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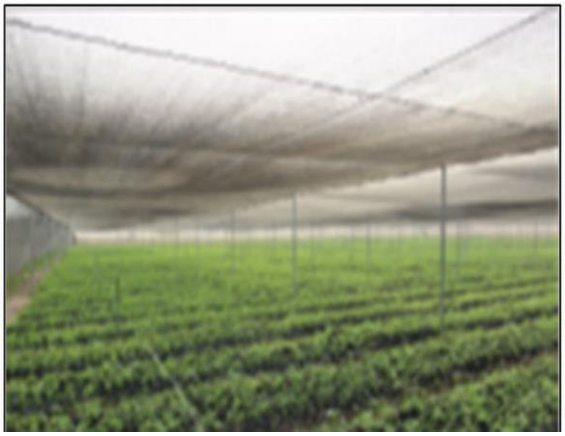
PUBLIC AND PRIVATE SECTOR DEVELOPMENT ON FOREST PRODUCTS INDUSTRY IN GHANA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Public and private sector development in forest products industry in Ghana

Beatrice Obiri, Kwame Oduro, Eric Nutakor and Stella Acquah

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Acronyms and abbreviations

AFF	-	African Forest Forum
AfDB	-	African Development Bank
APSD	-	African Plantations for Sustainable Development
BSAs	-	Benefit Sharing Agreements
CEPS	-	Customs, Excise and Preventive Services
CFMP	-	Collaborative Forest Management Project
CIF	-	Climate Investment Fund
CSIR	-	Council for Scientific and Industrial Research
CSO	-	Civil Society Organizations
DPs	-	Development Partners
ECOWAS	-	Economic Community of West African States
EPBG	-	EcoPlanet Bamboo Group
EU	-	European Union
FC	-	Forestry Commission
FDMP	-	Forestry Development Master Plan
FGLG	-	Forest Governance Learning Group
FORIG	-	Forestry Research Institute of Ghana
FR	-	Forest Reserves
FSD	-	Forest Services Division
FWG	-	Forest Watch Ghana
GDP	-	Gross Domestic Product
GFIP	-	Ghana Forest Investment Program
GREL	-	Ghana Rubber Estates
GTA	-	Ghana Timber Association
HFZ	-	High Forest Zone
ICRAF	-	World Agroforestry Centre
IUCN	-	International Union of Conservation of Nature
KCL	-	Kasapreko Company Limited
LAS	-	Legality Assurance System
LL	-	Land Lease
LBAs	-	Lease Based Agreements
MoFA	-	Ministry of Food and Agriculture
MOP	-	Manual of Procedures
MTS	-	Modified Taungya System
NFPDP	-	National Forest Plantations Development Programme
NGO's	-	Non-Governmental Organizations
NTFPs	-	Non-Timber Forest Products
OCAP	-	Oda-Kotoamso Community Agroforestry Project

PPP	-	Public Private Partnerships
REDD	-	Reducing Emission from Deforestation and Forest Degradation
RWE	-	Round Wood Equivalent
SDGs	-	Sustainable Development Goals
SMEs	-	Small and Medium Enterprises
SMFE	-	Small and Medium Forest Enterprise
STV	-	Standing Tree Value
TBI	-	Tropenbos International
TIDD	-	Timber Industry Development Division
TNS	-	Techno-Serve
TOR	-	Terms of Reference
TUP	-	Timber Utilization Permit
USA	-	United States of America
VPA	-	Voluntary Partnership Agreement
WD	-	Wildlife Division

Executive Summary

This study was commissioned by the African Forest Forum to analyze the nature and trends in primary and secondary forest production in Ghana with emphasis on public and private sector contribution to the development of the sector and organization of production activities. The aim is to strengthen the capacity of the industry to address both social and environmental concerns that contribute to sustainable, equitable and effective private sector development in forestry. The information presented in this report is a synthesis of qualitative and quantitative primary data from interviews of selected forest sector institutions and individuals, augmented with published and grey literature on the forestry sector of Ghana.

Forestry contributes 6% to GDP of Ghana and provides livelihoods for about 15% (3.6 million) of the Ghanaian population. Natural forests including tree resources on farmlands are the main sources of supply for timber and non-timber products in Ghana. Over 50 products are extracted from both humid forests and savannah woodlands across the country. The most frequently exploited products for subsistence and commercial purposes include wild foods (mainly game meat, fruits, nuts, mushrooms, snails, etc.) fuelwood, construction materials (timber, poles, rattan, bamboo) and medicines. There are over 27 forest-based enterprises, majority of which are in the small and medium enterprise category, that contribute significantly to local livelihoods and the national economy.

The forestry sector of Ghana is characterized by a wide range of public and private sector stakeholders in both primary and secondary forest production. The public sector consists of government institutions primarily responsible for policies, programs, development of resource capacity including technical skill by academic and research institutions for forest management. The private sector constitutes civil society and non-governmental organizations, communities, firms and individuals, among others, engaged in both commercial and non-profit activities involved in advocacy, commerce and other developments in the forestry sector. Private sector contribution to the national economy in the forestry sector has largely been in forest plantation, timber production and processing. The forestry sector contributes 6% of the Gross Domestic Product (GDP) and employs a labour force of over 75,000 people, whilst providing direct livelihood to about two million people. Foreign exchange earning from timber by the end of the third quarter of 2015 was Euro 135 million. Private sector contribution, with respect to the non-timber forest product sector, on the other hand has had minimum official attention, hence not adequately quantified. It has largely been operated by informal or private small and medium scale enterprises using rudimentary technologies whose activities are often unregulated and has hardly been governed by public sector policies and programs.

The organization of primary forest production for both timber and non-timber products involves acquisition of the raw material from forest resource owners and administrators by harvesters for supply to middlemen/traders or processors for secondary forest production. The organization of secondary forest production involves producers using secondary and tertiary transformation processes to convert primary forest products into higher value products for supply to middlemen/traders for distribution to domestic and export markets. The number of firms and individuals, their capacity/turnover and number of employees engaged in both primary and secondary forest production activities vary greatly with commodity type, although not empirically

well documented. Tenurial restrictions, including local and government regulations, may dictate the rights of access and control or use over forest resources. However, both male and female are involved in forest production activities and their level of involvement vary with commodity type and the segment of the supply or value chain they are engaged. For the majority of forest products, men tend to dominate harvesting and processing while women tend to be more involved in marketing and utilization.

Public Private Partnerships (PPP) are increasing in the Ghanaian forestry sector. Government-Company, Government-Community and Company-Community PPPs are evolving mainly in primary forest production for plantation development. For instance, there are over 330 Government-Company PPPs under the Leased Based Agreements (LBAs) involving the Forestry Commission of Ghana and private firms and individuals engaged in restoration of degraded forest reserves nationwide. Other notable successful PPPs are the Company-Community models, such as those of APSD, FORM Ghana, Newmont Ghana and Samartex Ghana Ltd., which have invested in community involvement in plantation forestry. In 2016, the African Development Bank (AfDB) and the Climate Investment Fund (CIF) granted a USD 24 million loan to FoRM Ghana Ltd to restore degraded forest reserve lands in Ghana, and in partnership with the Ghana Forestry Commission. This PPP is the first of its kind and expected to yield multiple outcomes to the benefit of Ghana, including communities in its operation area, especially women.

Forestry sector development is a priority on the Ghanian government development agenda. External fiscal aid worth USD 643 million from development partners has been invested in the forestry sector from 1989-2009. The national forest and wildlife policy recognizes the potential for private sector investment to promote growth in the forest sector. A forest plantation development strategy (2016-2040) has been produced to guide commercial and community-based forest resource development nationwide, including wood fuels. The Ghana Forest Investment Program (GFIP) funded by World Bank and the African Development Bank is all encompassing, involving government and private sector institutions and firms including communities, to increase the capacity of forest resources for carbon sequestration and socio-economic development.

The Ghanaian economy is experiencing a number of private sector investments in natural resource development in oil and gas, mining and forestry. There is considerable opportunity for primary and secondary forest production in both forests and savannah ecosystems especially for biomass development for timber, energy and carbon trading, as well as for medicinal plants, shea and subsidiary products. One million ha of land has been identified for reforestation over 25 years under the forest plantation development program. It is recommended that policies are revised for harnessing further PPP investments in primary forest production. This is necessary to curtail deforestation that grows at 2% per annum, and to ensure sustainably supply of raw material for the wood industry. Policy and fiscal incentives to provide the enabling environment for investments in secondary forest production particularly in support of the SMFE sector is urgently required. This could promote local welfare while ensuring economic and environmental sustainability. There is also a need to evaluate PPPs in operation in order to identify practical shortfalls for redress, as well as learn best practices for wider application.

1.0 INTRODUCTION AND OBJECTIVES TO THE STUDY

The contribution of forest goods and services for economic, socio-cultural and environmental welfare is globally acknowledged. The global export trade in forest products in 2018 was worth USD 270 billion (FAO, 2018). Worldwide, 19 billion and 17 billion USD worth of non-wood forest products and woodfuel respectively are extracted from forests (FAO, 2010). Particularly for rural livelihoods in sub-Saharan Africa, forests provide food, medicine, shelter, fuel and cash income (Kaimowitz, 2003). It is estimated that more than 15 million people in sub-Saharan Africa earn their cash income from forest-related enterprises such as fuelwood and charcoal sales, small-scale saw-milling, commercial hunting and handicraft. For some countries, the forestry sector is an important foreign exchange earner. For example, between 1993 and 2002, the value of net exports of various wood-based products from countries in sub-Saharan Africa amounted to more than US$2 billion (FAO, 2003). Further, forest's provisioning and regulatory benefits for ecosystem services, such as watershed protection, biodiversity and genetic resource conservation, carbon sequestration and clean air, micro-climate regulation, soil fertility improvement, soil conservation/soil erosion control, recreational (aesthetic) value cannot be underscored. Forest's importance to humanity particularly for reducing climate related vulnerability worldwide featured prominently at the recent UNFCCC-COP21 meeting in France and in the Sustainable Development Goals (SDGs) (UN, 2015).

The development of the forest sector in Africa, however, is currently challenged with a plethora of issues that do not promote appropriate investment opportunities that will guarantee the sustainability of forest resources while delivering the required range of goods and services for socio-economic development. Further, the private sector in forestry has contributed significantly to economic growth in many developed nations; however, their potential for doing so in African economies is often constrained by unfavourable environments. "Inadequate infrastructure and bureaucracy, corruption, and weak access to financing are the main barriers to private sector investment in forestry in many African countries" (Castrén *et al*., 2014).

Public Private Partnership (PPP) arrangements are investment modules being harnessed for strategic growth and development in economies worldwide. Various forms or modules of PPP are being adopted in the forestry sector in Africa. However, there is lack of a comprehensive documentation and appraisal of these initiatives to help understanding the nature of these partnerships, the magnitude of their contribution to addressing societal needs and best practices that can be harnessed for strengthening further development of the forestry sector on the continent. For this reason, the African Forest Forum (AFF) coordinated forest sector studies in 22 countries in Africa, including Ghana, with the broad aim of facilitating the development of public-private-partnerships in the forestry sector (from community forest associations, small and medium scale enterprises-SMEs to large companies) that are involved in value addition to wood and non-wood forest products, and including the marketing and utilization of such products. The studies also sought to identify and promote promising public private partnership (PPP) models/approaches for forest compatible sustainable livelihoods development; as well as strengthen the capacity of the industry to address both social and environmental concerns, all geared towards contributing to more sustainable, equitable and effective private sector development in the sector.

This report covers one of such studies on the forestry sector of Ghana. The report is organized into 6 chapters. Chapters 1 and 2 cover the context and primarily the basis for conducting the study; including the background, justification and objectives. Chapter 3 covers the methodology used in gathering data and its analysis for presentation in the report. The main study results are presented in chapter 4. This covers the nature of primary and secondary forest production in Ghana with emphasis on the status of forest resources, the major stakeholders in the sector and governance arrangements for administration and access for major products. The state of product processing (capacity for input-output flows) and utilization (including SMEs), and gender inclusion, extent of the contribution of the public and private sector to the development of the forest industry, and analysis of prevailing public private partnerships in the forest sector are also covered in chapter 4. Proposals for public-private-partnership models are presented in chapter 5 with conclusions and recommendations in chapter 6.

2.1 BACKGROUND AND JUSTIFICATION

Forests and wildlife resources are major contributors to Ghana's economic development. The humid forest and savannah ecosystems provide rich biodiversity of national and global significance and form the backbone of the economic and productive sectors of the Ghanaian economy (MLNR, 2012). The forestry sector contributed 6% to the Gross Domestic Product (GDP) of Ghana and 11% of export earnings in the 1990s (FAO, 2001). However, forestry's contribution to GDP has declined, staggering between 2-4 % in recent times (Birinkorang *et al*., 2014). The total export of timber and other forest products also decreased from 11% in the 1990's to 1.3% of Ghana's merchandize trade flows in 2014. Nevertheless, the sector provides most of the wood consumed in the country, as well as employment and government revenues in the form of various fees and taxes (World bank, 1987). From 1990 up to date, timber production is Ghana's fourth biggest foreign exchange earner. Its contribution to the Gross Domestic Product (GDP) has been increasing in nominal terms over the years, however, the declining contribution of forestry to the GDP is as a result of increasing oil exports (Figure, 1).

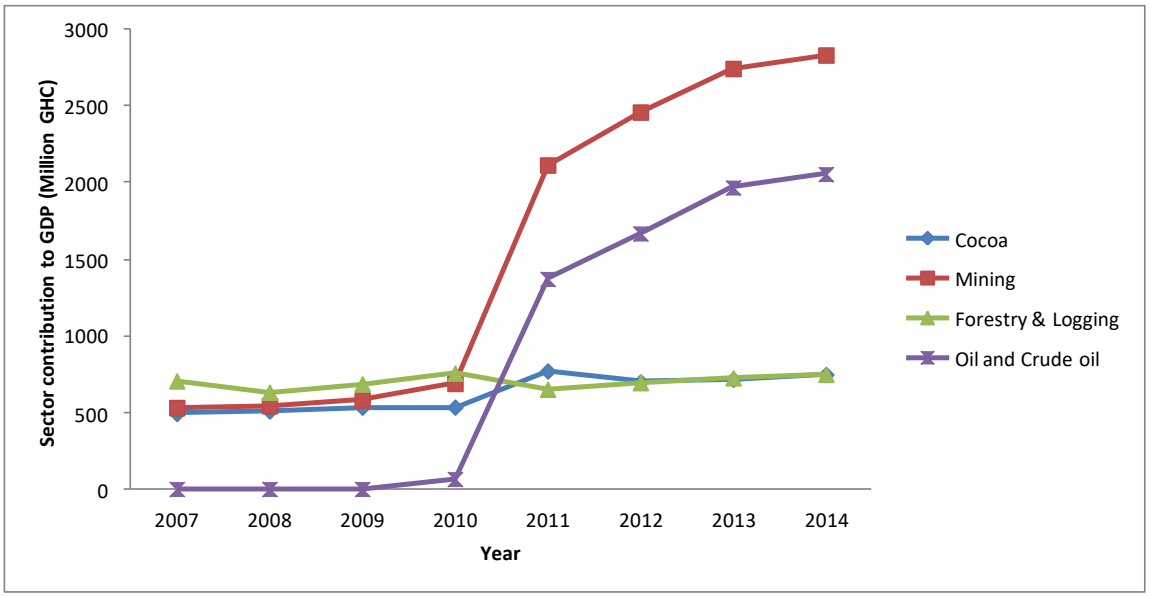

Figure 1: Sector contribution to Ghana Gross Domestic Product 2007- 2014
Source: Bank of Ghana, 2015

The forestry sector employs people in both formal and informal sectors (Dogbevi, 2015), including those engaged in timber sawmilling and manufacturing industries, artisanal lumber producers, non-wood forest product harvesters and traders. The informal wood industry sector, which consists mainly of chainsaw operation, carpentry and carving, employs about 130,000 people and it is the main source (84%) of supply for the domestic timber market (Oduro *et al.,* 2012). Over 85 percent of the population depends on forest resources for subsistence and to satisfy their traditional or socio-cultural needs (FC, 2014). Appiah *et al*., 2007, estimate 38% contribution from forests to household budgets of forest fringe communities in south western Ghana. These are involved in a variety of forest-based enterprises, including wild-meat production, fuel wood and charcoal production, wood-carving, canoe-carving, rattan production, chew stick-gathering, chainsaw lumber production and hunting (FAO, 2001). The value of national consumption estimates for 8 selected NTFPs in 2007 was worth US$50 million (Birikorang, 2008). Policies, regulatory, legislative instruments, programs and institutional arrangements in the forest sector including the Forest and Wildlife Policy, Forest Resource Management Acts, Forest Development Master Plan, Voluntary Partnership Arrangements and more recently, the REDD+ initiative, Forest Investment Program, Forest Plantation Development Strategy (2016-2040) among many others are being pursued to guarantee sustainable forest management for continued flow of benefits to society and enhancement of forest products supply and value chains for local and national development while ensuring environmental sustainability.

Despite its significant contribution to national and local economies and anticipated role in reducing climate risks, the forestry sector in Ghana has come under intense scrutiny. Poor forest governance (including weak law enforcement leading to flouting of laid down regulations, inefficiency of the timber industry, inadequate representation of local peoples' rights in forest resources, inequitable benefit flows, among others) has resulted in resource degradation. Typically, overdependence on forests for national economic growth (timber and mineral exploitation) and anthropogenic factors at the local level (population growth, agricultural

expansion and fuelwood harvesting, etc.) without adequate technical measures and economic incentives to stimulate sustainable use and conservation of forest resources have contributed to reducing forest cover. The Ghana forestry sector is also constrained with inadequate innovative policy and economic incentives for enabling efficient development of enterprises, particularly in secondary forest production.

Private sector investment in forestry and related activities in Ghana has been officially acknowledged in the timber production where such investments have contributed immensely to the development of commerce and employment in the wood industry, and as one major source of foreign exchange. To a large extent, the development of the non-timber forest products sector has been undertaken by numerous micro, small and medium private entrepreneurs operating in an informal setting, using rudimentary machinery and/or equipment for limited value addition that produces uncompetitive products. Further, declining forest resources threaten the viability of private investments at all levels and the sustainability of the associated value chains as well as the livelihoods of many that depend on them for employment. This calls for innovative investment strategies that will reverse these trends and strengthen the capacity of particularly small and medium forest enterprises to enhance their contribution to the development of both national and local economies in the country. In response to this, the African Forest Forum (AFF) commissioned this study with the objective of analyzing the nature and trends in the forestry sector in Ghana with emphasis on evaluating resource capacity and governance, technical, commercial and socio-economic organization of primary and secondary forest production, as well as prospects of public-private-partnerships (PPP).

Ultimately, best practice PPP models identified could aid in the development of an all-inclusive forest sector that is compatible with sustainable livelihoods development with a gender perspective. With respect to the terms of reference (ToR), the study focused on addressing five key questions as follows:

1. What is the nature and current development trends in the Ghanaian forestry sector (resource condition, governance, technical and commercial organization, industrial capacity, production, trade and consumption of forest products including Small and Medium Enterprises (SMEs), and including gender representation)?
2. Who are the key stakeholders in public and private sector of the Ghanaian forestry sector and their roles in the development of the sector?
3. What has been the contribution of the public and private sector in the forestry sector to local and national economies?
4. What is the status of Public and Private Partnerships (PPPs) in the forestry sector of Ghana?
5. Are there any best practice forestry sector PPP modules that can be leveraged in the development of the forestry sector in Ghana and Africa?

3.0 METHODOLOGY

3.1 Materials

The forestry sector of Ghana has been studied extensively, hence a wide range of sources were consulted for data, in addition to interviews to address the key activities outlined in the ToR. Using the AFF checklist designed to guide study, a framework was prepared to solicit primary and secondary data on the Ghanaian forestry sector and other key products from the following sources for the study:

- Interviews with selected forest product sector institutions, firms and individuals;
- Datasets from a number of recent studies on the forestry sector at the Forestry Research Institute of Ghana (FORIG) and Trop
- enbos International-Ghana (TBI);
- Databases of Ghana Forestry Commission, Ghana Export Promotion Authority, etc.;
- Grey and published literature from research reports, journal articles, policy documents, annual reports and sector working documents from FORIG, Tropenbos International-Ghana, Forestry Commission, Energy Commission, Ghana Export Promotion Authority, Civil Society Organizations (CSO's)/Non-Governmental Organizations (NGO's) and others;
- Information from universities and polytechnics;
- Information from web pages of private firms and civil society organizations in the forest and forest product sectors of Ghana.

Five forest commodities were identified as priority products for this report for their contribution to forestry GDP, extent of exploitation for dependency and livelihoods across the nation (Table 1). These were selected to cover the timber and non-timber categories for two broad ecological zones of Ghana i.e. high forest and savannah (Figure, 2).

Table 1: Product categories analyzed in the report across the main ecological zones

Category	Product	Ecology
Timber	Sawn wood, furniture and other wood products	High forest and Savannah
Non-timber	Woodfuel (charcoal & firewood)	High forest, Savannah, Coastal mangroves
	Bamboo and rattan	High forest
	Bush meat	Forest and Savannah
	Shea nuts and butter	Savannah

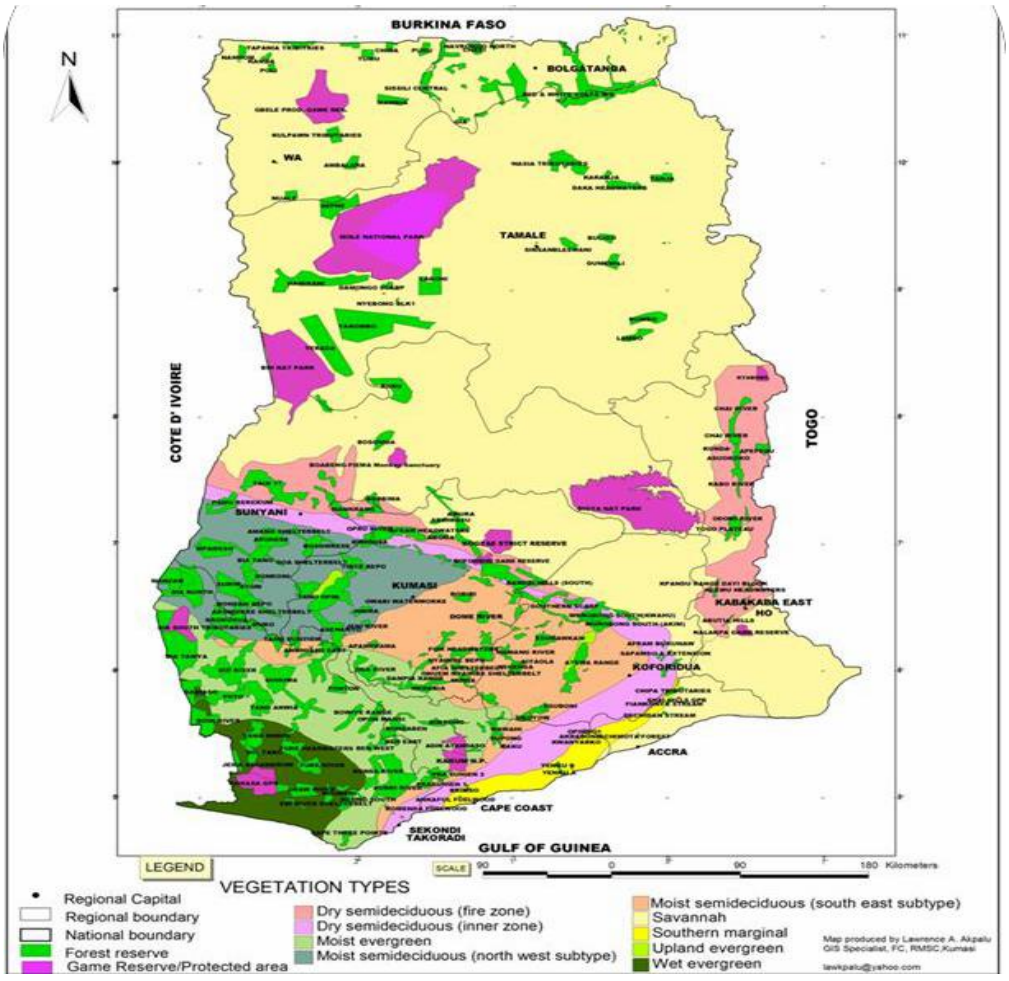

Figure 2: Map of Ghana showing ecological zones, forest and game reserves
Source: Hall and Swaine, 1981

3.2 Methods of data collection and analysis

Data was collected in three stages. Published and grey literature from technical research reports, theses, journals articles, and annual reports were first reviewed on the nature and trends of forest production, processing, products and marketing, state of forest resources and governance, identification of stakeholder groups, their roles and organization in primary and secondary forest production, linkages and gender issues, among others. Secondly, databases and datasets were consulted for quantitative archival and unpublished data on production, processing (technical, commercial orientation, etc.) and consumption trends in primary and secondary forest production. The third stage of the data collection process involved interviews and consultations to solicit data on the resource, production and market statistics, trends from specific stakeholder groups on the five key primary and/or secondary products listed in Table 1 using checklists.

Data analysis involved synthesis of narrative/qualitative information presented in text, tables and flow charts to show linkages. The quantitative data from datasets, databases and interviews was analyzed with the Statistical Package for Social Sciences (SPSS) and Microsoft Excel descriptively and presented in chart and tables to show trends.

4.0 RESULTS OF THE STUDY

4.1 Typology of key actors of the forest sectors

The main actors of the forestry sector of Ghana comprise of government or public sector agencies and private entities involved in administration, development and use of forest and wildlife resources. These include central and local government agencies, wood-using industries, local communities, research and academia, civil society and other entities involved in non-wood enterprises. The key actors are categorized into actor groups based on their primary interests in forest resources (Table2). The actor groups are not necessarily only determined by legislation or institutional arrangement in the forestry sector, but also by the benefits expected of forest resources.

Constitutionally, the Forestry Commission established by the Forestry Commission Act (Act 571) is responsible for the management and regulation of forest resources in Ghana. The FC is a corporate body consisting of a corporate headquarters and three divisions: the Forest Services Division (FSD), the Timber Industry Development Division (TIDD) and the Wildlife Division (WD). Other key actors from timber trade associations involved in policy processes in the country are the millers (mainly exporters), the loggers, the furniture producers' association and the small-scale operators. Also impacting on the operations of the sector are the activities of other public sector actors. Key among them is the Attorney General and Minister of Justice. Though not considered as a traditional actor in the sector, the occasional influence of this actor continues to make a difference in the sector. In addition, the decisions of the Ministry of Finance and Economic Planning regarding release of funds go a long way to determine the efficiency or otherwise of regulation in the sector. Other public sector actors are Customs, Excise and Preventive Services (CEPS) who continue to interface with the trade arm of the FC (the TIDD) and the Administrator of Stool Lands who receives and distributes revenue on behalf of the

stool lands. The Police and Military have played their role in the task force to combat illegal chainsaw operations (Beeko, 2009). Public institutions in research and academia have contributed scientific knowledge to development of the agenda of the forestry sector, and built technical manpower for the sector, among others.

Table 2: Categorization of key actors of the Ghanaian Forest Sector (private and public)

Private	Actor groups	Description of the group	Indicative number of organizations/ individuals in the group
	Medium to large scale tertiary wood product producers	Furniture, window and door manufacture, flooring, mouldings, turnery, handicrafts etc.	• 40 companies supplying the domestic market • 6 companies exporting
	Rotary veneer/plywood mills	Rotary peeling of logs and drying of veneer in preparation for plywood manufacture	• 9 integrated and 14 non-integrated rotary veneer mills • 5 integrated and 10 non-integrated plywood mills
	Sliced veneer mills	Secondary processing of flitches into sliced veneer in preparation for plywood manufacture	• 9 integrated mills • 5 non-integrated mills
	Sawmills	Sawing of logs into lumber or preparation for further processing such as boules, boards for kiln-drying and flitches for veneer slicing	• 8 integrated mills • 182 non-integrated mills
	Integrated loggers	Logging integrated with a log processing plant	• 8 companies
	Independent (un-integrated) loggers	Smaller scale loggers without saw mills	• About 503 companies in the Ghana Timber Association
	Employees of timber companies	Employees not including those in the large-medium scale tertiary production	• About 10,115 employees in the above timber companies
	Chainsaw operators.	Machine operators with several assistants - gangs. (The owners of the chainsaws are often lumber brokers, wholesalers and retailers - see below)	• About 17,000 chainsaw milling crews, each with an average of 4 persons
	Trade hands and porters	Porters who carry chainsaw lumber, truck loaders, truck owners and drivers and assistants	• About 264,000 people involved in the chainsaw milled lumber haulage sector
	Informal sector timber wholesalers and retailers	Chainsaw lumber sellers/brokers, often also chainsaw owners – example: 6 or 7 ‘tycoons’ in a district each providing chainsaws to 15 or 20 chainsaw gangs	• About 21,000 people involved in re-sawing chainsaw-milled lumber • About 1300 chainsaw lumber brokers each engaging about 3 people (total employment in the chainsaw lumber production and selling process about 350,000)

	Small scale tertiary and artisans.	Furniture, windows and doors, carpenters, wood carvers and canoe carvers, handicrafts	• About 30,000 small scale carpenter firms (41,000 members in the Woodworkers Association of Ghana) employing some 200,000 people • About 5000 woodcarvers and 1500 canoe carvers
	Civil society organizations.	Non-governmental organizations (NGOs) and community-based organizations active on forest policy or field issues, support to artisans	• About 150 NGOs and CBOs in the forest sector
	Farmers/Forest Fringe Communities.	Forest edge farmers and communities obtain limited economic benefits and user rights to trees (because chiefs own timber trees) – yet derive significant values from forest products (game, poles, fuelwood, medicines, mushrooms, fruits and nuts, etc.)	• About 14% of Ghana's people are in forest fringe communities, and about 35% of their livelihood is derived from forest resources
	Traditional authorities	As landowners, Chiefs are recognized by the state as the legitimate recipients of timber revenues	• There are at least 150 traditional councils nationwide
Public	Central and local government agencies.	Lead Ministry is Lands and Natural Resources; others include Ministries of Finance, Trade and Industry, Energy, Local Government and Rural Development. Security agencies including the police and customs	• A number of policy and regulatory agencies • Timber royalties can be a significant source of revenue for District Assemblies.
	Office of the Administrator of Stool Lands	Formal structure legally mandated to manage forest and tree resources as primary traditional forest owners	-
	Forestry Commission	Comprises Forest Services Division, Wildlife Division, Timber Industry Development Division, Wood Industries Training College and Resource Management Support Centre. It is committed to a service charter	• Manage 266 forest and wildlife reserves • About 3200 permanent employees in the FC
	Institutions in research and academia involved	Undertakes research and formal education into forest and forest products	

	in forestry activities ➢ CSIR-Forestry Research Institute of Ghana (FORIG) ➢ Kwame Nkrumah University of Science and Technology ➢ University of Energy and Natural Resources ➢ University of Development Studies		• About 285 permanent employees at FORIG

Source: Adapted from Mayers *et al.,* 2008

Other important actors include Forest Watch Ghana (FWG) which is a coalition of environmental NGOs, CARE International and International Union of Conservation of Nature (IUCN) among others. Farmers' activities continue to impact the resource in a significant manner through land clearing for farms as well as partnership with logging operators (whether legal or illegal). Another actor group, still in its formative stages, is the forest governance learning group (FGLG) which is made up of both civil society and governmental actors who create a platform for mutual learning. The development partners (DPs) constitute another key group of actors who impact sector policy making through their dialogues with government and the provision of programme related development assistance (Beeko, 2009).

4.2 Organization of the forest production sectors and gender groups' representation in each segment

4.2.1 Primary forest production

4.2.1.1 Forests and ownerships by categories

In Ghana, there are two main forest categories for management purposes, reserved forests (permanent forest estate) and off-reserve forests (non-permanent forest estate). The total reserved forest area is about 2.5 million ha under 266 gazetted Forest Reserves (FRs). In the high forest zone (HFZ), there are about 1.68 million ha in 216 forest reserves. Of the total, 0.35 million ha are protected for biodiversity and other protective functions, while the rest are designated for productive functions (MLNR, 2012). These forest reserves were originally established by the state to promote ecological stability while seeking to guarantee the flow of goods and services for socio-economic development

(Bird *et al.,* 2006). Occupancy and agriculture are not permitted within the reserves; however, certain lands within the reserve, were alienated as admitted farms at the time of gazetting the reserves.

Agriculture is also practiced within reserves as a component of the *Taungya* system of plantation established under departmental control and supervision of the Forest Services Division of the Forestry Commission. One hundred twenty-six thousand (126,000) hectares of forest reserves are under the jurisdiction of the Wildlife Division as protected areas. The forests and land outside the designated FRs (including protected areas, sacred landscapes, and wetlands) are commonly referred to as off reserve areas. Off-reserve forests in the HFZ are roughly 6.5 million ha, distributed as trees and forest patches in agricultural lands, forest fallows, riparian forests, sacred groves and dedicated forests. The Savannah Zone covers 14.7 million ha of woodlands and includes 0.88 million ha of forest reserves (MLNR, 2016), (Table 4.2).

Two main forest laws restrict access to natural forests resources. These are:

1. The 1962 Concession Act that vests all timber trees occurring in reserved and off-reserve forest areas in the president (the state). This means that only the state, represented by the Forestry Commission can authorize felling of timber trees through timber utilization contracts (TUCs), timber utilization permits or salvage permits (SPs). With the exception of clearing off-reserve land for agricultural purposes, all felling of timber without such authorization from the FC is, therefore, illegal. Officially, local people require a written consent known as the Timber Utilization Permit (TUP) to fell timber trees for household or community use.

2. The Forest Protection Decree, 1974 (NRCD 243), amended in 2002 as THE FOREST PROTECTION (AMENDMENT) ACT, 2002 requires a written consent of a competent forest authority, usually a forest officer or manager of the FC, in the form of a paid permit to legally collect or harvest any forest product from government reserved forests. Collection of forest products, except timber from the off-reserve areas, does not usually require permits. Local people may flout these laws and collect products illegally from reserved forests for subsistence or commercial purposes, not because they do not agree with reservation or protection but because of an 8-step bureaucratic procedure associated with permit acquisition from district forest offices. However, failure to secure permits may lead to impoundment of goods en-route to or on the market by security officials.

Table 3: Distribution of forest ownership by categories in High and Savannah Forest Zones

Category of forests ownership regimes	Area (Million Ha)	Main species	Main Products	Challenges	Opportunities
RESERVED FORESTS Central government forests *-High Forest Zone (HFZ)- Evergreen and deciduous)*	2.15	*Etandrophragma spp. Triplochiton scleroxylon, Mansonia altissima, Nesogordonia papaverifera, Khaya ivorensis, Guarea cedrata, Tieghemella heckelii, Tarrietia utilis, Uapaca spp.*	1. Industry • Timber for export and domestic market, mining of minerals – gold, bauxite, diamond 2. Household subsistence and cash • Timber, poles, cane, bamboo for construction, fuelwood, fodder, wild foods (game, fruits, etc.), medicines, agricultural production, grazing 3. Recreational, protection, conservation, biodiversity	• Illegal logging • Illegal mining • Illegal farming • Illegal hunting • Wildfire • Excessive logging • Agricultural expansion • Inadequate research funds	-Availability of local labour for forest restoration to provide: *-Local employment* *-Local forest based enterprises esp. tree seedling production* -Access to fertile land by the landless including women for taungya practice -Opportunity for REDD+& carbon trading -Forest assets to local people through the MTS -Wood biomass energy production
Savannah Zone (SZ)- woodland	0.88	*Khaya anthoteca, Parkia biglobosa*, *Vitellaria paradoxa, Adansonia digitata*, *Ceiba petandra, Ptericarpus spp. Anogeissus spp. Acacia spp.*	1. Industry • Timber for domestic market • Mining-gold 2. Household subsistence and cash: -Timber, game, fuelwood, poles, fodder, wild fruits, nuts including shea, vegetables, medicines, grazing, thatch grass for roofing 3. Protection, watershed, recreational, cultural, and conservation values	• Wildfire • Excessive livestock grazing • Illegal mining • Illegal timber harvesting • Agricultural expansion	-Restoration of degraded lands -Wood fuel resource development -REDD+ & Carbon trading -Eco-tourism
Public Protection forests (GSBA, wildlife sanctuaries and parks, watersheds, etc.)	0.35	*Guarea cedrata, Tieghemella heckelii, Tarrietia utilis,*, *Uapaca spp. Milicia excelsa,*	• Recreational • Protection/conservation • Wildlife parks • Watershed protection • Biodiversity	• Wildfire • Illegal hunting • Illegal harvesting	-Eco-tourism

		Khaya spp.			
OFF-RESERVE Community & smallholders farm including fallows *-High Forest Zone (Evergreen and deciduous)* *Mangroves in coastal belt on margins of high forest zone*	6.5 0.01	*Albizia zygia*, *Celtis mildbraedii*, *Termianlia ivorensis*, *Funtumia elastic*, *Alstonia boonei, Triplochiton scleroxylon, Pycnanthus angolensis, Termianliasuperb, Ceiba pentandra, Milicia excelsa* *Rhizophora racemosa, Avicennia germinans, Langucularia racemosa*	1. Industry • Timber for export and domestic market, mining of minerals – gold, bauxite, diamond 2. Household subsistence and cash • Timber, poles, cane, bamboo for construction, fuelwood, fodder, wild foods (game, fruits, etc.), medicines, agricultural production, grazing • Coastline protection • Fish breeding, crabs, shrimps, shellfish, etc. • Fuelwood for fish preservation	• Wildfire • Over harvesting • Grazing • Agriculture expansion • Tenure • Over harvesting • Poor management	-Restoration of degraded lands in tree-based agriculture for food security and incomes -Sustainable wood biomass energy production Restoration for eco-tourism, wood fuel production, sea food culture, etc.
Savannah Zone - woodland	13.2	*Parkia biglobosa, Vitellaria paradoxa, Adansonia digitata, Ceiba petandra, Ptericarpus spp. Anogeissus spp. Acacia spp.*	1. Industry • Timber for domestic market • Mining 2. Household subsistence and cash: • Timber, game, fuelwood, poles, fodder, wild fruits, nuts including shea, vegetables, medicines, grazing, thatch grass for roofing 3. Agricultural production, mining and conservation	• Wildfire • Excessive livestock grazing • Illegal mining • Agricultural expansion	-Tree-based agric. for food security and wood fuel/energy -REDD+ -Carbon trading -Eco-tourism -Timber for industry -Forest asset wealth creation -NTFPs including essential oils, spices, nuts, natural sweeteners, dyes, herbs and medicines, etc. carbon

Private plantations -*Mainly High Forest Zone* (on and off-reserves belonging to individuals and firms)	0.09	*Tectona grandis, Cedrela odorata, Terminalia* spp. *Gmelina arborea, Senna siamea, Eucalyptus spp*. *Khaya ivorensis, Albizia ferruginea, Ceiba pentandra*	• Timber for industry • Poles • Fuelwood • Medicines • Carbon trading	• Pests • Diseases • Fire	-Source of food and income -Local employment -Access to land by landless -Timber for industry -Forest asset wealth creation -REDD+ -NTFPs including essential oils, spices, nuts, natural sweeteners, dyes herbs and medicines, etc. carbon
Public plantation -Mainly in central government forest reserves *i. High Forest Zone* ii. *Savannah Zone*	0.16 0.003	*Tectona grandis, Cedrela odorata, Terminalia* spp. *Gmelina arborea, Senna siamea, Eucalyptus spp*. *Heritiera utilis, Aucoumea klaineana, Nauclea diderrichii, Khaya ivorensis, Triplochiton scleroxylon, Mansonia altissima* Teak, Gmelina, Anogeissus, Eucalyptus	• Timber for industry • Poles • Fuelwood • Medicines • Fuelwood • Protection • Timber • Poles	• Pests • Diseases • Wildfire • Wildfire • Excessive livestock browsing and grazing	-Source of food and income during establishment. -Local employment -Access to land by landless -Timber for industry sustainability -Community forest wealth creation -REDD+ and Carbon trading -Bio-energy/woodfuel production

Source : FC, 2016 ; FC, 2015, Obiri *et al*., 2015 ; MLNR, 2014 ; Obiri *et al*., 2014, Domson and Vlosky, 2007

By 2015, approximately 260,000 ha of forest plantations had been established in Ghana with 64% and 36% being planted by public and private sectors respectively (Figure, 3 and Figure, 4). Plantations established prior to the launch of the [1]National Forest Plantations Development Programme (NFPDP) in 2002 account for 26% of this total, with over 70% of the stocks comprising of *Tectona grandis Teak)*. Other species established include *Cedrela odorata*, *Terminalia spp*., *Gmelina arborea*, *Senna siamea* (Cassia), *Eucalyptus spp*, *Heritiera utilis*, *Aucoumea klaineana*, *Nauclea diderrichii*, *Khaya ivorensis*, *Triplochiton scleroxylon* and *Mansonia altissima*. Forest plantations in the Savannah Zones are estimated to cover 2,553 ha and were primarily established for fuelwood production and environmental protection. Tree species planted include Teak, Gmelina, *Anogeissus spp*. and Eucalyptus (Table, 3).

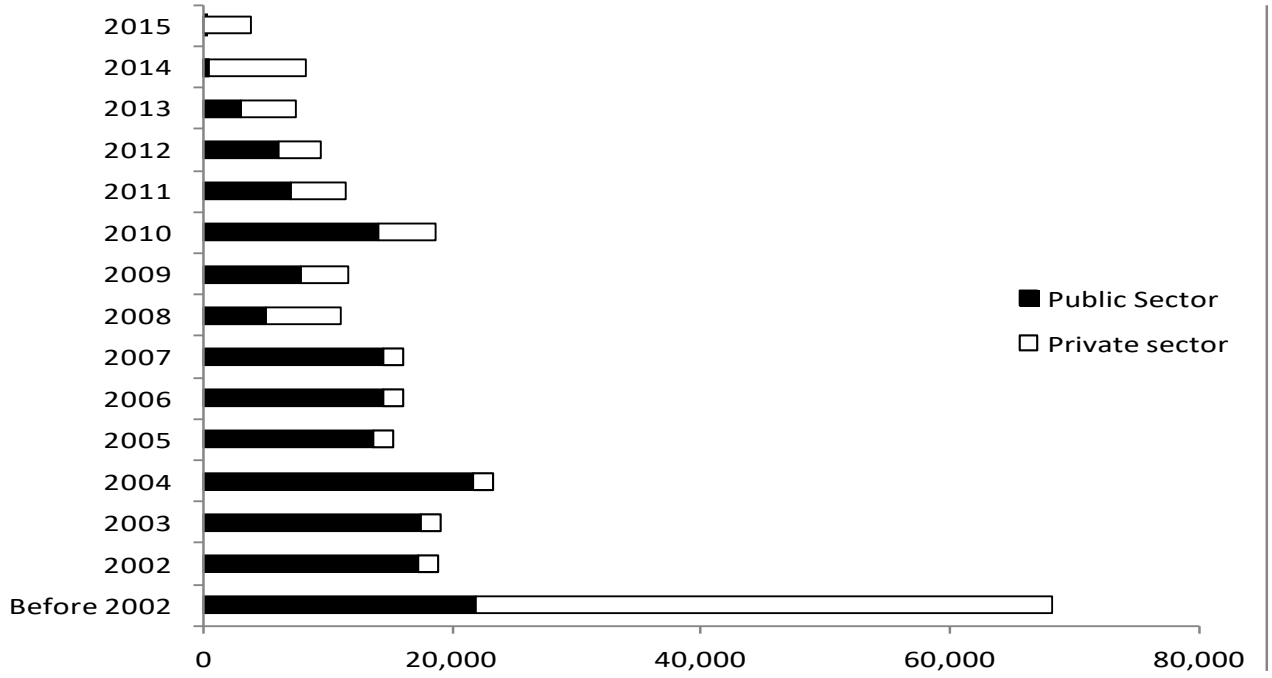

Figure 3: Forest area planted by 2015

[1]NFPDP was launched in 2002 to accelerate the rate of establishment of forest plantations in support of future demand for industrial timber and enhancement of environmental quality (FC, 2016).

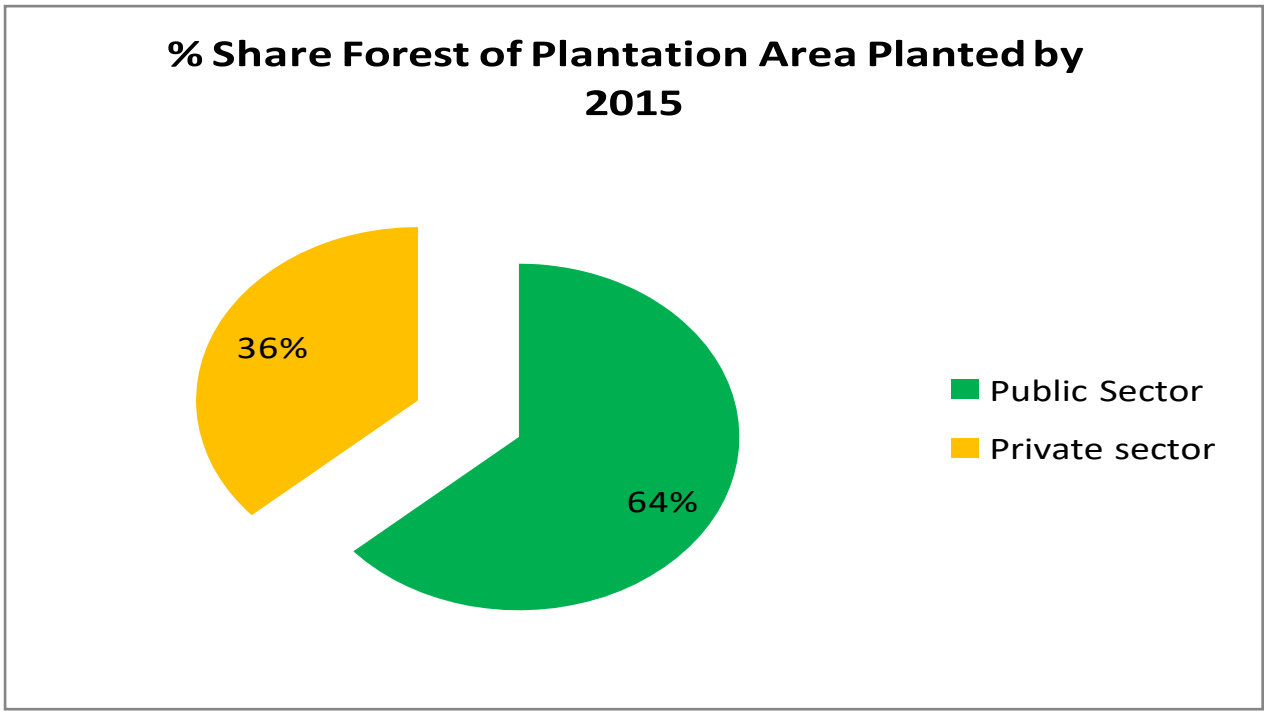

Figure 4: Percent of plantations share by public and private sectors

The 2002 Timber Resources Management (Amendment) Act, (Act 617) guarantees exclusive ownership rights to privately planted trees with respect to access, use, management, alienation, exclusion (Dumenu, 2010; Oduro *et al*., 2012). In practice, this applies when the plantation is established on private land under outright land ownership in the off-reserve area. A number of tenure arrangements have evolved in plantation forestry over time (Table, 4).

Table 4: Tenure arrangements in plantation forestry

Forest Land Category	Plantation forest tenure	Description and tenure conditions
On-reserve	[2]Taungya	Government represented by the Forestry Commission grants access to land, provide technical direction and tree planting inputs for farmers in forest fringe communities to inter-plant food crops in trees to restore degraded forest reserves. Farmers contribute labour to plant and maintain tree-food crops till tree-canopy closure 3-4 years after planting. Government owns 100% tree proceeds. Farmers own 100% food proceeds
	Modified Taungya System (MTS)	Forestry Commission provides technical and input support to establish forests in partnership with farmers in forest fringe communities in degraded reserves. Farmers inter plant food crops, provide labour inputs for establishment and tending the plantation including fire protection and earn 40% share in the Standing Tree Value (STV). The government, landowner and community earn 40%, 15% and 5% respectively. Communities own 100% food proceeds.
	Private developers in degraded reserves	The FC releases land in degraded reserve to private commercial developers upon satisfactory requirements. Private investor pays ground rent of $2/ha/yr and earns 90% of the total proceeds from the plantation while the FC, landowner and community earn 2%, 6% and 2% respectively
	Public-Private Partnership	FC signs a Public Private Partnership (PPP) agreement with private investor to establish tree plantations. Investor is entitled to 80% of the plantation proceeds and benefits. FC, landowners and local communities entitled to 20%
Off-reserve	Private (outright owner)	100% ownership of plantation proceeds
	Company-community partnerships	Variable negotiated arrangements

4.2.1.2 ary timber production

Diverse primary products are derived from natural forests types in Ghana for industrial, household, recreational and environmental protection purposes (Table 3). Officially, timber is the key primary product harvested by licensed loggers for industrial processing into lumber, veneer and plywood. Most of the timber species are obtained from the deciduous and evergreen forests in the high forest zone. The main species in the deciduous forests are *Triplochiton scleroxylon*, *Mansonia altissima*, *Nesogordonia papaverifera* and *Khaya ivorensis*. The evergreen forests are dominated by *Guarea cedrata*, *Tieghemella heckelii*, *Tarrietia utilis* and *Uapaca spp.* (Doomsom and Vlosky 2007, RMSC, 2016).

[2] All Taungya arrangements require farmers to invest labour inputs in land preparation, planting trees, tending and protection from fire in exchange for access to fertile lands for food cultivation until canopy closure.

4.2.1.3. Primary non-timber forest production

Non-timber forest products are harvested mainly by forest communities from a wide range of species for subsistence and commercial purposes. For instance, communities in the wet and dry forest zones harvest about 50 non-timber products, comprising wild foods (Game animals, snails, fruit, nuts, mushrooms, vegetables, etc.); poles, firewood, medicines, bamboo, and rattan, among others. Food items constitute up to 50% of the collection while up to 30% is for fuelwood (Figure 5 and 6). Common products derived from savannah woodlands include fuelwood, fruits of *Parkia biglobosa* and *Vetellaria paradoxica* (Shea); game and grass straw for thatch roofing and basketry. Osei-Tutu *et al.,* 2012 reports of 20 forestbased enterprises in the Small and Medium Enterprise (SME) sector. Details on primary production of the key NTFPs (i.e. woodfuel, bamboo, rattan, shea and game meat) that are extensively exploited for commerce are presented below.

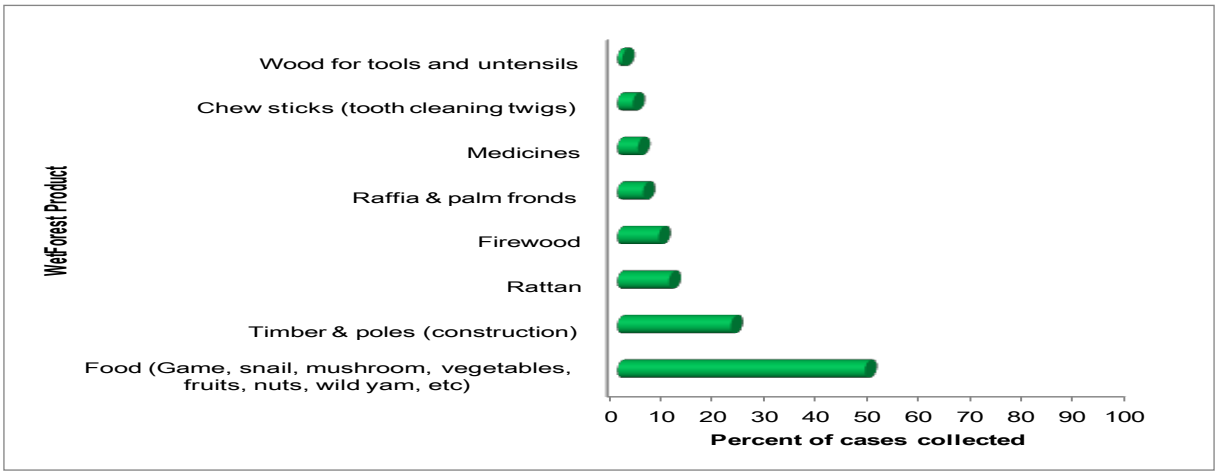

Figure 5: Subsistence products derived from wet forests in Ghana
Source: Obiri *et al*., 2014. (CIFOR-PEN Danida studies 2007-2010)

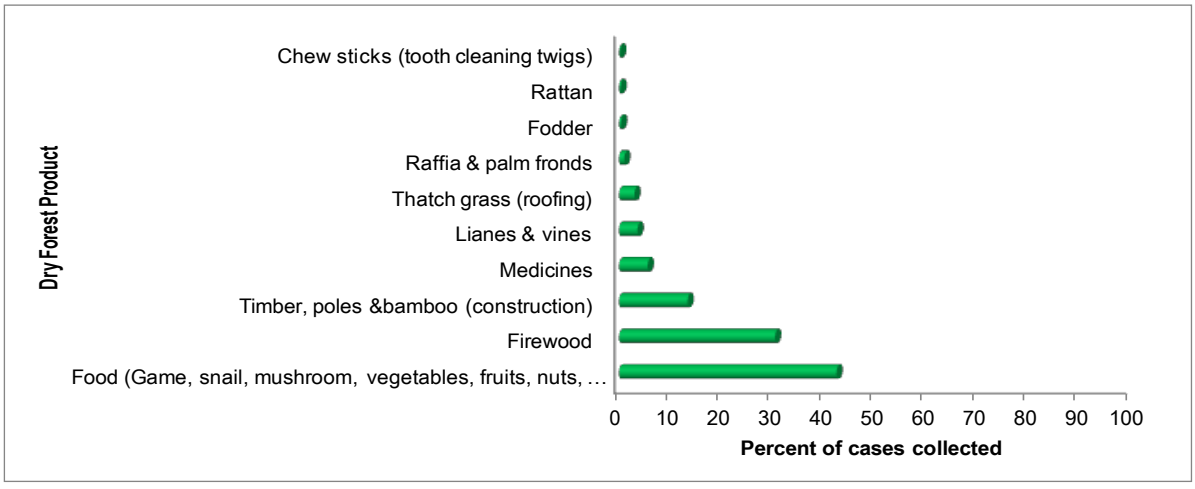

Figure 6: Subsistence products derived from dry forests in Ghana
Source: Obiri *et al*., 2014. (CIFOR-PEN Danida studies 2007-2010)

Woodfuel

Woody material used for fuel is acquired from public and private forest lands in both reserved and off-reserve areas (mainly farms and fallows). Ninety percent of woodfuel is harvested from farmlands and reserved forests. The remaining 10 per cent is obtained from other sources including residues from logging operations, sawmills and plantations or woodlots (MLNR, 2016). Overall, 98% of producers extract woodfuel from natural stands (Figure, 7), (Obiri *et al.,* 2015a). Areas of high woodfuel exploitation are in the charcoal producing zones concentrated in the transition zones between the high forest and the Guinea savannah woodlands. Most of the wood comes from savannah trees, which are felled for this purpose and also from logging residues. It is estimated that of the total round wood production in Ghana, 91% is used as firewood and charcoal. The remaining 9% is used as industrial round wood (Agyarko, nd).

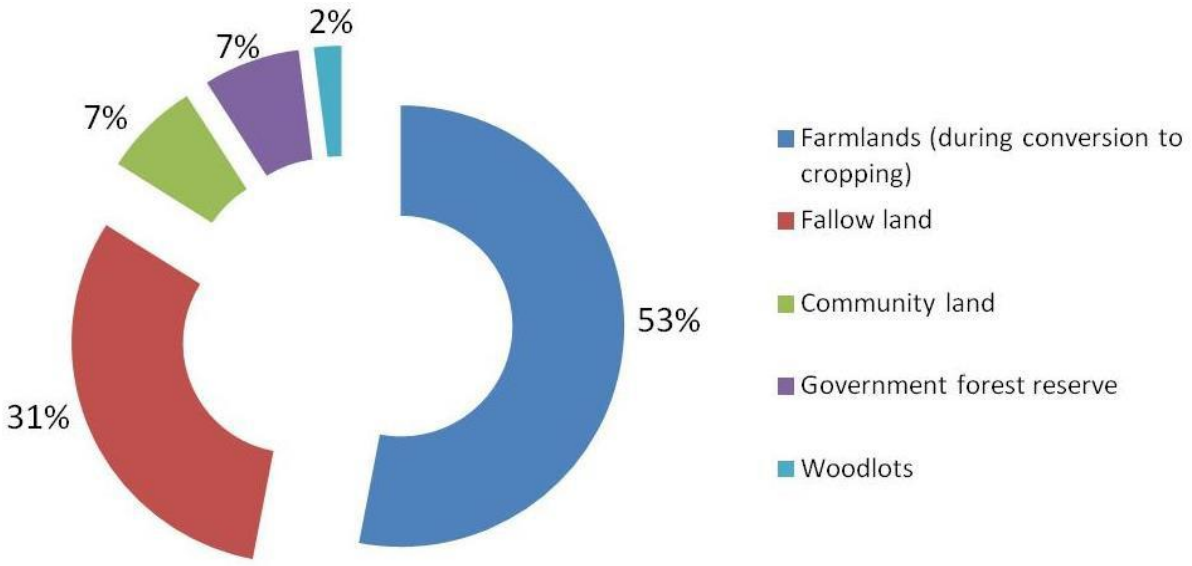

Figure 7: Sources of woodfuel exploitation
Source: Obiri *et al*., 2015a

Over 70 species are harvested for woodfuel in Ghana (Obiri *et al*, 2014a; Obiri *et al*, 2015b; Obiri and Nunoo, 2014). The most preferred are native hard wood species including *Anogeissus leiocarpus, Vitellaria paradoxa*, *Terminalia avicenioides, Pterocarpus erinaceous* for the Savannah and transition zones and *Celtis mildbraedii, Albizia zygia, Terminalia ivorensis, Milicia excelsa*, *Nesigordina papaverifera*, *Piptadeniastrum africanum*, *Khaya spp, Funtumia elastica* for the high forest zone. Mangroves, *Azadirachta indica* (neem) and *Senna siamea* (cassia) are the woodfuel species in the south eastern-central coastal zone. Stocks of woodfuel resources have not been quantified. However, most woodfuel species are also economic or merchantable timber species in trade, the stocks of which are increasingly declining in the natural forest estate.

Rattan

Rattan is mostly extracted from the moist and wet forests of the Ashanti and Western Regions. Up to 75% of rattan in trade is extracted from forest reserves (BARADEP, undated) through a paid permit from the FSD, while 25% is from secondary forests in the off-reserves acquired through varied negotiations with private landowners. Three species *Eremospatha (cane), Laccosperma (willow) and Calamus (green cane) spp.* (Plate, 1) are extracted for delivery to city markets, mainly in Kumasi, Accra and Takoradi. Ninety-eight percent of the raw rattan material is distributed to artisans for processing and manufacture of a variety of products in these cities and 2% supplied to markets in Togo.

A: *Eremospatha* B: *Calamus* C: *Laccosperma*

Plate 1: Rattan species supplied to markets

Bamboo

Ghana's bamboo resource is estimated to cover 300,000 ha. Two species *Bambusa vulgaris* (Plate, 2) and *Oxytenanthera abyssinica* (Plate, 3) are usually harvested for household and commercial purposes. *B. vulgaris* is the dominant species comprising 95% of the stocks and found in the high forest zone in forest reserves as well as on community lands and farm fallows fields belonging to individuals and/or families.

Oxytenanthera abyssinica, a savanna species is the only indigenous species in Ghana. It occurs in small clusters of 1-4 clumps on farmlands owned by families (Obiri and Oteng Amoako, 2007). Other species including *Bambusa arundinacea, Dendrocalamus strictus, Bambusa multiplex and B. pervariabilis* introduced from Asia, are grown in restricted sites including in arboretum and trial plots (Ebanyele, 2005). Bamboo regenerates naturally and is largely unmanaged.

Plate 2: Culms of *Bambusa vulgaris*

Plate 3: Clumps of *Oxytenanthera abyssinica*

Game/Bush meat

Bushmeat (the meat of wild animals) has traditionally been a natural protein source for Ghanaians. It is sourced from both wild animals that have been hunted, as well as those that have been captured and domesticated (Osei-Tutu *et al.,* 2012). Forest reserves in all ecological zones of the country are principal natural sources of bush meat harvesting. A license or permit is officially required for harvesting or hunting wild animals for commercial and educational purposes (FC, 2014). Dominant species supplied to city markets are grass cutters, birds, reptiles, bats, rodents, antelopes, elephants, buffalos, leopards, pangolins and primates. Grasscutters and rabbits are commonly domesticated. The main production areas for grasscutter are in districts and regional capitals of the Brong Ahafo, Ashanti, Eastern Region, Volta and Western Regions. The annual production among members of the Brong Ahafo Regional Grasscutter Farmers Association (BARGFA)for instance, is about 7,000 grasscutters (Osei-Tutu *et al.,* 2012).

Shea (Vitellaria paradoxa)

In Ghana, the shea tree, (*Vitellaria paradoxa*) constitutes the main vegetative cover of the Northern savannah zones. An estimate of 9.4 million shea trees grow in natural stands covering a land area of over 77,670 km^2 with a potential yield of 100,000 tons of dried sheanut per year. There is also sparse shea tree cover found in forest-savannah transition zones in Brong Ahafo, Ashanti, Eastern and Volta Regions in the southern part of the country (Bawa, 2007; Hatskevich, 2011). Nuts from the shea tree and its products are among the top ten non-traditional exports in the country. Ghana exports approximately 60,000 metric tons of raw shea nuts annually, making it the leading exporter in the West African sub-region (Lovett, 2013).

The rising global demand for shea threatens *V. paradoxa* as this has resulted in a high degree of thinning, selection, and natural mortality, all combine to contribute to a decline stand density (Lovett and Haq, 2000; Kelly *et al*., 2004). Indiscriminate burning of bushes, especially during honey harvesting and hunting, cutting of trees for infrastructural development, insecurity, and agricultural extensification have led to woodland degradation in some shea producing areas except in those where the shea trees are protected by traditional customs (Kavaarpuo, 2010; Ingram *et al*., 2015). Shea trees are often felled for building poles because the wood is resistant to termite attack. The tree is also extensively exploited for charcoal production due the high calorific value of the wood and high market demand (Okia *et al*., 2005). Additionally, natural regeneration has declined as coppicing and pollarding have limited ability to produce epicormic shoots that usually sustain the wild population (Byakagaba, 2011). Research on the domestication of the plant and development of improved cultivars for sustainable future performance is limited. Yidana (2015), reports of the possibility of reducing the gestation period of the tree to bear fruits from 12-15years to 3-6 years through grafting. In some communities, trees on farms are managed as part of parkland agroforestry with respect to tillage around trees and pruning to enhance growth. Selective thinning is practiced, and non-fruiting shea trees are culled (Ingram *et al.,* 2015).

4.2.1.4 Challenges/threats and opportunities in primary forest production

Ghanaian forests are highly vulnerable to climate risks. Extended drought and high temperatures promote retarded growth, incidence of wildfire (Plate, 4), pest and diseases in both natural and plantation forests (Table, 3). Amissah *et al*., (2015) reports that reduction in annual rainfall and increase in frequency and intensity of drought may affect species distribution in Ghana. Also decline in agricultural productivity as a result of climate related hazards promotes increased dependency on forest resources, especially commercial exploitation for woodfuel, illegal logging and mining among local communities to the detriment of forests. Officially, the level of harvesting of timber over the last two decades exceeded the Annual Allowable Cut (AAC). On the average, more than 46% capacity of the forest has been exceeded. Recent assessment of forestry resources indicates 20% of forest reserve areas have acceptable levels of integrity: only 2% are considered to be in “Excellent” condition and another 14% in “Good” condition. Sixty-four percent of the reserved forest is at risk of depletion from continued illegal-logging and agricultural clearing (RMSC, 2014).

Plate 4: Burnt teak plantation in Tain II Reserve –Brong Ahafo Region
Field survey: *B. D. Obiri, February 2016*

Despite the challenges, there are opportunities for investment in primary forestry production. The Forestry Commission is pursuing various strategies including PPP arrangements, revising policy and legislative instruments to provide fiscal, tenure and technical incentives for ensuring a congenial enabling environment to stimulate private investments, especially in restoration of degraded lands on and off forest reserves. An estimated area of 1.1million ha of land has been identified for reforestation over 25 years. This will be attained through the development of government and private commercial forest plantations, maintenance and rehabilitation of existing forest plantations as well as enrichment planting of under-stocked forest reserves with high value indigenous timber species (FC, 2016). This is expected to guarantee sustainable raw material for the timber industry, protect the environment while providing a range of benefits to the private sector or investors and communities.

At the micro level, restoration activities could provide employment for local people living on forest fringes to be engaged as labourers in nursery and plantation establishment. It will also grant them access to fertile land by the landless including women for food production through taungya practice thereby contributing to national food security and stimulate the development of forest-based enterprises especially, tree seedling production to supply plantations. Local people engaged in the Modified Taungya System (MTS) could also benefit from forest assets.

At the macro level, private investors could take advantage of local labour to engage in restoration activities for asset creation as well as take advantage of forest creation for emerging certification and carbon trading for payment for environmental service schemes,

as well as REDD+ initiatives. In addition, there are opportunities in the development of energy plantations for sustainable wood fuel and electricity production. Opportunities abound in ecotourism development, production of NTFPs including seeds, essential oils, spices, food additives, medicinal, natural dyes and other raw material for the manufacture of natural products in pharmaceutics, cosmetics, confectionary and beverage, as well as textile industries, among many others.

In general, there is a strong political will to create jobs through plantation development, community enthusiasm, increasing demand for industrial timber and other wood products, as well as making available genetically improved planting material and also through best practice plantation management. These are anticipated to foster successful primary forestry production in the country.

4.2.2 Secondary forest production

4.2.2.1 dary production in the timber industry

Approximately 800,000 people are employed in secondary forest production of the timber industry of Ghana and are engaged in production of sawn wood, plywood, veneer, furniture and other wood products as well as trading (Table, 2). Timber processing and manufacture of wood products is undertaken by large, medium and small-scale firms for domestic and export markets. Obiri *et al.,* (2012) report that 22%, 18% and 60% of these firms are engaged in primary, secondary and tertiary processing[3] respectively. The installed capacity of the timber sector is estimated at 3 million cubic meters of Round Wood Equivalent (RWE) per annum. However, the legal volume issued by the Forestry Commission is 2 million cubic meters per annum. Hence, the industry is producing under capacity at a deficit of 1million cubic meters of logs. The formal timber industry has over the years been characterized largely by export oriented businesses focusing mainly on primary and secondary processing (TIDD, 2011). There are 8 large scale processors controlling 80% of exports. Primary and secondary processing firms include sawmills (sawn wood), plywood and veneer mills. The bulk of the processors are in the small-scale category in the informal sector with hardly official statistics on their operations. However, they constitute 75% of wood processing entities. Approximately, 30,000 of such firms are involved in tertiary processing, mainly furniture and joinery, with a turnover for intermediary joinery worth US$50 million (Birinkorang *et al.* 2011).

Recovery rates vary with firm type and products manufactured (Table 5). Sawmills have low recovery rates with lumber recovery factor of 20-35% of the log input. The more integrated a firm is, the higher the recovery from log processed as more product types are manufactured from residues from preceding product lines. Vertically integrated firms

[3] ***Primary processing*** – The sawing of logs in preparation for further processing, such as boules, boards for kiln drying, and flitches for veneer slicing, rotary peeling and drying of veneer in preparation for plywood manufacture and the manufacture of particle boards.
Secondary processing-Kiln drying of lumber, plywood manufacture, block board manufacture, veneer slicing and non-decorative veneering of particle boards.
Tertiary processing -The manufacture of mouldings, flooring, parquetry, furniture manufacturing, window and door manufacture, veneer applications, turnery, wooden toys, handicrafts, etc. (Forestry Commission, 2001)

(engaged in primary, secondary and tertiary processing) such as Samatex and Ayum Company LTD producing up to 10 products could attain recovery of 60%. However, most firms produce only one product due to their inability to invest in the requisite machinery to increase recovery and make efficient use of the raw material for higher turnover. This is due to lack of low interest capital that could be accessed for such investments

Table 5: Log input-output recovery in timber processing

Product/firm type	% wood recovery from log input
Sawn wood	20-35
Veneer	30-45
Block boards	60
Vertically integrated firms	60

4.2.2.2 dary forest production in the non-timber forest products industry NTFP-based enterprises in Ghana are engaged in the production and trade of a wide range of products. NTFP raw material is supplied mainly from natural forest stands and trees on farmlands, including fallows, to small and medium enterprises; many of whom are in the informal sector and with limited information on their operations. Charcoal, firewood, shea butter, honey, mushroom, bush meat, cola, food spices, wooden utensils, wood carvings, chew sticks, bath sponges, brooms, plant medicines, rattan and bamboo furniture, essential oils, basketry, beverages including palm wine, gin, and many others are some non-timber products in commerce in Ghana (Osei-Tutu *et al*., 2012). Details on the production capacities of enterprises in woodfuel (charcoal and firewood), bamboo and rattan, shea and bush meat, the most popular products follow.

Woodfuel: Charcoal and firewood

Woodfuel, i.e. charcoal and firewood, are produced and sold in all regions of Ghana but mainly in the transition and savannah woodland areas. The number of enterprises and individuals, their production capacity and volume of product flow in the woodfuel supply chain is difficult to estimate due to the wide distribution of production areas, actors and their activities around the country. However, Osei-Tutu *et al.,* (2012) reports of 120 trucks of variable loads, 150-300 bags (40kg) of charcoal supplied per week to urban markets from one of the major producing areas in the Kintampo District in the transition zone. Thus approximately, 7,200-14,400 bags (288,000 kg-526,000 kg) per annum is produced for supply from this area. At the production point, labourers are engaged in scouting for appropriate species, felling and cutting the tree into pieces, either splitting bigger diameter logs that are bundled for sale as firewood or trunk pieces packed and burnt into charcoal and bagged into 20 or 40kg bags for sale. The distribution and marketing involve three categories of traders i.e. the roadside dealers (usually in production areas), truck dealers/transporter middlemen and traders usually women engaged in wholesale or retail trade in consuming areas.

Rattan and bamboo

Approximately 12,000-15,000 people are engaged in rattan and bamboo industry in Ghana (Kwaku, 2016). Secondary production of rattan and bamboo involve the supply of raw material directly to artisanal firms in cities for further processing into products or to raw culm traders on urban markets for sale to the artisans. Artisanal firms in urban centres of Takoradi, Kumasi and Accra patronize over 90% of supplies for the manufacture of baskets, furniture among others. Artisanal firms are individually based, and the quality of products manufactured depends on individual's own skilfulness. Master artisans either work with or without apprentices. In some cases, paid labourers are engaged either on contract or daily basis to assist in processing and manufacture of products.

There are isolated large-scale processors such as the Pioneer Bamboo Processing Company in the Central Region that processes bamboo into boards, with an output of 10 boards per week and further processing into furniture. Nations Pride ToothPick near Kumasi, processes bamboo into packaged toothpicks and barbecue skewers. When operating at full capacity, the company processes 1,000 bamboo stems in a month. Global Bamboo Products Ltd (GBPL) located at Enyiresi in the Eastern Region, processes bamboo and rattan into furniture, baskets and crafts. GBPL engages 320 community artisans each producing 30 rattan baskets per week during peak production periods (Osei-tutu *et al.,* 2012). Ghana Bamboo Bikes Company Ltd engages 35 employees in the cultivation of bamboo and manufacture of bamboo bicycles.

Shea

The shea industry involves 60,000 individuals and firms involved in secondary production. The installed capacity is estimated at 40,000 tons with operating capacity of 21% (8,500 tons). The largest firm, Ghana Specialty Fats has a projected production target of 25,000 tons of butter per annum (Amomba, 2011). At a smaller scale, Savannah Fruits Company based in Tamale in the Northern Region partners with 1,590 women from 20 women groups in the area for conventional butter processing. The company engages 3000 women involved in picking and supplying the nuts for processing (Bup *et al*., 2014).

Bush meat, poles and herbal medicines

The bush meat industry engages 300,000 professional hunters at the local community level producing 220,000 to 380,000 tons of meat annually. There are a number of other NTFP based firms including those engaged in processing of transmission poles and herbal products with various production capacities. For instance, Kasapreko Company Limited (KCL) produces alcoholic beverages from extracts of forest medicinal plant parts with core staff of over 200 people and 800 suppliers and vendors. The company operates on 7,500-square metre production floor installed with a US$35million ultra-modern plant producing 70,000 bottles of liquor per hour.

4.3 Gender groups' representation in forest product sector SME

The extractive and processing sector for forest related industry is gender sensitive. The majority of SMEs in primary and secondary forestry production in Ghana are sole proprietorship businesses. Men and women engage in these enterprises. A survey of

SMFE's in the Sunyani Forest District in the high forest zone indicated that 93% of the enterprises in wood and non-wood product industry were operated by men, while 47% of those in forest services category including plantation forestry were by women (Asante, 2011). However, in the northern savanna zone of the country women dominate, constituting 77% of proprietors in SMFEs activities (Osei-Tutu *et al*., 2010), mainly in collection and processing of fruits of shea and *Parkia biglobosa* as well as in basketry.

Generally, the level of specific gender group involvement in any one of the forest-based SMEs or commodity chains vary greatly with commodity type and segment of the chain. Usually, men tend to dominate the collection and processing of products such as chew sticks, local gin, timber, furniture, baskets from rattan and bamboo, wood carvings, mortar, pestles, firewood, charcoal, bush meat, and honey, among others. This is due to the laborious nature of these activities. Women, on other hand, tend to dominate in the marketing and trade of most products including firewood, charcoal, bush meat, wrapping leaves, snails, local gin, chew sticks, mortar, and pestles. For instance, in the bush meat commodity chain or enterprise, poaching and hunting is done by men while the trade in meat is dominated by women as wholesalers and retailers (Falconer, 1992; Tutu *et al*. 1993). However, there are exceptions for certain commodity chains where one gender type may be engaged in nearly all the segments from harvesting/collection to manufacture of the final product and its trade. For instance, the collection, processing and trading of shea (*Vitellaria paradoxa*), is predominantly a female activity. However, men have become increasingly involved in recent times with its integration into global commerce. Nuts and processed shea butter are mainly sold in local markets by women to monopolistic intermediaries who are (mostly) male who are also involved in wholesaling. Their involvement in this aspect of the chain is because they have sufficient capital to purchase in bulk, rent stores in the markets or main towns to hold stocks and transport afterwards. Women have been the dominant workforce in nursery production for plantation forestry. Recently, the Ghana Bamboo Bikes Initiative (a social enterprise) is engaging young people, especially women, to build high quality bamboo bicycles for sale.

4.4 Analysis of the technical and commercial organization of forestry production

4.4.1 Technical and commercial organization in primary forest production

4.4.1.1: Technical and commercial organization of primary production in the timber industry

Natural forest production

The natural forest estate reserved and managed by the Ghana Forestry Commission (FC) for timber and non-timber products production is segmented into compartments of variable sizes. Timber Utilization Contracts (TUCs) are allocated to concessioners for a number of compartments in designated reserves through a competitive bidding process for timber exploitation rights. Mature compartments are logged based on a 40-year felling cycle and according to technical directives in a manual of procedures (MOP) prepared by the FC. Logging operations begin with visual tree selection for merchantable species on demand with girth/diameter ranging from 30-110 cm depending on species. A non-

directional approach is used to fell selected trees using the chainsaw machine. The tree bole is cut into shorter pieces (referred to as bucking) with the chainsaw and dragged to a loading bay (referred to as skidding) using crawler and agricultural tractors as well as timber jacks. From the loading bay, the logs are forwarded or loaded on to trucks using timber jacks or front grapple machines for transport and supply to mills for secondary production (Plate 5).

Plate 5: Technical operations in log/timber production

The entire logging procedure is often criticized as unscientific and wasteful. For instance, the visual tree selection method often leads to felling of defective trees thereby reducing timber/lumber yield, while the non-directional felling results in high felling damage (Adam, 2016).

Plantation production

The Forest Plantation Development Strategy is a 25-year strategy developed to guide the development of all types of plantations nationwide from 2016-2040. The CSIR-FORIG and FSD are public institutions mandated to provide technical advice in forest plantation development. FSD is to inspect and provide documentation on the establishment and harvesting of plantations on private lands as well as issue conveyance certificate and waybill for authentication of logs from such plantations.

Over 70% of forest plantations in Ghana on government and private lands are comprised of teak mainly for lumber and electricity poles. This is because indigenous species plantations failed in the past due to disease and pest infestations. Following several years

of scientific research on the establishment and silviculture of indigenous species by CSIR-FORIG, plantations of economic indigenous species including *Terminalia ivorensis*, *Terminalia superba, Ceiba pentandra, Khaya spp.* (mahogany), among others, are currently being encouraged for timber production.

Plantation timber production begins with tree seedling production from government and private nurseries. A national tree seed centre has been established at CSIR-FORIG for commercial production and supply of quality seeds to the general public. CSIR-FORIG has tree seed orchards with genetically improved material that are managed for seed production. However, seeds for some indigenous tree species are collected from mother trees with good phenotypic traits in the wild. Traditionally, tree seedlings have been produced manually from central nurseries of CSIR-FORIG and FSD as well as numerous satellite community and private nurseries for supply to tree growers. However, private large-scale plantation developers (FoRM Ghana Company, African Sustainable Plantation Development (APSD), EcoPlanet Bamboo, MiRO, etc.) have introduced modern state of the art nursery production with drip irrigation and green house facilities (Plate, 6) in the last decade and half.

CSIR-FORIG Nursery Eco-Planet Bamboo Nursery APSD Nursery

Plate 6: Tree Nurseries for Forest Plantation Development in Ghana

Land preparation, planting and tending of tree plantations have traditionally been done manually with machete and other farm tools particularly in the high forest zone where traction is difficult. However, the use of tractors in land preparation on degraded lands (especially by large scale plantation developers) and open woodlands is also practised. Herbicide use in land preparation and weed control in forest plantations has gained prominence due to high weed incidence and high cost of labour. Timber harvesting from plantations involves the use of chainsaw in felling and preparation of the logs for sale. Machinery may be used for forwarding and loading on large scale plantations. Teak poles or logs are also commonly produced from smallholdings. Matured teak plantations of 15 years and above of age are scouted by middlemen or traders who engage the paid services of chainsaw operators and carriers for felling and conveyance to the roadside for truck haulage to their clientele. Teak poles may be sold to the DuPaul Wood Treatment Company for production of electricity poles.

4.4.1.2 Technical and commercial organization of primary production in non-timber forest products industry

Woodfuel

The production of wood for fuel commences with an identification of suitable trees or species. Labourers are engaged in scouting for appropriate species, felling and cutting the trees into shorter trunks of logs using machete or chainsaw machines for supply. Bigger diameter logs may be split with axe and bundled before supply. For charcoal production, the trunk pieces are sorted by diameter and stacked next to the burning site or transported to the production site packed for burning into charcoal for sale. Access to off-reserve trees for commercial firewood and charcoal production is purely based on informal arrangements with traditional, individual private or family landowners. Negotiations are made for exploitation rights. Usually, a subsistence producer secures wood resources from family owned farmlands or communal lands at no cost except for the labour invested in wood collection, while large scale producers negotiate with landowners, including farmers, to purchase exploitation rights on their lands at a fee. On-reserve access for commercial purposes is through a permit from the FSD at a fee for dead wood, logging residue, deformed plantation material and residue and species of no timber value. Non-commercial collection from government reserves, usually for household purposes requires no permit.

Rattan

A permit is secured from the FSD for commercial rattan extraction at a fee. Harvesting of rattan is done manually by pulling of the stems from tree canopies (in the case of *Eremospatha macrocarpa* as the species is a liana/climber) and from clusters of rattan clumps growing in the forest and then cutting using the machete or cutlass. Matured stems, usually 10 years of age, are selected from the clump by their greenish-dark brown colour and are cut 10cm above ground. The stems are cleaned of spines and other debris, sized and cut into 4-100m lengths depending on species, packed into bundles/headloads of 10 to 100 pieces for transport to marketing and processing centres. The approved number of stems per bundle of *Eremospatha macrocarpa* by the FSD (for permit purposes) is 30, that for *Laccosperma secundiflorum* is 10 and for *Calamus spp* is 25. Approximately 70,000 bundles could be supplied per annum to artisanal processors in Accra, Kumasi and Takoradi. Ninety-five (95%) of rattan collected is sold on the domestic market for commercial processing and household use; and 5% is exported to markets in Cote D' Ivoire, Togo and Nigeria (Obiri, 2008).

Bamboo

Commercial bamboo culms from forest reserves are acquired through paid permit from the FSD. Outside the reserves, commercial harvesters pay for culms from community lands. Matured bamboo is usually identified by its colour (yellowish-brown or green with brownish streaks), culm thickness, colour of the internal tissue and a whitish fungal cover on the bark of the culm. To minimize injury and prevent splitting or cracking, the matured culm, is cut on the leaning side and then opposite the direction of fall with a cutlass or machete at 1.5m on the average above ground level. Average length of culms cut or harvested is 7.5m long. A hacksaw is then used to crosscut the culm into required lengths

and for supply to culm traders, rattan processors, builders (construction) and fishermen. Bamboo collection is self-financed by harvesters with limited pre-financing from clients. It is done all year round due to increasing demand for use in the building industry and artisanal processing at urban centres.

Shea

Shea trees mature for fruit bearing after 8–15 years (Graham *et al.*, 2012; Yiadana, 2004). Fruits are collected from April-September annually from parkland compound farms and bushes. The fruits are picked by hand, predominantly by women, although men are increasingly getting involved due to increasing economic gains. An estimate of 600,000-900,000 women are involved in shea fruits collection and pre-processing into nuts for domestic and commercial processing into butter (GNA, 2013; Abubakari, 2015). Usually, women collect shea fruits at no access fee from land owned by male family members. However, in some cases the fruits may be harvested from land rented or bought by women particularly in communities where land sales occur. Traditionally, women have free access to shea trees on community land, but not on other people's farms. However, the increasing economic value of shea as result of the upsurge in demand on the world market in recent times, among other factors, is reducing access to wild shea trees (Ingram *et al.,* 2015).

Bush meat

The bush meat industry in Ghana has hunters, wholesalers and market traders involved in primary production. Hunters capture animals with snares and shot guns (Cowlishaw *et al*., 2004). Hunting is often done at night with touch lights by a gang of hunters and a hound of dogs in forest reserves. Fire may be used in some cases to drive out animals hiding in holes for dogs to capture. Animals caught may be supplied to traders for dressing and curing or preservation of the meat for onward distribution and sale on markets within local communities or to larger markets in urban centres (Swensson, 2005). Hunters may directly supply traders or wholesalers, market traders and restaurants operators. The bush meat trade in Ghana is estimated at $250 million per annum. Despite its socio-economic importance there are conservation concerns on the unsustainable nature of the bush meat trade, threatening user communities, survival of mammal species and the ecology of producing areas. In Ghana, although hunting is done all year, the peak period is in the dry season, i.e. period between December and April when wildfire incidence is high, is often declared as the closed season for commercial hunting.

4.4.2 Technical and commercial organization in secondary forest production

4.4.2.1 Technical and commercial organization of secondary production in timber/wood industry

There are two major streams in the Ghanaian timber supply chain, i.e. export and domestic supply systems. These are characterized by distinct processes of operations with respect to the mode of acquisition of logs and conversion into primary, secondary and tertiary products for respective market niches and consumers. On delivery of logs from the forest to the mill, they are stored in an open log yard for subsequent sawing into lumber using the band or circular saws. Obiri *et al.* (2012) surveyed timber processing

firms nationwide and documented 39 equipment types for timber and wood processing. Although approximately 50% of the equipment had been in use for less than 10 years, majority (75%) of the equipment are aged between 20 and 80 years from the dates of manufacture. This indicates high level of importation of over-aged and obsolete equipment used for processing.

Twenty-two primary, secondary and tertiary wood products are manufactured for the domestic and export markets. Lumber is the dominant primary product comprising 41% by volume of wood products processed (Figure, 8). There is less product diversification, with 69% of timber processing firms having one product line producing a single product. Most tertiary processors produce doors and furniture for the domestic market while 15 of such products are manufactured for export. Seventy percent (70%) of the staff in the sector acquired their skill while on the job.

Financial constraints, inadequate raw materials, high cost of machinery, poor fiscal incentives, high market competition with imported products and limited expertise in the wood craft industry are the main factors militating against higher value processing in the industry.

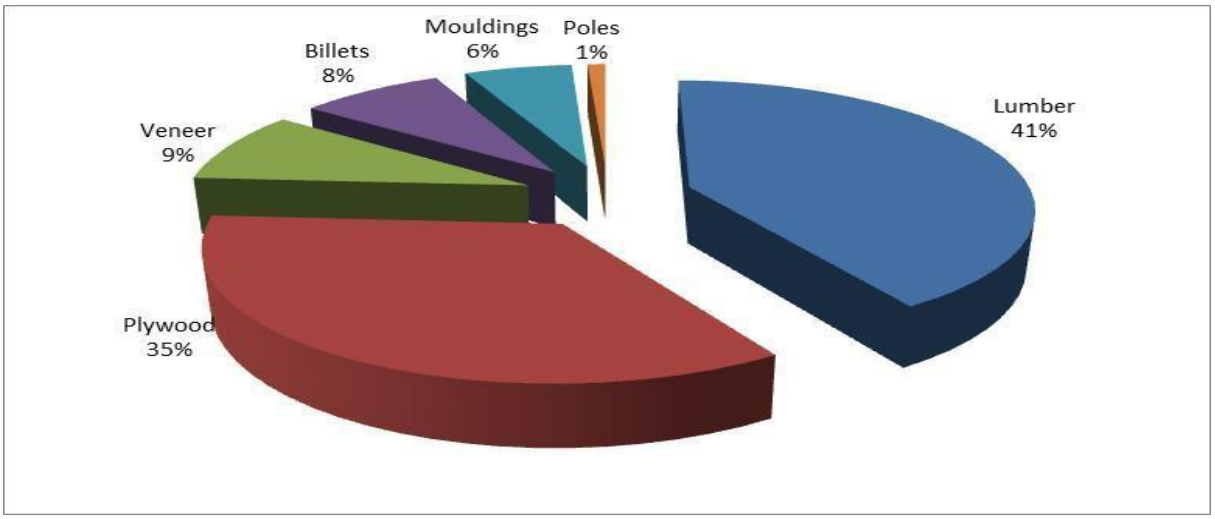

Figure 8: Wood products manufactured by Ghanaian timber processing firms (% by volume)

Source: Adam (2016).

The primary and secondary wood processing firms have been organized into the Ghana Timber Millers Association. Most of their products are exported to the EU, including sliced veneer, plywood, rotary veneer and kiln dried lumber, as well as curl veneer, boules, furniture parts and air dried lumber. Ghana's total export volume to the EU is around 45.04 percent, with the key markets being the UK, The Netherlands, Ireland, Spain, Belgium, Germany and France. The total export volume to the United States is 9%. The US is the biggest market for the exports of rotary veneers and lumber. Ghana exports timber and wood products to regional and sub-regional countries in Africa including Senegal, Nigeria,

Gambia, Togo, Burkina Faso, Benin, Niger and Mali. Thailand, Singapore, China, Taiwan, Malaysia and India are major export destinations for Ghanaian timber in Asia, with India offering the largest export market for teak lumber.

Domestic oriented secondary production largely involves processing, trading and use of lumber supplied to the domestic market. Lumber is produced from small scale mills using woodmizer, lucas mill, among others (referred to as bush mills), and portable hand-held chainsaws (Plate, 7). Lumber from chainsaw, referred to as bush cut on the domestic market, constitute 84% of stocks sold. It is produced by artisanal illegal millers and often supplied in bigger blocks for re-sawing by table-top enterprises into boards and beams. Lumber constitutes 94% of wood products sold on the domestic market. This is patronized for further processing into secondary and tertiary products and for use in the building industry.

Wood products on the domestic market are distributed to over 40 destinations in Ghana and West African sub-region (including Burkina Faso, Mali and Niger in the Sahel, as well as Togo and Benin).

Plate 7: Small scale lumber milling techniques

Major clients patronizing the market are carpenters, contractors and real estate developers, individuals, and overland exporters, purchasing 27%, 29%, 19%, 11% and 11% respectively of the total monthly wood sales (Obiri *et al.,* 2009).

Declining timber resources with respect to volumes and species preferred for processing and supply was the major challenge confronting the domestic timber market.

4.4.2.2 Technical and commercial organization of secondary forest production in non-timber forest product industry

Woodfuel (firewood and charcoal)

The technical aspect of secondary forest production in the fuelwood industry after cutting of tree stems and branches entails cleaning and sizing into shorter length with the cutlass; splitting with the axe where the pieces are larger in diameter (usually referred to as blocks), bundling with ropes and packing for transport to traders and end users including institutions, fish smokers, restaurants and manufacturing industries. The wood blocks may be supplied directly to trader or end-user for splitting before sale or use.

Charcoal production is done mainly by small scale commercial and subsistence producers with the earth mound technology. Brick and metal kilns are also used by large scale producers but on limited scale (Plate, 8). Production with the earth mound in Ghana involves tree identification, cutting of wood, digging of pit, packing of wood in pit, covering with grass and soil, creating smoke chimneys or vents, lighting of fire, monitoring of fire till all wood is carbonized or burnt, quenching fire, cooling of the charcoal, racking and packaging the charcoal in sacks for sale. The process may take up to one month for full time commercial production but for most traditional producers, the production cycle takes 10 days. Usually 1-4 mounds may be set per producer depending on the quantity of wood available. The size of the mound range between 43-76m^3 and volume of wood burnt per kiln ranges between 7.2-19.8 tons, yielding charcoal ranging from less than 20 and up to 40 of 45kg sacks/bags per kiln. The traditional earth mound technology or kiln has been questioned for losses of wood, with reported inefficiencies of between 9% and 15% in different countries (Mugo and Ong, 2006).

Wood packed in pit for Charcoal production

Earth mound kiln With wood packed in pit covered with grass and soil

APSD brick kiln

Plate 8: Charcoal production technologies

The distribution and marketing of firewood and charcoal involves three categories of traders i.e. the roadside dealers (usually in production areas), truck dealers/transporter middlemen and traders usually women retailing in consuming areas. Supplies are usually collected and sold at the harvest or production point where there is access route or hauled to the road-side in cases of inaccessibility, and sold to a truck dealer or

transporter/middleman. These in turn deliver to traders in towns and cities for wholesaling/retailing to consumers (food processors, food vendors or households, institutions) or deliver directly from the truck to the consumer. Direct supply from producer to the trader at sale points or to consumers also prevails. Middlemen and producers may also deliver directly to exporters. Export production goes to the European markets mainly the United Kingdom, Belgium, Italy, Netherlands and Germany (Obiri *et al.,* 2012; Obiri *et al.*, 2015).

Rattan and bamboo

Secondary production of rattan and bamboo involves the supply of raw material to traders, product manufacturers or end users for use in construction with little or no preservation. The raw material may also be supplied to artisanal firms in urban centres of Takoradi, Kumasi and Accra for processing into two main products: furniture and basketry for sale. Artisanal production is individually based, and the quality of products manufactured depends on individual's own skilfulness. Master artisans either work with or without apprentices. In some cases, paid labourers are engaged either on contract or daily basis to assist in processing and manufacture of products. Artisanal bamboo and rattan processing technology entails the use of manual tools including knives, saws, clumps, gas blowers, fire and others.

Bamboo is usually used in framing while rattan is used for binding at the joints in the manufacture of bamboo products. The process entails cross cutting the bamboo, cleaning, removing nodes, curing with kerosene, pesticide and fungicide mixtures, sun drying, framing, joining, sanding and vanishing. The manufacture of rattan products involves peeling, drying, splitting, framing and weaving with little preservation using kerosene to enhance durability. There are few firms processing with industrial equipment or machinery. For instance, the manufacture of ply bamboo by the Pioneer Bamboo Company LTD entails sorting and culling of defected culms, cross cutting, splitting, de-noding, cleaning, curing/treatment in hot water and insecticide/other chemical mixture and drying; planning, gluing, pressing at 90-100^{o}C and pressure of 200kgcm^{3} and final planning. Associations of bamboo and rattan processors have been formed for welfare and technical purposes at the various processing centres.

Artisanal rattan and bamboo processing and manufacture of products are done under tree or canopy workshops along major streets where products are displayed on the ground for sale. Seventy-five percent of the products are patronized by domestic consumers for use in homes, offices and restaurants/hotels and 25% exported to sub-regional and international clients on contract.

The chain of raw material supply, processing/manufacturing of products and marketing is hampered by a number of bottlenecks. Key setbacks being a dwindling rattan resource base, uncoordinated raw material extraction and distribution, rudimentary artisan processing with labour intensive simple tools, manufacture of low-grade products with limited designs and limited market clientele. To alleviate these constraints, the Government of Ghana, through the Millennium Challenge Account, has developed a permanent craft village at Ayi Mensah, a suburb of Accra at a cost of $416,000 for artisans

in support of processing and marketing of quality products. Further, with the aid of the Chinese government a batch of rattan and bamboo artisans from Ghana have been sent to China in March 2016 to upgrade processing skills to improve on efficiency and product quality (Kwaku, 2016).

Shea nuts and butter

The technical aspects of secondary production in the shea industry involve processing of shea nut into butter for domestic and internal markets. The traditional manual value addition stages involve primary processing of the nuts into kernels for supply to middlemen (kernel traders) and/or butter producers. Butter producers, mainly women, undertake further processing of the kernels (crushing, roasting, milling, mixing with water for boiling, skimming of oil and hardening) to produce the butter which is the tertiary product. The butter is purchased by traders for domestic market sales or supplied to exporters for niche markets (Figure, 9). Major importers of Ghanaian shea products are European Union, Japan and the USA. The international demand for Ghanaian shea butter by the cosmetic, confectionery and pharmaceutical industries far exceeds local shea butter production due to the quality of its nut.

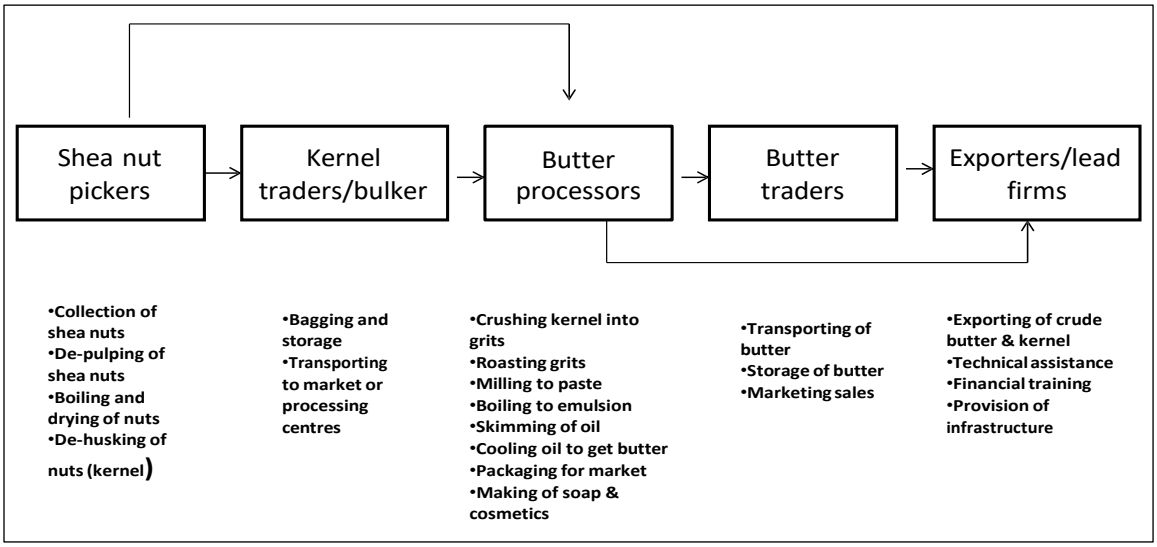

Figure 9: Value addition stages and marketing in the shea industry

Mechanical shea processing facilities are few in the country. Notable among them are Ghana Nuts Ltd Techiman, Bosbel Oil Mill, Tamale and Shebu Ltd Savelugu. The largest is the Ghana Specialty Fats, a joint venture between American agricultural processor Archer Daniels Midland Company and its Singaporean partner Wilmar Holdings. The company processes shea nuts into stearin and oil in Ghana and exports refined products to confectioners and cosmetic producers in Europe, the U.S.A and Asia.

Bush meat

Secondary production in the bush meat industry begins with dressing of the wild animal upon capture and smoking to cure/preserve the meat for a longer shelf life. The primary route of trade is from commercial hunters to local restaurants via wholesalers, although there is also substantial trade along other routes (Figure, 10). Two key actor groups are

local restaurants who make the bulk of retail sales, constituting 85% of all sales (by weight). The remaining 15% of the sales is made by market traders to the public (Cowlishaw *et al*., 2004).

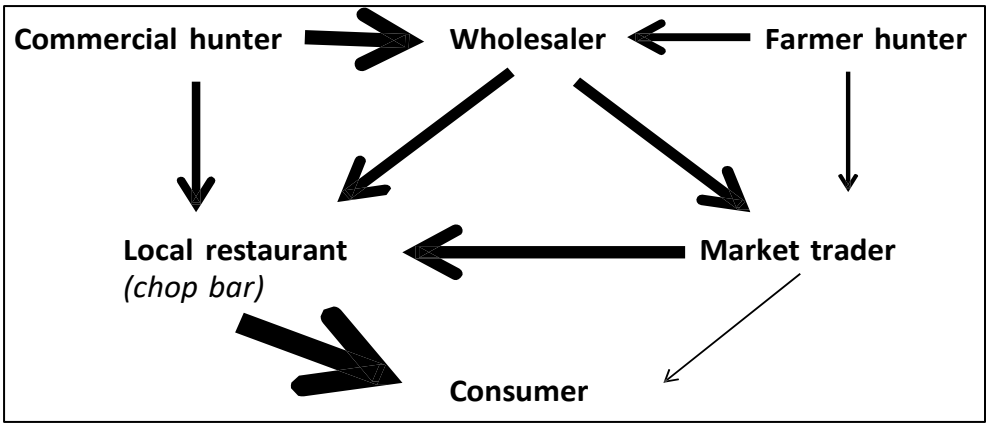

Figure 10: Flow of product among actors in the bush meat supply chain

The trade in bush meat is worth $250 million annually, with a yearly domestic market sale of $200, and an annual harvest of 385 million kg (US$350 million). Ninety-two million kg (US$83 million) of this was marketed with 60% of all sales occurring in urban areas. Retail sale on one major city market in southern Ghana is estimated at 15,859 kg amounting to US$48,000 per month (Cowlishaw *et al*., 2004).

4.5 Socio-economic analysis of primary and secondary forest production

4.5.1valuation of marketing and trade opportunities in forestry sector

There is enormous potential for marketing and trade in products in the forestry sector of Ghana. On the supply side, the forest and wildlife policy of Ghana seeks to promote increasing trade in forest products to support economic growth and eradication of poverty. The government aspires for more value addition in the industry to create and sustain employment and make efficient use of forest resources.

With respect to the timber industry, export demand is growing. Ghana exports timber products to nearly all continents (Europe, America, Asia, Middle East, Far East, Pacific, Oceania and Africa). Europe has been the largest trade destination; however, this trend is increasingly changing to Asia and other parts of Africa in recent times. This is because the European market had preference for traditional high demand red wood species such as the Mahoganies, *Melicia excelsa,* etc. which have declined in stocks in the natural forest estate. Secondly, the demand on American and European markets is moving towards certified products, which most producers in the Ghanaian timber industry have not been able to strictly comply with (Adam, 2017). Currently, trading has intensified in the ECOWAS Sub-Region (Senegal, Nigeria, Gambia, Togo, Benin, Niger, Mali, Burkina Faso, and Sierra Leone) in West Africa as well as in Egypt and Guinea Bissau. The potential for regional and sub-regional trade is huge.

According to Alison (2014), the change in the relative importance of sensitive markets is largely a reflection of Ghana's forest industry responding to new market opportunities. The author indicates that growth in demand for Ghanaian timber in many African countries increased from less than 10% of the total volume of exports in 2000 to approximately 30% in 2013 with a corresponding increase in value from $9 million to $36 million. Also, China has become an increasingly important export destination for Ghana since 2009, with exports increasing from approximately 1% to 20% by volume from 2009 to 2013 respectively. However, market destinations for timber products are growing against a declining natural forest estate.

Domestic market demand for timber and non-timber products is high. Domestic demand for most forest products is all year round with high and low peak periods which provides an opportunity for all year trade and marketing in these products. There is hardly any official statistics to capture the magnitude of demand for many products on the domestic market except for timber and woodfuel. Nevertheless, there is all year-round collection and supply for most timber and non-timber forest products on local markets including firewood, charcoal, bamboo, medicines, honey and timber among many others (Obiri and Addae 2007, Obiri *et al.,* 2009, Obiri *et al.,* 2014, Obiri *et al.,* 2015). There is increased demand for poles for electricity particularly from teak and eucalyptus in the country. In the past 10 years, majority of the supplies have come from teak from smallholder private teak plantations. The current demand, however, exceeds the supply and some of the pole treatment plants in the country have been importing softwood poles to supplement local supplies.

Development of timber from plantation forestry to sustain production and marketing of wood products on both export and domestic markets is critical. Government plantation development programs have been vigorously pursued in over the past decade to ensure sustainable timber supply. It is anticipated that this in addition to expanding wood supply will create opportunities for CDM and REDD+ initiatives.

4.5.2 Evaluation of policies and strategies facilitating or constraining the development of forest products industry

A coherent and transparent policy framework that is effectively and consistently enforced is a prerequisite for the development of forest products industry. In Ghana, the forest products industry has been dealing with a number of policy issues impacting the trade and development of the industry. Numerous policies, legislations, fiscal reforms and strategies in the forest products industry are geared towards ensuring development in the industry. For example, the Forest and Wildlife Policy of 1994 served as a gateway through which major reforms have been carried out notably, the preparation of the Forestry Development Master Plan (FDMP) and the subsequent implementation of its recommendations (Donkor, 2003). Among the recommendations of the FDMP, those with direct effect on forest products export trade included (1) reduction in annual allowable cut from 1.2 million to 1.0 million m^3 in late 1995, (however, since 2004 the AAC has been increased to 2 million m^3), (2) introduction of air-dry levy in early 1996, and (3) promotion of value-addition and lesser-used species, which saw a big leap in 1999 through the inception of the Woodworking Sector Development Project. It was anticipated that the

interventions of the FDMP would be capable of reducing pressure on the forests through reduction of export of commodity products, increased further processing and diversification in species used (Donkor, 2003). However, most of these policies, strategies and legislations have either not been enforced or have been weakly enforced.

A key issue in the forest products industry, particularly the wood industry is illegal logging. Illegal chainsaw milling currently consumes an estimated 2.5 million m^3 of roundwood (Marfo, 2010) mainly to meet the demands of the local market. The government of Ghana has taken a number of important steps to reduce illegal logging and related trade, most notably with the signing of the Ghana–EU voluntary partnership agreement in 2009. This agreement has prompted improved multi-stakeholder dialogue within the sector as well as a process of legal reform. Considerable effort has also been put into the development of a timber legality assurance system, which has been successfully piloted (Hoare, 2014).

Another key challenge for the country is the declining resource base. The forest sector has shrunk considerably over the last 15 years as a result of continuous and rapid decline of the resource base. Wood-balance estimates indicate that timber consumption considerably exceeds sustainable harvesting levels (Hoare, 2014; Oduro *et al*., 2014a). In addition, the timber industry in Ghana is currently distressed due to high installed processing capacity against a rapidly declining resource base in the country. The timber industry has an installed processing capacity of at least 5.2 million m^3 (Agyeman *et al.,* 2003, Birikorang *et al.,* 2001, Treue, 2001) and is seriously concerned about the degradation and depletion associated with the timber production systems (Oduro *et al*., 2014a). This is a major concern for future timber supply for the country as the current demand together with the rate of degradation is not commensurate with the rate of commercial timber plantation establishment in Ghana (Oduro *et al*., 2014a).

The country acknowledges that reducing the supply-demand gap requires measures at the demand side such as ensuring wood use efficiency. However, in Ghana, the wood industry is inefficient, thus contributing to the intense pressure on the already degraded forest resource base. The inefficiencies are promoted by ineffective policies that allow undervalued timber prices and a steady supply of illegal chainsaw lumber that provides a surplus of raw material. Demand-side measures such as forest taxes or fees, export levies, and log export bans, have not been effective in reducing over-exploitation (Oduro *et al*., 2014a, b). Richards (1995) argues that log export bans have caused severe distortions on the domestic market encouraging consumption of endangered species and negating the environmental objectives of the bans. Both low royalties and log export ban have encouraged over-capacity and inefficiency in processing, to add to already high wastage levels in the forest (Oduro *et al*., 2014a, b; Richards, 1995).

The country's strategies for promoting developments in the forest products industry include regulating the demand for timber. In this regard, a permitting system for sawmills has been in existence for many years but has not been regularly enforced. In 2003, the Forestry Commission introduced pre-qualification procedures for competitive bidding that included existing milling capacity. The policy applied to primary and secondary but not

tertiary processing capacity; however, it has not been implemented in recent years as sawmills have been closing rather than opening (Hoare, 2014).

A well-designed procedure for the allocation and management of rights to harvest timber are also in place. Competitive award processes and pre-qualification processes are laid out in legislation (Regulation LI 1721, amended in 2003). There are also procedures in place to obtain the consent of landowners (Regulation LI 1639 of 1998). These are implemented at the district level, which makes them accessible to landowners. There has been some improvement in the protection of forest-based livelihoods as part of the VPA process. New protocols for social responsibility agreements, required between logging companies and local communities, have been developed and piloted. However, they are yet to be implemented across the country (Hoare, 2014). Key areas for reform are the legal framework for artisanal producers and the domestic market. Furthermore, a review of forest fiscal policies is required to ensure that the sector is placed on a sustainable economic footing and that there is sufficient revenue for the effective oversight and management of the country's forests (Hoare, 2014). Moreover, since 2010 there has been some progress towards developing timber-tracking systems, even though the progress has been slow. The Legality Assurance System (LAS), for which the VPA provides, was first piloted in 2012, but severe problems were encountered owing to contractual issues with the service provider. The subsequent piloting in 2013, with a new service provider, was successful and preparations for a national rollout are now under way (Hoare, 2014).

In general, considerable effort has been made to tackle the issue of illegal chainsaw milling and other issues affecting the development of the forest products industry, and this should remain a priority. At the same time, given the continued over-harvesting of the country's forest resources, the question of how to establish a sustainable as well as legal forest sector demands serious consideration. Efforts to increase tree plantations and diversify livelihoods need to be intensified, but most importantly, harvesting levels will have to be reduced (Hoare, 2014; Mayers *et al*., 2008; Oduro *et al*., 2014).

Other issues of concern affecting the development of the forest products industry include the following:

- The Forestry Commission and its institutions are not adequately equipped with capacity, infrastructure and other logistics. This has hindered the Commission from implementing directives and enforcing existing policies and strategies effectively. Middle-level technical manpower has been one of the main obstacles to increase and improve value-added processing and export of quality forest products. In addition, large number of firms and the trade associations governing them are weak and are unable to seek the welfare of their members in many respects. Many firms are unable to meet the technical and marketing challenges and associated business practices (Raamsdonk, 2008).

- The research institutions, though endowed with well-qualified professionals, are ill-equipped and poorly funded to undertake adequate and meaningful demand-driven research and development to address developmental interventions in the forest products industry (Oteng-Amoako *et al*., 2008).

4.5.3 Evaluation of employment opportunities and wealth creation of the processing and marketing of timber and non-timber forest products in Ghana

The production and marketing of forest products is an important source of employment and income to 3 million Ghanaians (Osei-Tutu *et al*., 2010). Benefits often extend beyond rural forest communities where primary production occurs as the products move from production to end use through different stages of processing and marketing. Table 1 indicates the range employment options available in both formal and informal sectors of the forest industry of Ghana. At the rural level, a wide range of products derived from all forest types most of which are in commerce compliment income in these subsistence economies. Up to $20,000 could be earned per annum from primary forest products collected by forest households in dry forest zone of the country (Figure, 11).

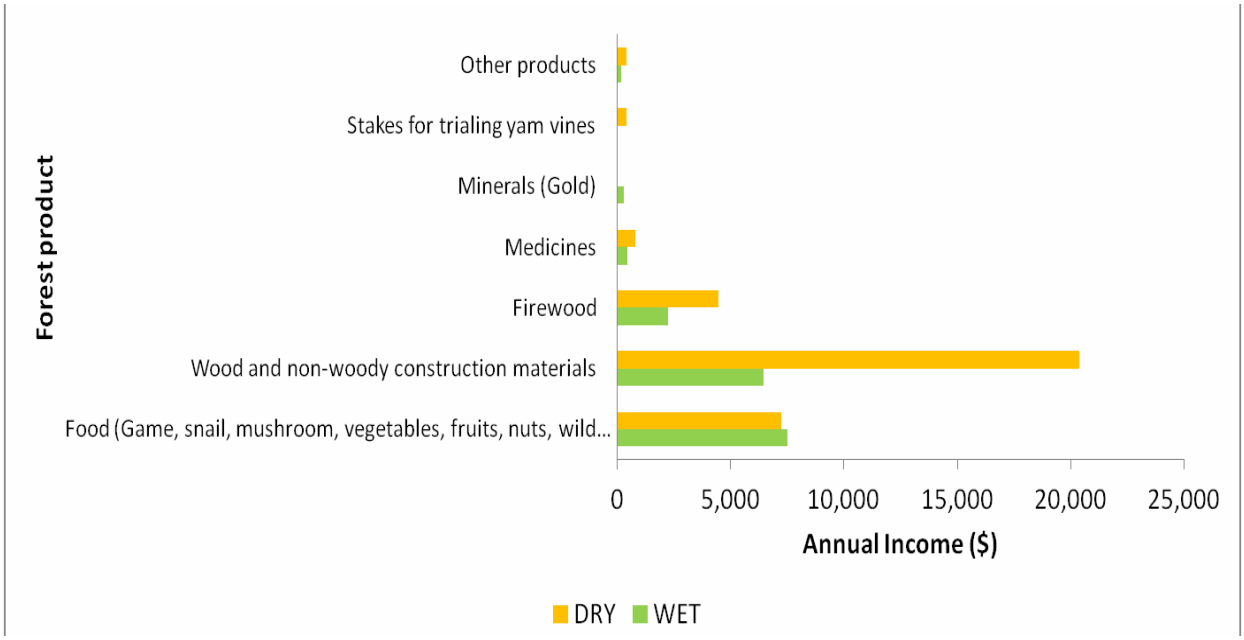

Figure 11: Income earned from forest collections by rural households

Source : Obiri *et al.,* 2014 (CIFOR-Danida Pen Project).

Osei-Tutu *et al*. (2010) enumerated over 25 small and medium forest-based enterprises generating export earnings of USD 61 million in 2007. These, in addition to those in sawn wood, plywood and veneer production, provide employment for both skilled and unskilled labour. Officially, the Ghana Investment Promotion Centre in collaboration with the Forestry Commission identified investment opportunities in the forestry sector to include:

1. Establishment of wood and non-timber forest products (NTFP) based small-medium enterprises (SMEs) and plantations;
2. Establishment of farm forest woodlots;
3. Establishment of pulp, paper and panel industries
4. Establishment of plantation-based construction grade timber and fiber supply;
5. Provision of tree seedlings for plantation species e.g. teak.

Despite the huge potential for production of non-timber forest products, this sub-sector is inadequately exploited in commerce. There is high demand for medicinal plants from Ghana. Depending on species of interest most parts of Ghana are suitable for the cultivation of various medicinal plants. Particular forest species including *Khaya senegalensis, Cola nitida*, *Alchornea cordifolia*, *Griffonia simplicifolia*, are high in demand by both international and local markets. Shea, bamboo and rattan are commodities in global commerce with promising production potential as raw materials that can sustainably be produced and processed to add value especially for supply on international markets.

Other major forest product value chains that need be harnessed for employment and wealth creation include eco-tourism and energy production from biomass including improved charcoal production systems, electricity from plantations/woodlots, forest and farm residues as well as municipal wastes. These are un-explored investments opportunities in the forestry sector of the country.

4.5.4Identification and assessment of the factors inhibiting and/or promoting the full and equal participation of marginalised groups

Marginalization within forestry context is mainly related to the limitation to the right of access and control over the use of forest resources for social, cultural and economic welfare. At the national level, the forest and wildlife policy of Ghana seeks to ensure flow of products from the forest estate to the benefit of all people. However, tenurial restrictions dictate the extent to which forest resources are accessible for any use. For instance, forest reserves harbour significant proportion of forest products and were established from traditional lands by working plans and native bye-laws that admit local people's right to access 'their' forest for non-timber forest products (NTFPs). However, their right of access to NTFPs as subsistence or economic goods for livelihoods in these reserves have been restricted and constrained by bureaucratic procedures for official permit for harvesting. This imposes practical difficulties for permit acquisition and criminalizes exploitation without official permit.

Secondly, local peoples' tenure rights to particular economic timber trees on their off-reserve lands do not allow them to exploit these resources. This is because the ownership of these economic resources is vested in the state, and does not permit local people, especially farmers/and or those on whose lands these resources prevail, to have control over their allocation to concessionaires or directly benefit from revenues accruing from them. At the national level, access to forest resources by communities is not gender biased, however the ability to exploit products might be controlled by financial capacity to acquire permit for legal access and engage labour to harvest desired products in commercial quantities and pay for other transaction costs.

At the local community level access to vegetation and wildlife in forests on off-reserve lands by community members for wood, (e.g. poles/timber) to be used as props for village construction (houses, storage cribs, etc.), stakes and firewood, as well as gathering of non-wood products like medicine, fodder, fruits and so on, is often not restricted.

However, timber for carpentry purposes, wood for burning charcoal and oil palm trees in the wild for tapping wine/distilling of local gin are sold by the owners of the land bearing these resources to anyone, including landless people for commercial purposes.

In most cases individuals or households that do not own forest land have limited user rights over the land on which trees and other forest resources are located for a particular purpose such as farming. In the forested regions of Ghana, many migrate to acquire land for cultivation of food or cash crops (mainly cocoa and palm plantations). The conventional '*abunu*' (50:50) or '*abusa*' (33:67) arrangements exist where the landowner share proceeds from the farm in 1:1 or 1:2 with the tenant farmer. In this case, the tenant farmer cannot claim ownership of the trees or other forest resources.

4.5.5 Identification and assessment of gender-based control and access to required assets/resources for the development of forest sector

The forest and wildlife policy seeks to mainstream gender and vulnerability issues into forestry development planning and management. Generally, there are no gender restrictions to participation in government forest sector development programs. It has been observed that in most cases 30-40% of participants in community forestry projects are women. Both men and women have invested in primary and secondary forestry production activities, although men tend to dominate in formal and informal activities in the forest sector. At the community level, male dominance in household decision making and limited financial capability may restrict women's ability to acquire assets and/or resources to contribute effectively to forest sector development.

4.6 Evaluation of the relationship/linkages between actors in primary and secondary forest production

4.6.1 Evaluation of the relationship/linkages among actors in primary and secondary forest production in the timber industry

The relationships or linkages among actors in the formal and informal sectors of the timber economy of Ghana are illustrated in Figure 12. Business relations among actors in the formal sector are purely based on transactions for acquisition and supply of timber for processing into lumber, ply, veneer and other products for export. Licensed loggers or concessioners have property marks as timber right holders with timber utilization contracts (TUCs), Timber utilization permit (TUP) and special permit holders registered by the FC for log tracking purposes. These may engage the services of chainsaw operators for tree felling and bucking, tractor or timber jack owners and operators for skidding and forwarding as well as truck operators for log delivery to their clientele, i.e. sawmills and log traders. Usually the large-scale integrated mills with TUCs have the requisite resources, i.e. personnel and equipment for log extraction and haulage to their mills directly for processing.

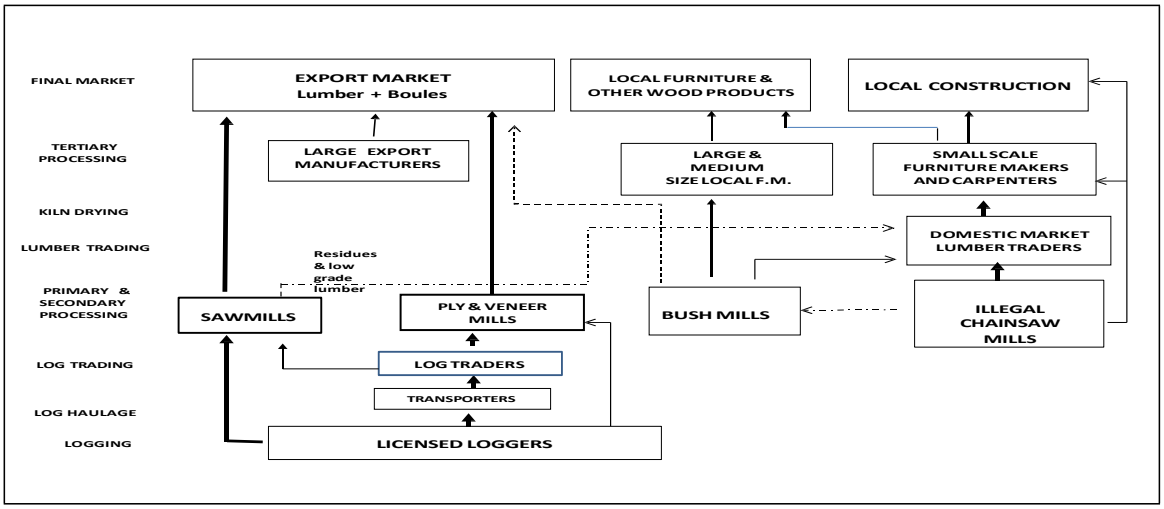

Figure 12: Linkages among actors in primary and secondary forest production in the timber industry

Source: Adapted from Ward & Gilbert (2001)

The FC is intricately related to the actors in the formal sector as the official government agency mandated manage and allocate forest resources for legal primary and secondary production as well as collect data from their production statistics for policy planning. After issuance of the TUCs and property marks by the FC, the Forest Service Division (FSD) of the FC inspects and enumerates trees felled for appropriateness and estimation of stumpage to be paid as royalty to the government. The FSD also issues conveyance certificate and waybill to authenticate legality of the source of the timber and permit for supply to the mill. While en-route to the mill, the Timber Development Division (TIDD) of the FC inspects property marks and other documentation as well as record data on production flows from the forest gate to export markets.

On the other hand, relationships among actors in the informal sector are primarily based on the supply of logs or lumber for sale or further conversion into higher value products for sale on the domestic market or use locally. Artisanal loggers, majority of who are officially unregistered, use chainsaw for tree felling and further processing to supply 80% of lumber on the domestic market[4]. Artisanal producers normally gain access to trees through informal arrangements with communities from off-reserve lands. They may also transact with TUC holders to trade their un-removed yields for processing. However, in some cases distressed mills, especially those without logging concessions and some tertiary wood processing companies in the formal sector, may acquire log/lumber from artisanal chainsaw producers due to unreliable supply of timber from the formal sector.

[4] *Timber production from regular mills failed to keep up with local wood demand which is almost three million cubic meters for the domestic market (Agyeman et al., 2003). The government mandated Timber Utilization Contract (TUC) holders under the Timber Resource Management Regulations, 1998 (LI 1649, s 36) to supply the domestic market with timber products of specified volume, dimension and species. By this regulation, the selected formal mills were required by law to make not less than 20% of their lumber outputs to the local market. However, this directive failed with a resulting proliferation of artisanal chainsaw millers meeting the supply-demand deficit.*

The formal or registered sawmills often offload low grade lumber that does not meet export requirements to the domestic lumber market.

4.6.2Evaluation of the relationship/linkages among actors in primary and secondary forest production in the non-timber product industry

The relationships or linkages among actors in the formal and informal sectors of the non-timber forest products economy of Ghana are illustrated in Figure 13. A wide range of products including medicines, poles, snails, mushrooms, game, mortar, pestle, fuelwood, carvings, natural dyes, gums, resins, tool handles, honey and many more flow in the NTFP supply and value chains. Business relations among actors in the formal sector are purely based on transactions for acquisition and supply of products for processing, marketing or consumption. Due to transportation difficulties, merchants (middlemen/women) often travel to villages to buy forest products from rural collectors or producers at cheaper prices and convey them to the market centres to sell to consumers, retailers, wholesalers and processors.

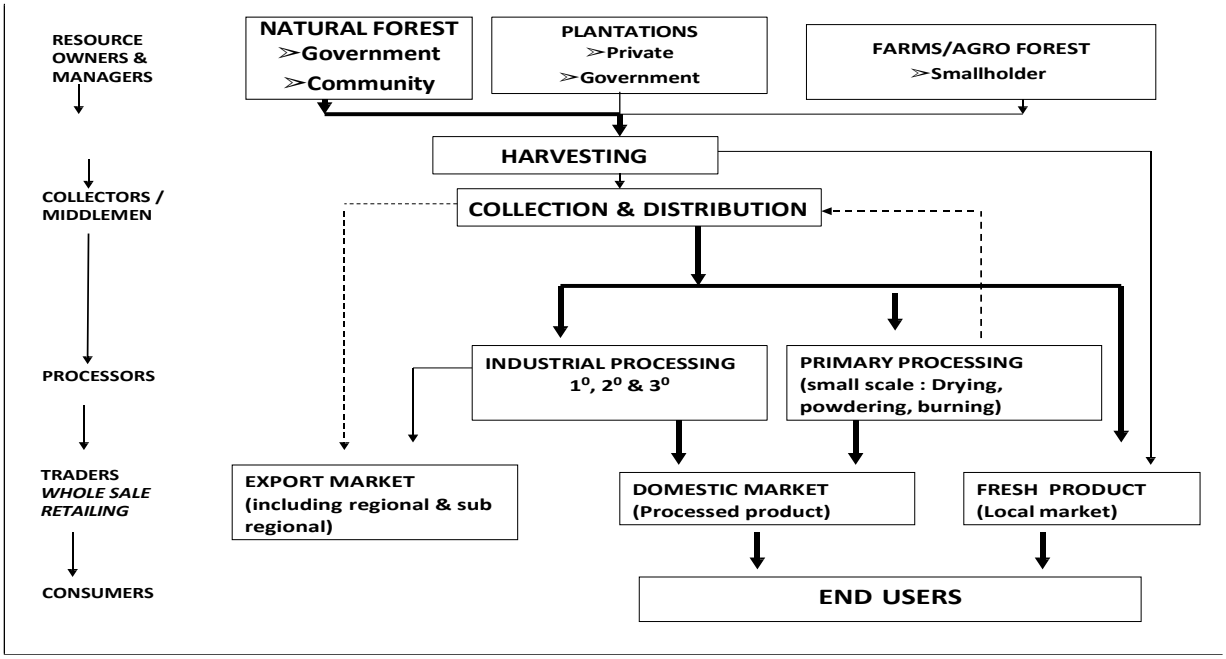

Figure 13: Linkages among actors in primary and secondary forest production in the non-timber industry

Enterprises within the informal forest and wood use sector exhibit a complex interconnection between each other and with the formal sector. For instance, there are arrangements between some informal charcoal producers and formal sawmills for the charcoal producers to purchase off-cuts, slabs and other wood residues for charcoal production.

Within the formal sector, the FC, through FSD the government agency mandated to manage and regulate harvesting of products from reserved forests relates directly with

NTFP harvesters/or collectors by issuing paid permits for acquisition of products for commercial purposes from designated forests. Local Government Administrative Office often referred to as the District Assembly (DA) issues paid waybills for conveyance of products from the forest gate while law enforcement agencies (Police, Customs) check FSD permits and waybills for legality of product origin during transportation. A greater proportion of NTFPs are destined for the domestic Ghanaian market. However, products for export require paid phytosanitary certificate issued by the Plant Regulatory Services Department.

4.7 Scope of public private partnership

4.7.1 tification of current capabilities of public private partnerships in forestry In Ghana, Public Private Partnerships (PPPs) in the forestry sector can be categorized into three main types (Table 6). At the national level, it entails government represented by the Forestry Commission partnering with private sector companies and communities in primary forest production in plantation forestry and natural forest management at various scales. Company-Community Partnerships have also emerged over the past three decades.

Table 6: Public private partnership arrangements in the forest sector in Ghana

Actors	Number	Business type	Contractual obligations	Terms of contracts
National government and private sector	331	Logging concession in natural forest estate Restoration of degraded lands in forest reserves	40 years of logging (felling cycle) Payment of SRA (5% of timber volume harvested) to communities. Compensation payments for tree felling damages on farms. Production and execution of plans for sustainable management of forests Government lease LBSA	Royalties and taxes SRA payment Private investor pays ground rent of $2/ha/yr and earns 90% of the total proceeds from the plantation while the FC, Landowner and Community earn 2%, 6% and 2% respectively
National government on one side and	-	Restoration of degraded forest lands	Benefit sharing agreement for final value of wood at the end of rotation	Payment at the end of rotation depending on tree species

Actors	Number	Business type	Contractual obligations	Terms of contracts
Communities and households		Natural Forest management	• 40% to communities' households and communities • 60% to government	
Private company and Community	-	Rubber plantations Forest plantations for timber and NTFPs	Supply of latex by out-growers Community lease land for plantation development Provision of labour on plantations Social Responsibility Agreements (SRA)	Payment on delivery Paid labourers Provision of community priority infrastructure

4.7.1.1 ment-company/community bidding and application partnerships This involves private firms, including communities with or without concessions or lease arrangements in government forest reserves, engaged in afforestation of state land as part of a planting or reforestation drive to reduce cost and enhance stocks for supply to industry. It is the most common with over 331 firms registered since 1999. For concessionaires, it is mandatory to provide reforestation and forest management plans when bidding for Timber Utilization Contracts (TUC). The FC supervises and monitors operations on the field as well as provides technical assistance in the form of standard procedures or manual of operation for establishment and maintenance of planted forests.

Where forest communities are involved, they take the initiative to approach the District FSD office to be enrolled for planting in a nearby degraded reserve through a formal application. The FSD facilitates the plantation establishment and maintenance process with technical assistance when the application is approved. It also monitors operations while the community mobilizes members to provide labour for plantation activities at their own costs, including policing (Damnyag *et al.,* 2016).

4.7.1.2 Government-Community Collaborative Forest Management/Partnership Forestry Commission engages local communities in managing natural forest resources or establishment and management of plantation forests. For natural forest management, the FSD devolves some of its responsibilities to communities, including resource management tasks such as silviculture, inventories, planning, re-forestation and monitoring. Community resource management groups or committees are formed and facilitated by the FSD to carry out these functions. Communities may be supported with alternative livelihood income activities in return for their labour. The FSD supervises and monitors operations.

Where the government engages communities in plantation establishment, it provides a range of technical, material and monetary incentives for establishment using a taungya approach. The community integrates food crops and provide labour for maintenance at their own cost but are entitled to 100% of food proceeds and 40% shares of standing value of timber at the end of the rotation. The FSD facilitates documentation of community participation for preparation of legal binding documents, including a benefit sharing agreement to encourage forest protection and equitable flow of benefits.

4.7.1.3 Company – Community Partnerships

This approach entails private sector organizations, including timber logging and processing firms and other private companies, entering into direct agreement with local forest communities in plantation and agroforestry development as well as produce supply. The partnership arrangements vary from service payment (community engaged as paid plantation workers), taungya farmers and out-grower schemes to agreements with local farmers for supply of forest produce for processing.

4.7.2 Analysis of promising public private partnership models/approaches for an all-inclusive forest compatible sustainable livelihoods development and supporting measures

In Ghana the concept of PPP in forestry has been exploited by the government through the Forestry Department in primary forest production in both natural forest management and plantation forestry development. The Ghana Forest and Wildlife Policies of 1994 and 2012 encouraged private sector participation in forest development at the 3 levels enumerated in Table 3. Some successful cases are outlined in the following sections.

4.7.2.1 ment - Community Collaborative Forest Management Partnership

In the early 1980's, collaborative forest management arrangements piloted by the Forestry Department sought partnership with local people for forest management, mainly to sustain forest resources while improving their livelihoods through management of economic non-timber forest products (NTFP'S). Over the past 3 decades a number of government- community forestry initiatives have evolved, notably among them are:

- Community Forest Committees (by 2003 about 100 CFC's had been formed),
- Community Biodiversity Advisory Groups for the management of reserved and protected areas designated as Globally Significant Biodiversity Areas (GSBA),
- Community Resource Management Areas (CREMAs) protecting natural forest, rehabilitation of degraded forest reserves and the promotion of private woodlot establishment for both timber and NTFPS , and
- Community forests managed for ecotourism as in *Buabeng Fiema* monkey sanctuary in the Brong Ahafo Region.

Government through the Forestry Commission has since the 1970's partnered communities in plantation forestry. Initially communities through a taungya system participated in the establishment of teak and *Gmelina arborea* plantations. The benefit they derived in the partnership in exchange for their labour for planting and maintenance of trees was access to land for farming food crops, from 1-3 years before canopy closure. Public-community engagements in forestry became popular in the 1980's when it was

realized that formal forest management mechanisms had disenfranchised communities from benefiting from forest resources and has contributed to the rapid deforestation in the country.

With the advent of social forestry and agroforestry in the 1990's, the focus of government community forestry arrangements widened to include the establishment of community woodlots/forests. Communities, as private groups, provide lands while the government Forestry and Agroforestry Departments assist with planting materials and technical information for establishment and management of these forests. During this era, the initiatives primarily focused on establishing tree cover over the landscapes without considering factors such as local culture, indigenous knowledge, risk aversion strategies of the households and the increasing need for financial income from market supply (AMANOR, 1996). In 1997, the Timber Resource Management Act (Act 547) was enacted to guarantee ownership of planted trees as the property of the planter. This brought a renewed interest in plantation forestry, enabling private participation in various ways.

With a high annual deforestation rate of 65,000 hectares in Ghana, the government intensified forest restoration. In 2001, the president's special initiative on forest plantation development with a target of 20,000 ha/annum was launched. Over the first three years (2001-2003), 37,000 ha of plantations were developed as small-holder plantations. During this period also, the government used a variety of direct and indirect incentives to stimulate forest plantation development with communities and other private individuals. For example, under the HIPC funds, communities were involved in plantation development by awarding contracts and paying workers, but the government had 100% ownership of the planted forests. The government also issued loans and grants to private plantation developers to engage communities in plantations establishment, but developers had 100% ownership. A modified taungya system (MTS) in which participating community benefit 40% of the standing value of timber proceeds was later devised to encourage private sector participation in forest plantation development.

In 2003, the Ghana government with funds from the African Development Bank initiated a collaborative forest management project (CFMP) using a modified taungya system (MTS). The CFMP MTS involved the production of agricultural crops and timber under a legally binding shared timber agreement with 2,500 household in 50 communities. The farm forestry component of the modified taungya system enabled individuals, local communities, private companies and non-governmental bodies to develop and manage farm forest plantation systems either on their own farmlands or on degraded government forest lands. The goal was to reduce poverty while securing future supply of timber to the wood industry and reducing forest establishment and management costs, as well as ensuring environmental sustainability. It incorporated a strong sustainable livelihood approach by adding another source of income in lieu of the reduced income from food crops. Timber from the MTS scheme will be sold to logging and sawmilling firms by the supporting agency and 40% of the revenue paid to the community or individual households in exchange of their investment in establishment and maintenance of the plantations. The government facilitated with funds and material inputs for establishment while communities and other private entities ensured maintenance of planted fields,

supervision and/or monitoring. Acreage established through various programs up to 2014 is presented in Figure, 14.

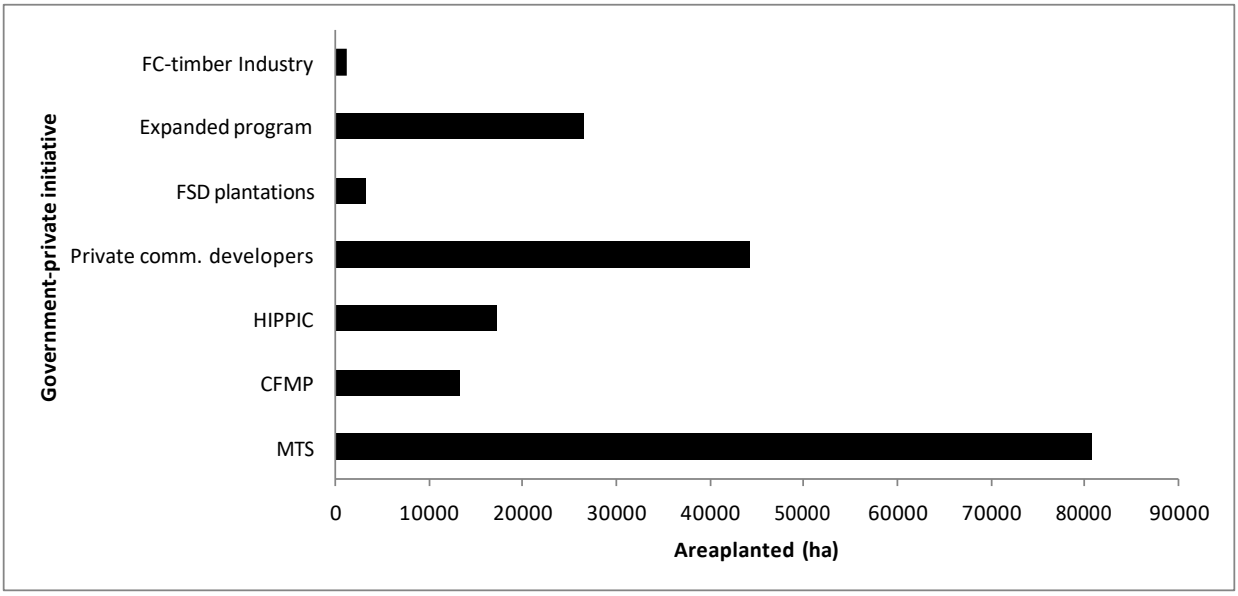

Figure 14: Forest area planted from government-private partnerships
Data source: Forest Plantation Development Program, 2014 Annual Report

4.7.2.2 ment-Company Partnerships

From 1999-2014, 331 private firms across the nation had been allocated 138, 697 ha of degraded forest reserve land for restoration, out of which 38,563ha has been planted. By 2015 the government had engaged the private sector in seven kinds of arrangements to establish 185, 527 ha of forest plantations (Table 7). One hundred and twenty-eight (128) Land Lease and Benefit Sharing Agreements (LL/BSAs) had been signed between The Forestry Commission of Ghana and various private entities were involved in commercial primary forestry production activities. Food intercrops in plantations from 2012-2014 amounted to 17,119.7 metric tonnes for subsistence and sale across the country.

Table 7: PPP between FC and selected private forestry firms

Company	Activity	Location	Species	Area allocated for planting (ha)
Form Ghana	Timber plantations; (at a cost of US$50.3 million)	Tain II Forest Reserve, Sunyani Forest District.	*Tectona grandis*, *Terminalia superba*, Khaya spp, *Albizia zygia*, *Erythrophleum ivorense* and *Cola gigantea*	14,596

Company	Activity	Location	Species	Area allocated for planting (ha)
EcoPlanet Bamboo	Bamboo plantations	North Bandai Hills Forest Reserve, Juaso Forest District	Bamboo	3,400
Platinum Plantations	Rubber plantations	Esen Epam Forest Reserve, Akim Oda	Rubber	1,200

4.7.2.2.1 Forestry Commission-FORM Ghana Company Partnership

FC signed a public private partnership (PPP) agreement with FORM Ghana Company Limited to jointly undertake a commercial plantation covering 14,596 ha within Tain II Forest Reserve in the Sunyani Forest District. The project is estimated to cost US$50.3 million to implement. Within the partnership, FORM Ghana is entitled to 80% of the plantation proceeds and benefits with the Forestry Commission, landowners and forest fringe communities entitled to the remaining 20%. FORM Ghana also pays ground rent of the Ghana Cedis equivalent of $2/ha/yr to the landowner, together with a facilitation fee of $2/ha/yr for the customary and conflict resolution role expected of the traditional authorities. The FC undertakes survey and demarcation and fire education within fringe communities at its own cost, as part of its contribution to the project. The PPP to date has employed 213 permanent employees and 700 temporary labourers with staff recruited from the forest fringe communities in the project area to undertake routine plantation activities, including land preparation, planting and weeding.

4.7.2.2 .2 FoRM Ghana-Donor-Government Partnership

In 2016, The African Development Bank (AfDB) and Climate Investment Funds' Forest Investment Program (CIF FIP) granted a $24 million loan (US $10-million concessional loan from the FIP and supplemented by US $14 million in co-financing from the AfDB) to Form Ghana Ltd, for the company to engage in a Public-Private Partnership for the restoration of the degraded forest reserve through Verified Carbon Standard (VCS) and Forest Stewardship Council (FSC) Certified Plantations.

The project is expected to produce net greenhouse gas sequestration of about 2.8 million tonnes of carbon dioxide (tCO2) over 40 years (a long-term average of 70,103 tCO2 per year); 11,700 hectares of sustainably managed forest plantation with FSC and VCS certification; and 400 direct full-time jobs and 600 direct seasonal jobs. It is expected that 40% of the jobs generated through the project will be held by women.

4.7.2.2.3 Forestry Commission-Ecoplanet Bamboo Group Partnership

EcoPlanet Bamboo Group (EPBG) is a US based company with bamboo plantation operations currently in Nicaragua and South Africa, and with an expansion into south-east Asia underway. The company is the first globally to develop commercial plantations of clumping bamboo, as well as develop associated technology and market demand for this fibre to be accepted as an alternative to the harvesting of natural forests for industries that currently rely on timber. In November 2014, the FC signed a PPP agreement with the company for the development of a 3,340ha commercial bamboo plantation in a degraded reserve. Currently nursery operations are underway, engaging predominantly a female workforce of about 250 drawn from surrounding forest fringe communities (Plate, 9).

Plate, 9: Women engaged in EPBG bamboo nursery
Source: FC 2015

Plate10: Potted bamboo seedlings at EPBG

4.7.2.3 Company- community partnership

Following from government-community initiatives and government review of tree ownership rights in favour of the tree planter, private sector forest developers, including non-governmental agencies, have actively engaged communities in farm forest plantations, both on farmlands and on degraded forest lands under various arrangements. A number of the approaches have generated commendable results through private community forest-based initiatives. Notable among these are:

- SAMARTEX OCAP, a 1,000-hectare plantation with the Oda Kotoamso community in the Wassa Amenfi District in the Western Region,
- ABTS Company Limited, replanting degraded forests in TAIN II Forest Reserve with fringe communities in Berekum area, and
- FORM GHANA, replanting degraded Asubima Forest Reserve with settler communities, among many others.

4.7.2.3.1 SAMARTEX - Community Agroforestry partnership

The Oda-Kotoamso Community Agroforestry Project (OCAP) has been initiated by S*amartex Timber & Plywood Co. Ltd* in its concession area, with farmers of Oda-Kotoamso, a rural community in the Wassa Amenfi District of the Western Region of Ghana. The company's aim is to ensure the availability of timber for processing by the company, while improving local livelihoods and contributing to biodiversity and environmental sustainability. OCAP was started in 1997 and has been executed in collaboration with local land-owning authorities and farmers, as well as with the civil sector agencies that include the District Assembly, Forestry Services Division (FSD), Ministry of Food and Agriculture (MoFA) and the Fire Service.

OCAP is managed by a local steering committee, comprising representatives from the listed stakeholders with the District Chief Executive as its chairman. Samartex's vision was to develop a community co-forest management model that can be replicated in other areas. Samartex acts as the financier and facilitator in this collaborative process. The company negotiated with the land-owning authorities to release some community land for farmers who employ their labour for cultivation. Each farmer paid an entry fee for an acre of land allocated, and is assisted with seedlings/planting materials and technical know-how from Samartex for planting the tree farm. The tree farms are designed as multi-strata tree-crop systems comprising long, medium and short-term components.

Over 100 farmers are involved in OCAP and have planted these multi-strata agroforests of timber species (Cedrella, *Terminalia* spp, Mahogany spp.) as the long term, agricultural tree cash crops (e.g. oil palm, kola), as the medium term and food crops (cassava, plantain, maize), and as the short-term components. This is to ensure a continuum of products for the farmer. Pure timber tree plantations are also established. A total of about 450 ha of abandoned community cocoa land, not very suitable for the crops, has been planted and converted to the farm plantations. Samartex has also integrated alternative income generating activities, including bee keeping, piggery, snail farming and gari processing into OCAP to further improve farmer income.

A legal agreement has been signed between Samartex, the land-owning authority (represented by the chief) and farmers to cover the disposal of timber and sharing of proceeds from the plantations. Samartex has the first option to purchase the timber at the end of the rotation. The land-owning authority benefits from a third and the farmer two-thirds of the timber revenue. The major challenge being encountered by Samartex and farmers in OCAP mainly concerns finance. Samartex has been unsuccessful in seeking complementary funds from other sources e.g. the Ghana plantation development fund to assist farmers in maintaining their plots. The Company has offered a number of alternative livelihood/income generating ventures to the community, in addition to the medium-term income tree components to make up for the delay in timber production. A wide array of non-timber forest species including citrus, cocoa, oil palm, passion fruit, beekeeping, snail rearing, black pepper, *Thaumatococcus daniellii* (Plate, 11), Griffonia and other plants for essential oils were inter-planted in indigenous timber species. The company has established a processing plant with ISO standards for extracting Thaumatin, a natural low-calorie protein sweetener and flavour enhancer for the international market.

Plate11: *Thaumatococcus daniellii* fruits

4.7.2.3.2 FORM Ghana-Asubima Community Partnership

FORM Ghana operates in the Techiman District of the Brong Ahafo Region of Ghana and has also collaborated with communities to plant certified teak through reforestation of the degraded Asubima Forest Reserve. Portions of the project area in the forest reserve are inhabited by illegal squatter farmers who are cultivating grains, legumes and vegetables for sale. Firewood and charcoal production are also key economic activities.

The degraded reserve is predominantly characterized by many grass species and is highly prone to persistent wildfires in the dry season. The reserve is also characterized by high levels of illegal logging or timber theft. FORM Ghana has engaged farmers to work as paid labourers on the plantation including security patrols. The farmers are anticipated to cultivate in-between rows of tree seedlings until canopy closure for a total of over 1700 hectares of land in 10 years. Fire belts of 5m wide, have been created around the plantations with *Senna simea* (Cassia) planted as green belt in rows to be managed

by the company and farmers for firewood and charcoal. Farmers cultivate the alleys in-between tree rows with soya bean and groundnut/peanuts for sale and consumption. Soya bean and peanut are to be sold to a local oil mill for production of soya and peanut oil. Also, some farmers cultivate vegetables and maize in the alleys in the cassia green belt for sale (Abeney *et al*., 2008). FORM Ghana will sell the certified logs from its Asubima plantations to prospective buyers.

4.7.2.3.3 The Novella Africa Initiative

A private–public partnership known as Novella Africa is developing a sustainable allanblackia oil business that could be worth hundreds of millions of USD annually for local farmers (*Jamnadass, et al., 2015)*. The *Novella Africa Initiative* is a public-private partnership formed in 2002 by Unilever, The World Agroforestry Centre (ICRAF), IUCN, and the Netherlands Development Organisation (SNV), and involves UNDP, and a number of governmental organizations and NGOs in Africa. The initiative is undertaking commercial scale collection and extraction of oil from seeds of the allanblackia (AB) tree, which is native to tropical forests of West, Central and East Africa. This edible oil is used by Unilever to make food products, such as spreads; and detergents, like soaps. The project is unique in its goals to sustainably use non-timber forest products on a commercial scale, undertake forest reforestation through planting of AB trees, and provide significant employment benefits to subsistence farmers (NAF n.d.).

Ghana is the first country to implement the production process, from seed gathering to the generation of crude AB seed oil and involves approximately 4000 seed collectors in the project (IUCN 2008). Unilever guarantees purchase of sustainably produced AB seeds at a pre-agreed price and transports the crude oil to the Netherlands, where it is processed into consumer products (UNDP n.d.). AB trees grow in relatively degraded lands, meaning that the initiative contributes to the rehabilitation of unproductive areas. Increases in farmland productivity reduce the frequency of forest clearance, protecting natural flora and fauna (ICRAF n.d.).

4.8 Trends on production, trade and consumption of timber and non-timber products

4.8.1 Trends on production, trade and consumption of timber and non-timber products in the last five years

Timber products

The Ghanaian wood processing industry produces mainly for domestic consumption and a surplus for export (Figure 15).

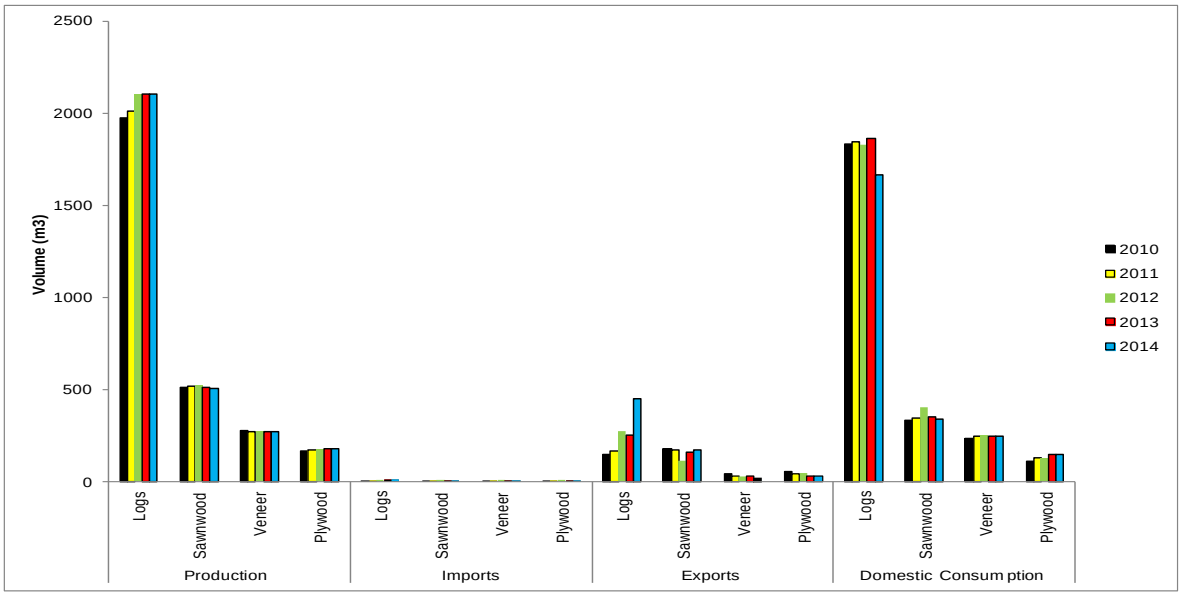

Figure 15: Production and consumption of wood products 2010-2014
Source: TIDD, 2015

Production and consumption trends over 5 years (2010-2014) indicate an average of 2.1 million m^3 of round log available for processing annually; with 99.7% (2,059,800) produced from Ghanaian forests and 0.3 million m^3 imported. Eighty eight percent (88%) of the logs are processed locally into a variety of products; the three main ones being sawn wood, veneer and plywood. Over 70% of these products are consumed locally (Table, 8).

Table 8: Five-year average for production and consumption of wood products

Average 2010-2014 (x1000 m^3)

Timber product	Production	Consumption	Exports	Imports
Log	2,059.8	1,808.4	258.3	6.9
Sawn wood	513.0	354.8	160.1	2.0
Veneer	272.4	243.9	28.8	0.3
Plywood	172.1	133.1	40.8	1.8

Other reports estimate total log requirement of 1.32 million m^3 that excludes logs required for other primary wood processing activities like veneer and ply milling for formal or legal sawmills in the country.

The total volume of sawmill lumber or sawn wood available for domestic use is 152,660 m^3 per year, yet the demand of the domestic end-users is about 384,730 m^3. The supply deficit of 230,070 m^3 has led to the proliferation of illegal chainsaw milling operations which supplies 80% of lumber demanded on the domestic market (Marfo *et al.,* 2009). This is because the industry has traditionally concentrated on exports, to the neglect of the local market. The domestic demand is likely to rise to keep pace with the expanding building construction industry and the growth of the economy (currently 3.8%, targeted at 5% per year). According to the export statistics, the bulk of the exports are processed wood products with secondary products averaging 89% of the total export earnings from 2007 to 2014.

Non-timber products

Woodfuel

Ghana is one of the countries with high per capita fuelwood demand in West Africa (Anang *et al.*, 2011). However, supply-consumption trends from 2006-2015 show a mean surplus of 4.1kilotonnes of fuelwood not consumed after extraction (Figure, 16) (Ghana Energy Commission, 2015). This means fuelwood supply often exceeds demand. The excess possibly goes to waste from decomposition of the wood. The annual per capita fuelwood consumption is estimated to be 1.0 m^3 round wood equivalent (FAO, 2010).

Current aggregate consumption of woodfuel (i.e. firewood and charcoal) in the country is beyond sustainable harvesting levels of the natural woodlands. In the Northern Region, consumption of woodfuels is approximately 2 per cent above the overall sustainable harvesting levels.

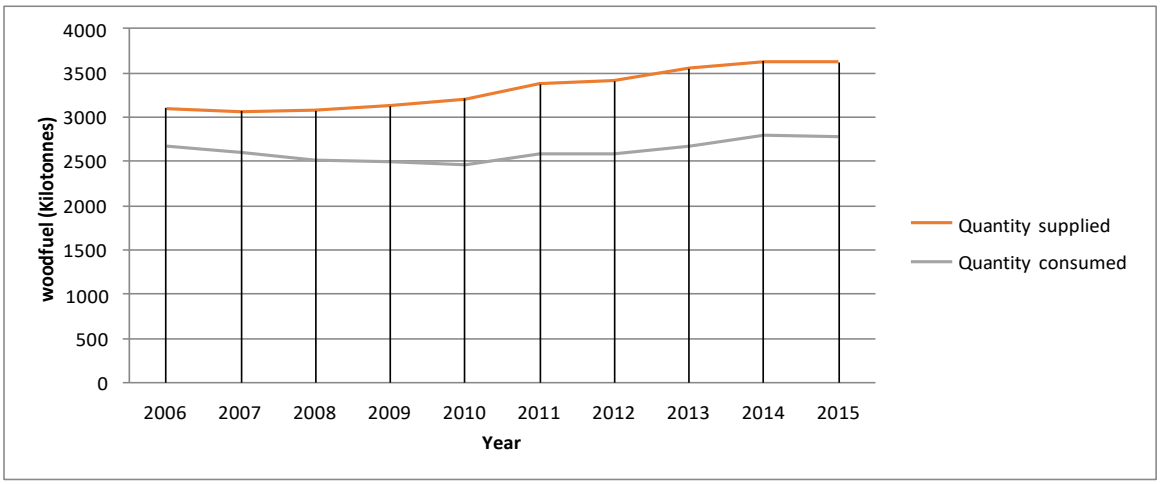

Figure 16: Ghana wood-fuel supply – demand balance

Source: Ghana Energy Commission (2015)

In the Upper East and Upper West regions, the consumption is respectively 60 per cent and 30 per cent over sustainable harvesting levels. In the Upper East Region, the relative scarcity has attracted firewood imports from Burkina Faso and Togo.

4.9 Evaluation of the contribution of private forestry sector activities to local livelihoods and national economy

4.9.1 Contribution of private forestry sector activities to local livelihood

Forest plantation development

Private forestry sector has contributed to local livelihoods through provision of jobs or paid labour in plantation development activities. In addition, communities, as private people, have partnered with firms and the government to establish forests under various taungya arrangements. For instance, under the National Forest Plantation Development Program (NFPDP) and the CFMP, community groups integrated food crops into forest plantations to rehabilitate degraded forest and farmlands throughout the nation. Food harvests from the NFPDP (Figure, 17) and the others contributed to food availability nationwide and enhanced local incomes in forest fringe communities.

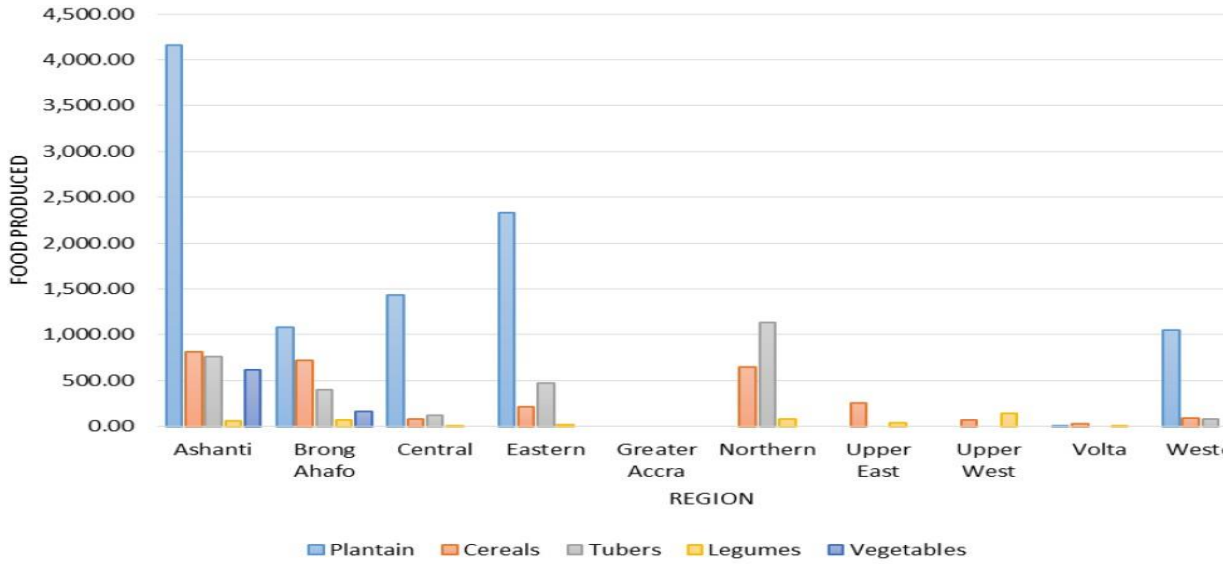

Figure 17: Food production within forest plantations by communities engaged in NFPDP in 2014
Source: (FC, 2015)

Timber processing industries

Private timber firms operating in forest communities have contributed to the development of local economies by engaging labour from these areas in their operations, hence providing income to local mill workers. In addition, they also provide jobs indirectly to others providing food and other services to workers as well as small scale enterprises depending on timber off-cuts and other mill residues for furniture, charcoal, herbal preparation (barks of trees), among others.

Non-timber forest products industry

NTFP-based enterprises serve as important additional income sources for a large number of people, providing a safety net when other revenue sources fail. For some people, they are the main or only source of household income. Though difficult to quantify due to their mostly informal nature, their contribution to livelihoods may even outweigh the formal timber enterprises. This is due to the large number of people engaged in them, the significant values involved, and their tendency to accrue wealth locally.

Apart from farmers who occasionally engage in hunting to supplement their household food needs, trade in bush meat could be classified as a viable enterprise which employs many from hunters and middlemen to final sellers in the market. The bush meat sector employs about 300,000 hunters at the local community level who produce between 220,000 to 380,000 tons of bush meat valued at between US$210 million to US$350 million for domestic consumption annually. It is an important food source, consumed in both rural and urban areas, and can make a significant contribution to the cash income of rural households living in extreme poverty. In addition, the value of animal and plant products from the forests used in traditional medicine and cultural practices is estimated at US$13 million. It's been observed that in Ghana, wildlife hunting and consumption increases when alternative livelihood fails (Brashares *et al*., 2011). In some communities, bush meat hunting and trade provides an income safety net during the lean agricultural season and it enables households to spend 30 per cent less on other types of meat and fish (Schulte-Herbrüggen, 2013).

An estimated 600,000-900,000 women are employed in the shea enterprise, which contributes up to 15 per cent of their household incomes (GNA, 2013). Many NGOs have promoted shea nut and butter production and marketing in Ghana. These institutions have supported general shea trade facilitation, including aiding to establish linkages to markets, assistance with obtaining technology and training in business skills, as well as improved resource management, and increased women participation in the shea value chain (Lovett, 2004, Asante-Dartey *et al.*, 2009). USAID, Techno-Serve (TNS)-Ghana, Centre Canadien d'Étude et de Coopération Internationale (CECI), OXFAM, Christian Mothers Association and SNV Netherlands have all provided various forms of support to shea producers in northern Ghana, who are mainly women.

4.9.2 tribution of private forestry sector activities to national economy

The forest sector in Ghana contributes 4 percent to the country's GDP and provides livelihood for about 650,000 people (Dogbevi, 2015). Private forestry sector's share to this national welfare may be significant but not adequately documented as many of the enterprises involved are SMEs in the informal sector, and with limited official statistics on their operations. Generally, SMEs constitute 90 per cent of private sector businesses in Ghana and generate about 60 per cent of employment in the country (Osei –Tutu *et. al.,* 2012).

Plantation development enterprises

African Plantations for Sustainable Development (APSD) Ghana Limited is a privately-owned company engaged in the establishment of fast-growing plantations for bio-energy production in the Atebubu and Sene districts of the Brong Ahafo Region. The company operates a mechanised state of the art forest tree nursery, with an installed capacity of 25 million seedlings annually. The company has so far invested about US$35 million in infrastructure, equipment and plantation development in Ghana. APSD Ghana Limited has acquired an off-reserve concession with an estimated area of 86,000ha. An estimated 25% of this concession has been taken out of production and is being managed as a biodiversity conservation area. The company has so far established 5,684ha of Eucalyptus and Acacia plantations and employs a labour force of 1,106 people, predominantly sourced from the local communities within the company's catchment area. In 2014, the company established 4,121ha of plantations. The company aims to establish efficient electrical power production based on fast growing Eucalyptus and Acacia plantations. APSD plans to plant approximately 20,000ha of these trees species to feed two 30 MWe power plants based on three to five-year tree rotations (FC, 2015).

Shea and bush meat enterprises

Ghana is the leading exporter of raw shea nuts in the world (Lovett and Haq, 2000). The shea industry, on the whole earns 30 million USD of foreign exchange for the Ghanaian economy. This amount is expected to triple with full exploitation of its potentials in Ghana (Hatskevich *et al*., 2011).

The value of the bushmeat trade in Ghana is estimated to be worth $250 million annually. Wild animal meat sold in Ghana's major markets every year amounts to anything between 200 and 350 million dollars in revenue. It is believed that revenues from the sale of grasscutter, antelopes, rats, snails, birds, etc., compares with, and even outstrip annual revenues from timber and minerals (Ghanweb, 2011).

5.0 PROPOSALS OF PROMISING AND STRONG PUBLIC PRIVATE PARTNERSHIP MODELS/APPROACHES IN FORESTRY

Generally, the three types of PPP models being practised in the forestry sector of Ghana are worthy of emulation.

Government-company partnerships involving large and medium scale activities to restore degraded forest reserves, particularly under the 330 Lease Based Agreements, have so far yielded some degree of success. These arrangements have reduced pressure on government funds for reforestation investment, while also providing local employment and ensuring environmental sustainability. The recent FoRM Ghana-AfDB-CIF-GoG partnership needs to be promoted. The Ghana government needs to improve on current policy incentives to attract more investors into such partnerships for the development of forestry sector and local economies.

Government-community modified taungya partnership, government-company lease based partnership for restoration of degraded forest reserves, and *company-community*

forest plantation or forest product enterprise development partnerships are promising PPPs that have contributed immensely to local economy development particularly in forest areas where there are often limited livelihood options. Obviously, government and traditional authorities need to provide incentives to create the necessary environment for such investments in the forestry sector. Most activities often involving local communities are prone to risks and uncertainities which need to be minimized by involving them in all stages of planning and partnership discussions and providing innovative incentives that will motivate them to work effectively.

With respect to Government-community and company-community partnerships, planning with communities at the onset of the project will help to identify appropriate products of market value for forestry enterprise development. This calls for a clear identification with communities' specific commercial products that they desire from forests being managed on a partnership basis. This will dictate components and design of forests to be established. Where a forest must be planted, choice of species is important. Communities may want to integrate trees of commercial value (cocoa, mango, *Tetrepleura spp*, Allanbrakia *spp*, Cassia for fuelwood, etc.) in planted forests for interim income and continued interest for effective management. Specific example cases are the Samartex OCARP Agroforestry and FORM Ghana Certified Teak models.

6.0 CONCLUSIONS AND RECOMMENDATIONS

6.1 Conclusion

The forestry sector is undoubtedly a key contributor to GDP of the Ghanaian economy. However, the sector is constrained by declining natural forest resources against increasing demand for wood/timber and non-wood/timber products for domestic, industrial and export purposes. For instance, the installed capacity for the timber industry is 3 milliom cubic meters per annum. The Forestry Commission allows for harvesting only 2 million cubic meters. Thus, firms are producing under their installed capacity, with a deficit of 1 million cubic meters annually.

Also, primary and secondary forest production in the timber and non-timber industries involves mainly private individuals and firms using obsolete equipment and rudimentary techniques in harvesting and processing/manufacture of products. This is because majority of forest sector businesses self-finance their operations, thus have limited capital for upgrading equipment and capacity for efficient higher value production.

Past policy and fiscal interventions had very limited impact on the industry. Recovery rates in timber processing and wood products manufacture vary with firm type and products manufactured ranging from 20-60%. There are very few vertically integrated firms capable of attaining higher recovery rates up to 60% as these have up to 10 product lines, thus tend to use raw material more efficiently.

The private sector plays a key role in both primary and secondary production in the forest sector. The contribution of its efforts in the timber industry is well accounted for but that in the non-timber sector has remained unrecognized until recently. This is due to limited policy interventions/incentives to stimulate sustainable growth in the non-timber forest economy, and also by the fact that its operations are largely informal.

Small and medium enterprises are critical to the growth in the Ghana forest products sub-sector. In the timber or wood industry, they are largely informal participants in wood processing, constituting 75% of wood processing entities. Their turnover in intermediary joinery products has been estimated at US$50 million. Small and medium forest enterprises (SMFEs) serve as main or additional sources of income for about 3 million people, yet they have received little or no attention in national forestry planning. The sub-sector is not guided by operational provisions like legislative instruments, manual of procedures (MOPs), resource allocation procedures, and regulations (Tropenbos International Ghana, 2012). Thus, the SMFEs have over the years been constrained with a plethora of challenges, including financial investments into quality product development or value addition, distribution and trade. Hence, they have failed to compete favourably on both the domestic and international markets.

All forest categories in Ghana are generally under threat from climate related risks such as drought and wildfires, as well as anthropogenic uses including illegal mining, logging, farming and exploitation for woodfuel, among others. These obviously threaten the productive capacity of the forest estate, hence the sustainability of the industry and investments in the sector, as well as livelihoods of local communities, professionals and many others in both the private and public sectors depending on the forest economy.

Forestry sector development has remained a priority on Ghanaian government development agenda in the natural resource sector over decades. Several sector policies and programs have been pursued to enhance the capacity of institutions and industry in the forest sector. For instance, fiscal interventions were made to promote downstream processing in the timber industry during the era of the Economic Recovery Program financed by the World Bank in the 1980s among many others. However, challenges in implementation have restrained the attainment of desirable results in some of the sub-sectors. Nevertheless, the government continues to pursue topical programs to promote the development of the forest sector.

External fiscal aid worth USD 643 million (in 2009 dollar value) from development partners have been invested in the forestry sector from 1989-2009 (Beeko *et al.,* 2014). The government is currently providing appropriate incentives to promote resource development to sustain the industry, and has signed on to major international market incentive programs including VPA, FLEGT, forest certification, among others, to improve legality standards in forest product trade. The Ghana Forest Investment Program (GFIP) is all encompassing, involving government and private sector institutions and firms including communities, to increase the capacity of forest resources for carbon sequestration and socio-economic development. The national forest and wildlife policy and forestry development master plan have been reviewed to recognize the potential for

private sector investment to promote growth in the forestry sector. The tree tenure regime prevailing in the country encourages private investment in forest development. A forest plantation development strategy (FPDS) has been developed to guide commercial and community-based forest resource development nationwide over 25 years (i.e. 2016-2040). Thus, public private partnerships are being pursued to promote primary forest production. There are a number of initiatives are currently in operation. Ironically, while investment into medium and large-scale plantations is increasing through various PPP arrangements (e.g. 331 government-company/community licenses for plantations on degraded lands), the number of timber processing mills are declining as a result of over dependence on natural forest tree resources.

6.2 Recommendations

From the foregoing, the following recommendations are made to strengthen the sustainable development of an all-encompassing forest product sector in Ghana:

Expansion of PPP in primary forest production

The future for sustained supply and economic growth in forest product sector of Ghana depends on production from plantations because the natural forest stocks for prime merchantable species have declined. Policy and fiscal incentives for further promotion of PPP in primary forestry production in all ecological zones will be necessary. The governments' FPDS (2016-2040) needs to be actively pursued to meet future demand for timber and non-timber products, a demand which is anticipated to increase consistently in the future.

The Ghanaian economy is growing and is experiencing private sector investments in natural resource development in the oil and gas, mining and forestry. There is considerable opportunity for primary forestry production, especially for biomass development for timber, energy and carbon trading. There is also potential for bioprospecting and large-scale development of shea, allanbrakia, medicinal plants, among others, for industrial supply.

Policy incentives need to be further enhanced to promote *Government-company*, *Government-community* and *Company-community* partnerships for primary forest production on appropriate state and non-state degraded lands, including small holdings in the forest-agriculture landscape. This will ensure sustainable wood raw material supply, while simulating growth in rural economies and ensuring food and income securities.

Promote PPP in secondary forest production

The need for policy and fiscal incentives to promote private investment in secondary forest production is paramount. *Government-community* and *company-community* partnerships may be appropriate in this context. For instance, company-community partnerships involving out-grower schemes, such as the model adopted by the Ghana Rubber Estates (GREL) or the Samartex OCAP Thaumatin case, to provide raw material for secondary forest production. Investment is required for acquisition of machinery and enhancement of skills to increase value addition. In the timber industry, retooling for efficient processing of small-diameter logs from plantations, and particularly minimizing

waste during processing and conversion of wood waste to valuable products, will enhance forestry sector development. Similarly, more efficient charcoal burning kilns, as well as tools and equipment, are required to reduce drudgery and health hazards from obsolete technologies used widely in secondary forest production. These will ensure efficient use of timber resources while enhancing market opportunities.

Promote and develop small and medium forest enterprises (SMFEs)

Small and medium forest enterprises (SMFEs) serve as the main or additional sources of income for more than three million Ghanaians. However, majority of these operate in the informal sector, they are untaxed and largely invisible within state forest planning and management. Pressure on the forest resource within Ghana is growing, due to both domestic and international demand for forest products and services. The need to improve the sustainability and livelihood contribution of SMFEs should be priority in policy strategies.

Government-company PPPs for the establishment of technology transfer centres within the portfolio of the Rural Enterprise Commission need to be promoted to upgrade the business and technical skills of numerous groups of SMFEs in both timber and non-timber sector, for cost-effective value addition or enterprise viability, and production of quality competitive products for a wide range of market niches.

Policies to promote fiscal incentives for enhancement of commodity/value chains

Cost of capital is high in Ghana to incentivise local producers to invest in primary and secondary production. It is suggested that the Government of Ghana is supported to facilitate the establishment of venture capital and private equity firms to support industrial ventures, and facilitation of medium-long term funds for forest product sector enhancement. An enabling environment would need to be created for private sector access to these financial resources, especially start-up capital for SMFEs.

Evaluation of existing PPPs for their enhancement

An evaluation of the PPPs currently in operation need to be undertaken to identify practical shortfalls to guide the development of appropriate interventions that can enhance their operations in Ghanian forestry sector.

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