through the use of interview schedules is presented thus.

4.3.1 Registration of Private Forest Plantation Owners in the Study Area

Information gathered revealed that Ekiti State'sDepartment of Forestry possessed well detailed lists of private owners with their personal records like phone numbers, location, year of plantation establishment etc. which means the Department is actively involved and also has relationship with most of the private forest plantation owners in the State. Oyo State Department of Forestry to some extent had the lists of private owners of forest plantations, while Ministry of Forestry in Ogun State did not have a well-documented list of private forest plantation owners in the State. The number of private owners in the list was very few with little or no detailed and valid information about the private forest owners. On the other hand, private forest owners interviewed in the State confirmed that the number of private forest owners in the State is much more than the list the State Ministry had and that the relationship between the Ministry and private forest owners in the State was very poor.

Ekiti State registered private investors through the use of all the "charge officers" in the sixteen Local Government Areas. These "charge officers" responsibility is to locate private forest plantations and their owners and then document the details of such private forest owners. Oyo State didn't have a complete data of all private plantation owners in the State. Furthermore, the register in this State was obsolete and outdated, comprising plantations that are no more in existence. OgunState Ministry of Forestry didn't register private forest plantation owners. The Ministry only has the list of those who had at one time or the other sought the assistance of the ministry as regards the development of their plantations (for seedlings or technical assistance) and some other forestry stakeholders who were involved in exploitation of timber from natural forest but also had their own plantations.

Registration of private owners is essential because it gives the Ministry or Departments an official record of people involved in forest plantation development, the location, size and other details about the plantation.When Government has the records of private forest owners, there is thorough access and communication between government and private investors which in turn promote sustainable forest resources management. Therefore, it's the responsibility of government officials to link up with private owners by identifying them, recording the details and keeping in touch with them regularly.

4.3.2 Issuing of Hammer and Permits to Private Forest Plantation Owners

The issuing of permits is a major bone of contention between government and private plantation owners. It is expected that before a tree can be felled either on government land or private land, permit must be collected from the Regional or Zonal Officers who are staffs of the State Ministries and Departments. The only permit issued to private forest plantation owners by the State Forestry Ministries and Departments is extraction permit, that is, before forest landowners can exploit trees from their plantations, they must obtain permission from Government. Furthermore, the study revealed that large scale private owners who export timber out of the country and those who sell within the country but outside their State purchase property hammer from the government. Property hammer is used to stamp/mark timber taken out of the forest and convey to another State. The property hammer is registered to individual/contractor/company by the government.

Findings revealed that one private forest plantation owner in OyoState has property hammer and he paid forty thousand naira to obtain it a long time ago. In Ekiti and Ogun States, one private forest plantation owner each claimed to have the property hammer but the amount paid for the property hammer was not revealed. These private owners have large hectares of forest plantation.

The study also reveals that in Ogun State, many private forest owners do not comply with the collection of permits from the government and this was confirmed by the Ministry also. The only revenue generated by the Ministry through issuing of permits is the extraction permits given to individuals or companies who exploit from the natural forests. In Ekiti and Oyo States, the regulation is strictly adhere to and if anybody is caught without the extraction permit when exploiting tree(s), forest guards/ patrol officers will confiscate the tree (s) / the machines used in felling the trees or arrest the owner. The forests guards and patrol officers move around to ensure compliance.

4.3.3 Administration of Extraction Permit for Private Forest Plantation Owners

As earlier Stated that extraction permit policy exists in all the study area, although there is little or no enforcement by the Ogun State Ministry of Forestry on compliance of this policy

Corroborating this findings, Singh (2010) Stated that forest lands in India is governed, either by separate Private Forest Acts or by provisions in different States Forest Acts. One of the Law Stated that landowners has to obtain permission, often from the District Collector, in order to sell, mortgage, lease or otherwise alienate the whole or any portion of forest land (or forest produce). In the felling permits,relevant species to be harvested are listed in schedules that may be modified through notification. Indicating scheduled species are done to prevent illegal removal of some species from forest plantations.

It was observed that the State governments did not control or influence prices of timber harvested from private forest plantations in the study area. The price of timber was determined by the international or local market, timber contractors and local or foreign buyers. The Ministry and Departments of Forestry only specified the percentage expected from each stand sold by private forest owners. The extraction permit obtained by the private owners from the government indicate the amount to be paid on each stand felled, that is, 10 percent of the value of stand harvested or sold is expected to be paid to the Government.

Investigation further revealed the amount paid on extraction permit was not uniform in the study area. InEkiti and Oyo States, 10% of the value of the harvested timber is required to be paid, while it is 20% in Ogun State. For instance, if a stand is sold at two thousand naira (₦2000) in Oyo and Ekiti States, two hundred naira (₦200) is expected to be paid as extraction fee (permit), while Ogun State will expect four hundred naira (₦400) as extraction fee. Taking into consideration is that the extraction fee for all tree species are the same, it didn't matter if the species is exotic or indigenous and also the size of the stand did not influence the fee in any way.

The States' Ministries and Departments require all private forest plantation owners to write application to the ministry through the charge or zonal officers before exploiting from private forest plantations. Extraction permit is grantedonce the application is processed. Issuing of extraction

permits to private forest owners doesn't take long too once private forest owners indicate their intention.

4.3.4 Rules and Regulations Guiding Exploitation Rate in Private Forest Plantations

The study revealed that there are no rules or regulations guiding the rate of exploitation in the three States expect for collection of extraction permit. Although, Ekiti and Oyo States Departments of Forestry are doing their best in ensuring that private owners' comply with acquiring extraction permits but they do not control or influence the rate of exploitation.

Singh (2010) revealed that under Section 35 of the Indian Forest Act, 1927, the State government may regulate or prohibit cultivation, pasturing and clearing of vegetation in private forests through notification issued after a process of dealing with any objections that the land owner may have. Additionally, the regulations provide that if government perceives that the land owner is not taking adequate care of his/her forest, it has the power to assume management through a process of notification. Such forest is variously termed 'private protected forest' (in Bihar), 'controlled forest' (in Himachal Pradesh) and 'vested forest' (in Uttar Pradesh and West Bengal). Another regulation is the issuing of felling permits. These existing restrictions are expected to serve two purposes: first, to check the alienation of valuable forest land, and second to prevent the forests from being cleared or degraded.

Extraction Permit should be seen as one of the instruments used to regulate exploitation rate in Nigeria. Controlling or regulating exploitation rate of timber in the nation is important to achieve a sustainably managed forest plantations. It's quite unfortunate that extraction permits doesn't play this role in Nigeria but it's seen as an instrument to generate revenue for government alone and confirmed by Private Forest Plantation owners in southwestrn, Nigeria. They remarked that the way State Forestry Officials go about imposing the permits on private owners without clear Statements of the relevance of the permits and its contribution to private investors is not acceptable. Therefore, Forest permits should be more than means of generating revenue but as a way of preventing the forests from being clear fell or degraded and also the revenue generated through this must be used to develop both the government and privately owned forest plantations.

CHAPTER FIVE

SUMMARY, CONCLUSION AND RECOMMENDATION

The study was conducted in the context of assessing private investment in forest plantation development in southwestern, Nigeria, with respect to the distribution and location of these forest plantations, species planted, age distribution of forest plantation, current and potential funding sources, evaluating the cost and returns associated with private forest plantations development, identifying existing institutional mechanisms (policy, legislation, incentives), challenges associated with private forest plantation development and the willingness of other forestry stakeholders who are non-forest plantation owners to participate in forest plantation development in the study area.

Three major analytical techniques were employed for the analysis of the data:

- Descriptive statistics: frequency distribution tables, percentages and bar charts;
- Logistic Regression
- Discounted Financial Analysis; NPV, BCR, IRR, DPBP, DROI, LEV and AEV.

5.1 SUMMARY OF MAJOR FINDINGS

5.1.1 Socioeconomic Characteristics of Private Forest Plantation Owners

The total number of valid response from private forest plantation owners in the study area were seventy-one (71). The demographic characteristics of private forest plantation owners such as age, gender, major occupation, financial sources and educational status were determined.

The study observed that in Ogun, Oyo and Ekiti States, 90.9%, 73.1% and 95.7% of private forest plantation owners were men while 9.1%, 26.9% and 4.3% were women respectively. Also, 84.5% of private forest plantation owners in the study area had formal education but high proportion of the private owners in Ogun (72.7%) and Ekiti (82.6%) States had tertiary education while 40.9% and 23.1% specialized in Renewable Natural Resources respectively. Significant portion of the private

forest plantations established in Ogun, Oyo and Ekiti States (77.3%, 76.9% and 87.0%) were owned by individuals.

Furthermore, most of private forest plantation owners in Ogun State (86.4%)bought the forestland. In Oyo State, 34.6% of the private forest plantation owners bought the forestland while 46.2%private forest plantation ownersinherited the forestland from their parents' lineage. In Ekiti State, 43.5% of the private forest plantation owners inherited the forestland from their parents' lineage and 47.8% of private forest plantation owners bought the forestland.Findings also revealed that in Ogun, Oyo and Ekiti States, 85.7%, 65.4% and 65.2% of the private forest plantation owners established forest plantation for timber production in order to supply raw materials to the industries and companies and also for exportation.

It can be observed that in all the three States, most of theprivate forest plantation owners in the three States have small sized plantation, followed by medium and then large size plantation.Observations showed that ninety five percent, 84.6% and 87.0% of the private forest plantation owners in Ogun, Oyo and Ekiti States respectively, used their personal savings to establish and manage the forest plantations.

5.1.2 Cost and Returns Associated with Private Forest Plantations Development in the Study area.

The results of investment analyses showed all positive NPV, AEV, LEV value and BCR is greater than one which means forest plantations investment is a profitable and feasible business regardless of the size of plantation and can be recommended to potential investors. DPBP of three out of five private forest plantations in the study area were high because huge capital were expended at the initial stage of investments and little or no revenue were generated until towards the end of year of rotation. Hence, initial outlay will never be fully paid until the end of rotation when the investment will yield returns. Therefore, multiple land use system should be incorporated to increase revenue.

5.1.3 Effect of Existing Institutional Mechanisms (Policy, Legislation, Incentives) on Private Forest Plantation Development.

Investigation revealed that there is no substantial policy, legal or administrative framework to direct and guide sustainable private forest development in the study area. The only existing mechanisms that affect private forest plantation development is the extraction permit policy i.e. private owners are supposed to take permission before exploiting from their forest plantation. The study observed that there is little or no proper law enforcement, clear and efficient regulations in the study area. The result of the study revealed that no private owners in Ogun State claimed to have received any form of incentives from the government. However, only 7.7% and 13.0% ofprivate forest plantation

owners claimed to have received one form of incentive or the other from the government in Oyo and Ekiti States respectively.

5.1.4 Challenges Associated with Private Forest Plantation Development

The study revealed that 31.8%, 30.8% and 4.3% of private forest plantation owners in Ogun, Oyo and Ekiti Staterespectively identified inadequate capital as a major challenge to private forest development,4.5%, 7.7% and 13.0% of private forest plantation owners remarked that lack of extension services has been a challenge, 23.8%, 12.5% and 27.3%of private forest plantation owners identified policy and legislature as challenge**,** 9.1% and 15.4% in Ogun and Oyo States identified illegal felling and clash with herdsmen as another challenge.The results further show that in Ogun, Oyo and Ekiti States,22.7%, 11.5% and 13.% ofprivate forest plantation owners identified land availability and security as a challengeaffecting private investment in forest plantation development. Private forest owners have limited access to land either through purchase or by lease.

5.1.5 Willingness of Non-plantation owner forest stakeholdersto Participate in Forest Plantation Development.

Males were more likely to be willing to participate in private forest plantation development than females. This was also found to be statistically significant ($p<0.001$). The willingness to participate in private forest plantation development increased down the age groups; however this was not statistically significant. Those who had tertiary education were more willing to participate than those who had no formal education. MDAs staff were more willing than marketers to engage in private forest plantation.

5.2 CONCLUSION

The need to invest in forest plantation development in order to generate a wide variety of resources, the most important of which are timber, non-timber products, recreation, wildlife habitat, and watershed services cannot be over emphasized. Private investment in forest plantation development will be a major way of achieving sustainable forest development, income generation, increase wood supply and also reduce the pressure on natural forest in Nigeria.

This study has shown that investment in forest plantation is feasible, acceptable and contributes to the economic, social and environmental development of private forest owners and the society.The results are encouraging in that they indicate the opportunity for reasonable rates of returns in forest plantation investments in southwestern, Nigeria. All 5 private forest plantation investments had positive NPV, AEV, LEV value and BCR greater than one.

Private forest plantations establishment in the study area dates back to as far as 1947, which is an indication that private forest plantation establishment in southwestern, Nigeria is not new. However, most of the private forest plantations in the study area were established between 1995 and 2015, which could be an indication of increasing interest of the private investors in forest plantation establishment and development in southwestern, Nigeria. The results indicated that fast growing exotic tree species were planted by the private owners. The species planted include: *Tectona grandis and Gmelina arborea* (exotic species) while some indigenous tree species like*Terminalia superba, Terminalia ivorensis*, *Nauclea diderrichii, Triplochiton scleroxylon, Mahogany khaya and Cassia spp* were also planted. Study showed that tree cultivation and development is not the major occupation (livelihood activity) of most of the private forest plantation owners, the primary purpose of forest plantations establishment is for economic reasons, while environmental or social reasons were secondary.

The inquisition into the challenges associated with forest plantation development revealed that policy, legal, institutional and technical constraints have been undermining investment in forest plantations as well as limited opportunities for forest development in the country. The study revealed some burdens shouldered by investors in the study area can actually be minimized if there is good governance in the country. For instance, the cost incurred during harvesting and transportation of timber will definitely reduce if there are basic infrastructures e.g. good roads. Furthermore, forest policy which is another challenge that undermines investment in forest plantations development in Nigeria lacks proper legal backing, coupled with obsolete and unenforceable State Forestry Legislation. In approved National Forest Policy, 2006, some of the strategies on plantation establishment and development are limited and does not focus on private owned forest plantations but directed towards government owned forest plantations. The study provided sufficient evidence testifying that there is no Private Forest Acts guiding the use and management of private forest plantations in the country. It is believed that the State Forest Acts which governs the natural forest reserves and forest plantation owned by the government cannot govern private forest plantation effectively.

In addition, one of the major reasons forests have not been attracting attention economically is the attitude and reaction of forestry agencies and services. There has been inadequate intellectual communication between professionals in the forestry and other sectors. The isolation occur when there is no or little interaction among all forest stakeholders. For instance, Forest Research Institute of Nigeria is concern with research and development and University Lecturers are also concern with teaching and research but the extent to which they have been able to impact other stakeholders

through extension programmes, practical demonstration and teaching of the findings of their researches are yet to be felt except few private owners who consult individual lecturers and researchers. It is important to note that some forest stakeholders are illiterates, some are educated but not professionals in forestry and they need practical demonstration on plantation management and development. Therefore, all forest stakeholders must come together not just to give talk on findings (seminars and workshops) but to actually demonstrate and participate in practical forest activities (development and management). The study discovered that the coming together of all forest stakeholders in Ekiti State through their association (Ekiti State Tree Growers Association), have been able to some extent bridge the gap. This association comprises of various forest stakeholders including forestry lecturers, staffs of department of forestry in the State Ministry etc. Members have been able to share knowledge and experiences. Therefore, efforts must be taken to improve interactions and exchanges across the sector. Extension services and technical assistance to private owners should not be restricted to forest officials in the Ministries but to all professionals in forestry.

Data and information gaps had limited improved understanding and management of forest plantations. The study observed that many private forest owners do not keep records of the activities done in the plantation especially the cost incurred and revenue generated. This is mostly because they tend to plant and manage the plantation at their own pace with no target of production and no specific period of rotation. The findings of this study could be useful to potential, emerging and established private owners since effective and efficient cash flow management is an integral component of any successful business.

Finally, reliable information on investment analyses to show the feasibility and acceptability of forest plantation investment is very essential for sustainable forest plantation development, formulating sound management strategies and decision making. The investment analysis reviewed in the study can help all investors comprehend and apply economic principles better. The analyses will guide private owners on how to estimate investment returns for entire forestry projects and other projects on the forest land. This will indicate if forest investments are meeting the needed alternative rates of return for private investors and communities. The estimates also can be used to benchmark rates of return and costs among communities and other organizations, to determine how competitive production may be in one region versus others, or in the world. Based on investment analysis, this study provides some empirical evidence to the fact that investment in forest plantation development is feasible and it is also evident that forest plantation can be a successful solution to

timber supply and trade in Nigeria. It can promote/increase timber production and sustainable land use.

5.3 RECOMMENDATIONS

There is no doubt that Nigeria has a high potential for forestry development that has not been adequately exploited. Private investors' interest can be stimulated through provision of incentives in order to fulfil Nigeria potentials in forest plantation development.Provision of adequate incentives such as financial support, technical support, good governance and secure land etc. are fundamental in making private investment in forest plantation development somewhat attractive.

5.3.1 Cost and Benefits Analysis of Private Investments

Investment in forest plantation development is profitable going by the economic returns. However, multiple land use system should be adopted to reduce the payback period and increase economic returns in private forest plantation development.Correspondingly, up to date cash flow Statement and cash management practices are essential to ensure the profitability and sustainability of private investment in forest plantation development. Hence, professionals (forest economist from Federal and State Ministries, Departments and Research Institutes) should be assigned tasks to provide cash management advice to private forest plantation owners. Up to date cash flow Statement improve private forest plantation owners'decision making to manage their investments profitably and sustainably.

5.3.2 Formulation of Appropriate Policies and Strategies

Encouragement of private forestry and creation of forest plantations for specific end uses are part of the aims of National Forest Policy in Nigeria. Unfortunately, government has not encourage and support an aggressive establishment of private forest plantations. Therefore it is important that all forest stakeholders (timber contractors, plank sellers, forestry lecturers and researchers etc.) should join force with the apex body in Nigeria that is Forestry Association of Nigeria to liaise with government to create policy that will facilitate private forest plantation development and also make provision for incentives so as to remove bureaucratic and market bottleneck.

Government should recognise all stakeholders (public, private, NGOs, CBOs, and societies) in the formulation of appropriate policies and strategies. Stakeholders must be seen as agents that would promote sustainable forest management. After putting these policies in place, the policies have to be effectively implemented.

The study revealed that land availability either for purchase or rent remains beyond the reach of many private investors. Government policy of leasing out land to private investors can be an instrument used in facilitating private investors' interest in forest plantation. Therefore, provision should be made by government to lease or rent land to interested investorsand reassure prospective forest plantation investors about the security of the land they rented.

5.3.3 Provision of Incentives to Reduce Challenges Faced by Private Forest Plantation Owners

Access to financial services and market can be especially challenging for small and medium forest enterprises. Often, sustainable practices cost more to implement and the return on investments comes at the end of rotation period. Therefore, reducing cash-flow problems in forestry investment would be a significant incentive to attract private investment in forestry.For this, a special concessional loan with longer grace and payback periods is required. Access to creditcan be improved through concessional micro-finance programmes backed by both private and public sources. Soft loans can also be assessed through local and regional cooperative association of private forest plantation owners. Thus, it is recommended that forest owners should be empowered to form clusters, by facilitating cooperation and servicingprofessional units such as cooperatives. This will help in monitoring and supporting different activities going on in members' forest plantations.

There is need to increase the number of trained cadres of forestry manpower in the country and improve their stock of knowledge in all areas of forestry in order to ensure that all private owners who need extension services are effectively covered.Governments should foster a skilled workforce through basic education programs and trainings, consider labour market interventions that promote higher skills, and help all forest stakeholders.

Furthermore, widespread promotion of opportunities, new technologies and market information relevant to forest plantation development must be embarked upon. There should be research-extension linkages to promote private forestry. Forest Research Institute of Nigeria, Federal Department of Forestry, all Nigeria Institutions with Forestry Departments, State Ministries/Departments of Forestry and other forestry stakeholders must come togetherand discuss the challenges unique to business climate of forest plantation in Nigeria and at the same time

proffer solutions to these challenges. This process promotes public-private partnership which enhance transfer of information that can improve forestry development in the country.

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Appendix

Nigeria: Lending Interest Rate (measure: percent; source: The World Bank)

Year	Nigeria
1970	7
1971	7
1972	7
1973	7
1974	7
1975	6.25
1976	6.5
1977	6
1978	6.75
1979	7.79
1980	8.43
1981	8.92
1982	9.54
1983	9.98
1984	10.24
1985	9.43
1986	9.96
1987	13.96
1988	16.62
1989	20.44
1990	25.3
1991	20.04
1992	24.76
1993	31.65
1994	20.48
1995	20.23

1996	19.84
1997	17.80
1998	18.18
1999	20.29
2000	21.27
2001	23.44
2002	24.77
2003	20.71
2004	19.18
2005	17.95
2006	16.9
2007	16.94
2008	15.48
2009	18.36
2010	17.58
2011	16.02
2012	16.79
2013	16.72
2014	16.55
2015	16.85

DEPARTMENT OF FOREST RESOURCES MANAGEMENT,

FACULTY OF AGRICULTURE AND FORESTRY,

UNIVERSITY OF IBADAN.

Dear Sir/Ma,

QUESTIONNAIRE FOR PRIVATE FOREST OWNERS

I am a doctoral student in the above named Department and University. I am currently on a research work titled "Assessment of Private Investment in Forest plantation Development in Selected States in Southwestern Nigeria". Kindly answer the following questions and be rest assured of confidentiality of your response.

Thank you and God bless.

Oyinlola Fasoro (158996)

SECTION A

1. State: ……
2. Local Government Area: ……....
3. Age (in years): ……
4. Sex: Male ( ) Female ( )
5. Phone number(s).....
6. Educational background:No formal education ( ) Pry( ) Secondary( ) Tertiary ( ) Others (specify) …….....
7. Area of specialization in educational training
   Commercial/Business (specify).....
   Social Science (specify).....
   Arts (specify).....
   Pure Science (specify).....
   Renewable Natural Resources Management (specify).....
   Others (specify).....
8. Major occupation.....
9. Other occupation(s).....
10. Income.....
11. Location of plantation ……
12. Year of establishment of plantation ……

13. Purpose of establishment of plantation: (i) Pole (ii) Timber (iii) Non timber forest product (specify)..... (iv) Recreation and tourism
    (v) Watershed protection (vi) Others (specify) .....
14. Plantation ownership structure (i) Individual (ii) Company (iii) NGO (specify).....(iv) Community
    (v) Family (vi) Others (specify).....
15. Size of plantation.....
16. Sources of idea to establish forest plantation (i) Through a friend (ii) Through media (iii) Through government officials(iv) Through members of academia (v) Others {specify}.....
17. What are your reasons for investing in forest plantations

.....

18. Species planted.....
19. Do you practice agroforestry system Yes( ) No ( )
20. If yes to question 19, mention the crops planted in the plantation

    .....

21. Source of seedlings (i) Personal Nursery (ii) State Nursery
    (iii) Private nursery (iv) Others (specify)
22. Sources of seeds.....
23. How did you acquire the land? (i) Inherited land (ii) Purchased land (iii) Lease
    (iv) Rent (v) Others (specify).....
24. Cost of acquiring the land.....
    a) If inherited, what was the cost of purchasing land of that size in that area at that time?.....
    b) If leased, how many years is the lease.....
    c) How much do you pay for the lease?.....
    d) If rented, how much do you pay as rent per year?.....
25. Total number of employees: …….
26. Please indicate the sources of funds for the plantation establishment and management by ticking the relevant sources.
    i. Personal savings ( )
    ii. Special grants from the State government ( )
    iii. Special grants from the federal government ( )
    iv. Grants from foreign bodies ( )

v. Loans from foreign bodies ( )
vi. Loans from commercial banks
vii. Loans from social financial institutions (such as cooperative, etc)
viii. Loans from national development banks
ix. Loans from international development banks(such as World Bank etc)
x. Others (specify) .....

27. Please specify the type of special grants you received
28. Please indicate the type of foreign grants you received

29. Provide the names of the donor agencies, if the grants were from agencies

30. What were the specific projects upon which these grants were expended?

31. Briefly provide a list of benefits or functions which these were meant to provide or serve.
32. Please kindly fill the table below to indicate cost of operation and activities in the plantation.

Costs of Establishing and Maintaining the Plantation

ACTIVITIES	**COST(Naira)**									
	1st year	**2nd year**	**3rd year**	**4th year**	**5th year**	**6th year**	**7th year**	**8th year**	**9th year**	**10th year**
Land Preparation (brushing of land, felling of trees, burning)										
Planting Activities (supply of pegs, seedlings, transportation)										
Planting Exercise										
Tending and Maintenance Operation (weeding, clearing, fire tracing)										

Monitoring and Supervision										
Harvesting (transportation, machines etc)										
Labour										
Total										

33. Kindly fill the table below

Type of personnel	Number	Year of employment	Functions
Professionals			
Technicians			
Sub technicians			
Skilled			
Unskilled			
Casual workers			
Administration			
Accounts and store			
Any other (please specify)			

34. Please , kindly fill the table below to indicate returns generated from the plantation

Year (specify the exact year)	Returns (Naira)							
	Timber	Pole	Non Timber (please specify)					
							Rate	Value (naira)
1								
2								
3								
4								
5								
6								
7								
8								
9								
10								

35. What are the roles of government in forest plantation administration and sales of plantation products.....?
36. What are the challenges associated with investment in plantation
    i) Low market price (ii) low demand iii) haphard/unstable policies
    iv) restrictive legistions v) inadequate technical expertise
    vi) Others please specify.....
37. Suggest ways to promote or enhance private forest plantation investment in Nigeria
    .....
    .....
38. Have you started exploiting your plantation? Yes ( ) No ( )
    If yes, how much do you exploit a hectare of (i) Timber.....
    (ii) Pole..... (iii) Non timber forest product (specify).....
39. What is the rotation year of (i) Timber ..... (ii) Pole.....

(iii) NTFP (specify)..... (iv) others (specify).....

40. Do you obtain permit before you can harvest your products? Yes ( ) No( ).
41. If yes to question 40, how much do you pay .....
42. Is the permit renewable?.....
43. Do you have an association of private plantation owners? Yes ( ) No ( ).
44. Are you a member? Yes ( ) No ( ).
45. If yes, name them .....
46. What are the benefits derived from being a member of the association .....
47. How do you find your customers.....
48. How much did you sell a unit of your product?

	SPECIES/PRODUCTS	PRICE (₦)
Timber		
Pole		
NTFP		
Others (specify)		

49. Is there a central coordinating agency responsible for promoting private investment in forest plantation? Yes( ) No( )
50. If yes to question 49 name them.....
51. Do you set price yourself or is there a marketing board responsible for marketing and setting prices for timber and other resources in the plantation? Self ( ) Marketing board ( ).
52. If marketing board set prices, mention the names of the marketing board .....
53. Do you enjoy any incentives for plantation development from the government? Yes ( ) No ( )
54. If yes, name them.....
55. If no, propose incentives that can enhance private forest plantation establishment by private investors .....
56. Do you pay royalty/dues and tax/levies? Yes ( ) No ( ).

57. If yes, who do you pay to? (a) Government (b) Community c) Others, specify.....

58. How much do you pay?.....

Appreciation: Thanks very much for your cooperation, God bless you abundantly.

DEPARTMENT OF FOREST RESOURCES MANAGEMENT,

FACULTY OF AGRICULTURE AND FORESTRY,

UNIVERSITY OF IBADAN.

Dear Sir/Ma,

QUESTIONNAIRE FOR STAKEHOLDERS

I am a doctoral student in the above named Department and University. I am currently on a research work titled "Assessment of Private Investment in Forest plantation Development in Selected States in Southwestern Nigeria". Kindly answer the following questions and be rest assured of confidentiality of your response.

Thank you and God bless.

Oyinlola Fasoro (158996)

1. State: ……
2. Local Government Area: ……....
3. Age (in years): ……
4. Sex: Male ( ) Female ( )
5. Phone number(s).....
6. Educational background:No formal education ( ) Pry( ) Secondary( ) Tertiary ( ) Others (specify) …….....
7. Area of specialization in educational training
   Commercial/Business (specify).....
   Social Science (specify).....
   Arts (specify).....
   Pure Science (specify).....
   Renewable Natural Resources Management (specify).....
   Others (specify).....
8. Major occupation.....
9. Other occupation(s).....
10. Income.....
11. Do you have an idea what forest plantation is? Yes ( ) No ( )
12. Do you have a plantation? Yes ( ) No ( )
13. If yes to question 12, when was the plantation established?.....
14. What is the size of the plantation.....

15. What motivated you to have a forest plantation?.....
16. If no to question 12, given reason(s) you do not have plantation.
    (a) Lack of capital (b) Land tenure problem (c) Tax and government policy challenges (d) Long gestation period of trees (e) Age barrier
    (f) Others (specify) .....
17. Do you think investing in forest plantation will increase or boost the economy of the country and also increase the standard of living of people? Yes ( ) No ( )
18. If yes to question 17, how? (a)Revenue from exportation (b)Returns, benefits and earnings from the venture/business (c) Job creation (d) Others (specify).....
19. If no to question 17, why? .....
20. In your opinion how will you rate the level of involvement or participation of forest stakeholders in forest plantation development? High ( ) Low ( )
21. If high what do you think is responsible for the level of stakeholders' participation in investing in forest plantation?
    (a) Awareness (b) Literacy level (c) Incentives (d) Others (specify).....
22. If low what do you think is responsible for the level of stakeholders' participation in investing in forest plantation?
    (a) Lack of awareness (b) Capital (c) Security reasons{land, life, investment etc} (d) Government policies
    (e) Others (specify).....
23. Will you be willing to establish forest plantation if the necessary incentives (seedling, financial support, tax relief etc) are provided? Yes ( ) No ( )
24. What do you think are the challenges inhibiting the participation of stakeholders in the forest plantation investment?.....

    .....
    .....
25. Recommend preferred approach to increase the level of participation of stakeholders in forest plantation investment.....
    .....
    .....
    .....

DEPARTMENT OF FOREST RESOURCES MANAGEMENT,

FACULTY OF AGRICULTURE AND FORESTRY,

UNIVERSITY OF IBADAN.

Dear Sir/Ma,

QUESTIONNAIRE FOR STATE MINISTRY

I am a doctoral student in the above named Department and University. I am currently on a research work titled "Assessment of Private Investment in Forest plantation Development in Selected States in Southwestern Nigeria". Kindly answer the following questions and be rest assured of confidentiality of your response.

Thank you and God bless.

Oyinlola Fasoro (158996)

1. State: ……
2. Name of Ministry/Department.....
3. What are the roles of forestry department in private forest plantation development (i) technical advice(ii) aid administration and sales of plantation products (iii) set prices for forest plantation products (iv) serve as extension agents to promote investment in forest plantation (v) provide incentives e.g. seedlings (vi) others specify.....
   .....
   .....
4. Does the Ministry/Department perform all the roles? Yes ( ) No ( )
5. If No to question 4, what are the reasons for not performing the roles?.....
   .....
   .....
6. Do private forest plantation owners register with the State Forest Department/Ministry? Yes ( ) No ( )
7. If yes, how?.....
8. If no, why?.....
9. Do the Ministry give permits/licence to forest plantation owners to exploit? Yes ( ) No( )
10. If yes, how many types of permits does the Ministry issue out to private forest plantation owners? .....

11. Mention them and the functions of each

    (a).....

    (b).....

    (c).....

    (d).....

12. Are the permits renewable? Yes ( ) No ( )

13. If renewable, what's the duration of the permit

    .....

14. What does the Ministry/State Forest Department require of private forest plantation owners to obtain the permit? (i) survey plan of the land used for forest plantation development

    (ii) certificate of ownership of the land (iii) National identification card

    (iv) international passport or driver's licence (v) others

    specify.....

15. Do they obtain the permits from the State Ministry office or the permits can be given to them by forest officials in their various zones

    .....

16. How does the Ministry set price for permit? (I) Number of logs (ii) Length of trees (iii) Girth of the trees (iv) Others, specify .....

17. Kindly indicate the value and duration of the different permits/licence issued to private forest owners

Permit/licence	Value (₦)	Duration

18. What is the basis for the value of the permit? (a) Species (b) volume of wood

    (c) number of logs (d) length of stumpage/standing tree (e) others

    specify.....

19. Are there any rules and regulations given to private forest owners to guide/aid the rate of exploitation? Yes ( ) No ( )
20. If yes, name them

    .....

    .....

    .....
21. Does the Ministry/State Forest Department issue any property hammer to forest plantation owners? Yes ( ) No ( )
22. If yes, how much.....
23. What is the basis for the value of the property hammer? (a) Size of forest plantation (b) species (c) others specify.....

    .....
24. Is the hammer renewable Yes ( ) No ( )
25. If yes, for how long? .....
26. What does the Ministry/State Forest Department require of private forest plantation owners to obtain the property hammer? (i) survey plan of the land used for forest plantation development (ii) certificate of ownership of the land (iii) National identification card (iv) international passport or driver's licence (v) others specify.....
27. What other things are required from private forest plantation owners before they can exploit timber from their plantation?.....

    .....
28. If yes, mention them and the amount paid (i).....

    (ii).....(iii)....

    ....
29. Do private forest plantation owners pay royalty/dues and tax/levies to the government Yes ( ) No ( )
30. If yes, how much?.....
31. How will you rate the level of involvement or participation of forest stakeholders in forest plantation development? High ( ) Low ( )
32. If high what do you think is responsible for the level of stakeholders' participation in investing in forest plantation?

    (b) Awareness (b) Literacy level (c) Incentives (d) Others (specify).....

33. If low what do you think is responsible for the level of stakeholders' participation in investing in forest plantation?

    (b) Lack of awareness (b) Capital (c) Security reasons{land, life, investment etc} (d) Government policies

    (e) Others (specify).....

34. Is there any current programme or projects done by government and the State Forestry department to sensitize and educate the general public of the importance of planting trees?

    Yes ( ) No ( )

35. If yes, mention them .....

    .....

36. What are the incentives given to encourage the interested public (a) soft loan (b) technical advice (c) distribution of free seedlings (d) land lease (e) tax relief

    (f) others, specify.....

37. What do you think are the challenges inhibiting the participation of stakeholders in the forest plantation investment?.....

    .....

    .....

    .....

38. Suggest ways by which the level of participation of stakeholders in forest plantation investment can be increased.....

    .....

    .....

    .....