

AN OVERVIEW OF FOREST CONSERVATION STRATEGIES IN GHANA

***KWAWUVI, D.**,^{1,2} **BESSAH, E.**³ AND **OWUSU, G.K.**²

¹Graduate Research Program on Climate Change and Water Resources, Université d'Abomey-Calavi du Bénin, République du Bénin

²Pan African University, Institute of Life and Earth Sciences (Including Health and Agriculture), University of Ibadan, Oyo State Nigeria

³Department of Agricultural and Biosystems Engineering, Kwame Nkrumah University of Science and Technology, Kumasi, Ghana

*Corresponding author: danielkwawuvi@gmail.com

Abstract

Deforestation in Ghana over some decades now has undoubtedly destabilized the socio-economic and socio-cultural importance of the forests for a large number of rural people especially, forest fringe communities who directly depend on the resource to support their livelihood. The assessment identifies activities such as; agricultural expansion, unsustainable wood harvesting, population and development pressures, mining and mineral exploitation as the principal drivers of deforestation in Ghana. Although deforestation is having negative effects on the nation in many ways, some communities derive their livelihood from it through their access to forest resources like Fuelwood for sale. Forest conservation policies in Ghana were discussed and further highlighted limitation of skills and surveillance instruments, cultural and customs drawbacks, policy limitations and climate change as the challenges to sustainable forest management in Ghana. The study recommends that scientists as well as policy makers scrutinize the extent to which the issue of deforestation is affecting the country's economy and her environment, and revise, and where necessary formulate new policies that will help in the conservation of Ghana's Forests. Furthermore, attention be paid to the adoption of a bottom-up approach in Forest management through the proper inclusion and involvement of the various stakeholders in the conservation and management processes at the community level.

Key Words: *Forests, Deforestation, Management, Sustainability, Ghana*

Introduction

Forests are vital for the existence of life on earth. Tropical forests alone serve as a habitat for more than 13 million distinct species (Hammond, 1996). Forest is land spanning more than one-half hectares with trees higher than 5 meters and a canopy cover of more than 10

percent, or trees able to reach these thresholds in situ (UNFAO, 2010). It could also be defined as a large stretch of land of about 0.5 hectares dominated by trees, plants and other organisms in their natural environment, being intact and without external or human intrusions (Mohammed, 2014). It does not include

land that is predominantly under agricultural or urban land use. About 30% of the global land area is covered by forest (UNFAO, 2010). Worldwide, forests contribute to the livelihoods of almost 1.2 billion of the world's poorest people, according to the World Bank (Schroeder-Wildberg and Carius, 2003). The reliance on forests for livelihood is gradually increasing with the rise in population growth. However, with the increase, negligence towards the management of forests and their resources also increases. Therefore, population poses a threat to forests conservation. Anthropogenic activities are the major causes of forest degradation and/or deforestation (Dimobe *et al.*, 2015). Deforestation mostly results from other land uses (Gorte and Sheikh, 2010). Deforestation is a contemporary environmental challenge that is considerably hindering the resilience and distribution of forests across different boundaries. Annually, the rate of global deforestation is around 13 million hectares, most of which occurs in the developing world (FAO, 2010). Forest loss in Africa is particularly worrying, however, two-thirds of the continent's population depend on forest resources for income and food supplementation, and 90 percent of Africans use fuelwood and charcoal as sources of energy. Despite, or perhaps because of this reliance on forest resources and non-timber forest products (NTFPs), deforestation in Africa is estimated at about 3.4 million hectares/year (FAO, 2010; CIFOR, 2005). Forest resources play vital roles in protecting the environment and are of great significance to the sustainable development of every society. This has resulted in the increased attention by the world community on its conservation and

prudent use especially in the last two decades (Boon *et al.*, 2009).

Status and Trend of Change in Ghana's Forests

Ghana's Economy and the role of forest resources

Ghana lies between longitudes 3° 15' W and 1° 12' E, and latitude 4° 44' and 11° 15' N with a total land area of 238,533 km², a coastline of 550 km² and an Exclusive Economic Zone (EEZ) of 110,000 km² of the sea, forming her territorial area. This West African country is bordered by; the Gulf of Guinea, Togo, Burkina Faso and Cote D'Ivoire to the South, East, North and West respectively (Figure 1) and is well endowed with natural resources (Tamakloe, 2000). Ghana's natural resources encompass both renewables and non-renewables such as gold, manganese, diamond, bauxite, clay, timber among others, majority of which are found in the forest regions. These resources have contributed immensely in revenue generation, foreign exchange earnings, employment creation and the Gross Domestic Product (GDP) of the country for decades (Tuffour, 2014; Bessah and Addo, 2013).

Forest resources play a significant role in income generation and food provision for households in Ghana, with forestry products providing sustenance and revenue for approximately 2.5 million people in the country (Acheampong and Marfo, 2011; Domson, 2007). Ghanaian communities depend on forest resources through: the collection and production of fuel wood, hunting for game, collection of snails and mushrooms, gathering of medicinal herbs and chewing sticks, and both legal and illicit logging (Ahenkan and Boon, 2008). An estimated 5,000 to 6,000 people

engage in hunting with approximately US\$1,000 average income per year. In 2003, export of wild plants and animals was valued at US\$18.0 million (Ministry of Land and Natural Resources, 2012). Forests and savannah ecosystems provide rich biodiversity of national and global significance. The economic contributions of forestry cannot be underestimated. In 2009, forestry and logging accounted for 3% of GDP and contributed US\$240.9 million (representing 7.6 per cent) to total export value. Also, an estimated 120,000 people are formally employed by the forest and wildlife sector (Ankomah, 2012). Forest products have been found to be at the core of socio-economic development in forest communities in Ghana-as they contribute about 38% or more of household income than any other income-generating activity (Appiah *et al.*, 2009).

Despite the major roles played by the forest resources in the country's economic development, forests in Ghana have suffered a significant decline due to over-exploitation to meet the growing socio-economic needs of the population (Environmental Protection Agency, 2004). Forest depletion determining factors are categorized into direct and indirect causes (Caviglia, 1999). The indirect causes are mostly external, and trans-boundary factors which are usually difficult to measure (Humphreys, 2006; Sands, 2005). A third category that has evolved emanates from competing land uses (including agriculture, urbanization and industrial infrastructure development) and inadequate economic systems to accurately value forest resources (Pearce and Brown, 1994). Agriculture and its related resettlement of subsistence farming settlers and overgrazing are the major cause of tropical forest depletion (Amor, 2008; Amor and Pfaff, 2008). In an

attempt to maximize the benefits of economic development and meet societal needs, forest conservation strategies and policies are not thoroughly adhered to which poses a threat to sustainable development especially, now that the globe is working together to reduce carbon emissions with a vision of achieving 1.5°C warming by the end of the twenty-first century (Allen *et al.*, 2018).

Status of Ghana's Forest

Forests in Ghana, play a major role in the nation's economy (Acheampong and Marfo, 2011; Boon *et al.*, 2009; Appiah *et al.*, 2009). Among the numerous resources that Ghana possesses, its natural forests gives her its unique and diverse tropical climatic and environmental conditions and serves as a habitat for various plants and animal species (Quacou, 2016). Forests cover about 36% (84,000 km²) of total land area in Ghana (EU, 2006; Rice and Counsell, 1993). It is recorded that there existed relatively undisturbed forests, which served as home to abundant biodiversity, protected fragile soils and regulated the supply of scarce water resources (Boon *et al.*, 2009). Currently, Ghana's forest reserve, covering about 24.2 % of the country's total land, constitute part of the Guinea-Congolean phytogeographical region (FAO, 2010). Forest areas are confined to two vegetation zones, each with different forest types: (1) the high forest zone (HFZ) constitutes 34 % with the remaining 66 % belonging to the: (2) savannah zone (Marfo, 2010). The country has the following ecological divisions: high forest zone to the southwest, covering about a third of the land area (approximately 7.5 million hectares), a savanna zone (14.7 million hectares) mostly in the north and a transition zone (1.1 million hectares) (ITTO, 2006). Ghana's forests are classified into reserved

and unreserved areas. The reserved areas account for 1.77 million hectares of forest lands, of which 1.634 million hectares is under the management and control of the Forest Services Division (FSD), while the Wildlife Division (WD) manages 0.136 million hectares (Nang, 2016; Kotey *et al.*, 1998).

Forests are further classified as on-reserves and off-reserves with 282 Protected Areas covering a total area of 22,754 km² (216 of them located within the high forest zone) (Oduro *et al.*, 2012). Areas for the conservation of forest and wildlife constitute about 16.2% of the total land area of Ghana (Ministry of Land and Natural Resources, 2012). Among the two types of forest reserves, that is, production (80%) and conservation areas (20%), the production of timber are mainly concentrated in the south western part of Ghana (Figure 1) where forest types range from wet evergreen to semi-deciduous (Ankomah, 2012). In the high forest ecological zones, there is high biodiversity which accounts for most of the country's biodiversity. Although amphibians, reptiles and fish had not yet been properly researched on in the forest zone, it is assumed that the zone contains most of the diversity of these groups. About 2,300 out of 3,725 higher plants known to be in Ghana are found in the high forest zone, including 730 tree species (Ministry of Environment and Science, 2002).

Similarly, about 82% and 28% of mammals and resident birds are located in the high forest zone. According to a recent land use land cover (LULC) project by the

European Space Agency (ESA), the tree cover of forest in Ghana is currently 44.58% of the total land area (Figure 1 and 2). Grassland is the second highest LULC followed by Cropland (Figure 2). Grassland mostly dominates the Guinea Savannah agro-ecological zones (Brong Ahafo region and up north of the country) and the Coastal Savannah zone (Coast of Greater Accra and Volta Regions) as presented in Figure 1.

The trend of change in forest cover

The world over the years has experienced unprecedented loss of its forest, especially in the tropical regions due to deforestation (Tuffour, 2014). According to FAO (2010) globally, 13 million hectares of forest is lost per year with Africa contributing about 3.4 million hectares (26.15%) of this loss. A World Bank policy paper on the forest sector defines deforestation, as a major cause of change in forest cover as “the clearing of the forests and the conversion of the land to non-forest uses” (World Bank, 1991). According to Gorte and Sheikh (2010) deforestation is a prevalent environmental challenge greatly affecting the resilience and distribution of forests across different regions. It is the loss of trees' cover usually as a result of forests being cleared for other land uses. Quacou (2016) also explains deforestation as the clearing, destruction or removal of trees and other plant species in a deliberate, natural or unplanned manner for various reasons. Based on these definitions, it can be said that deforestation simply is the destruction of forests which involves the removal of trees for other land use purposes.

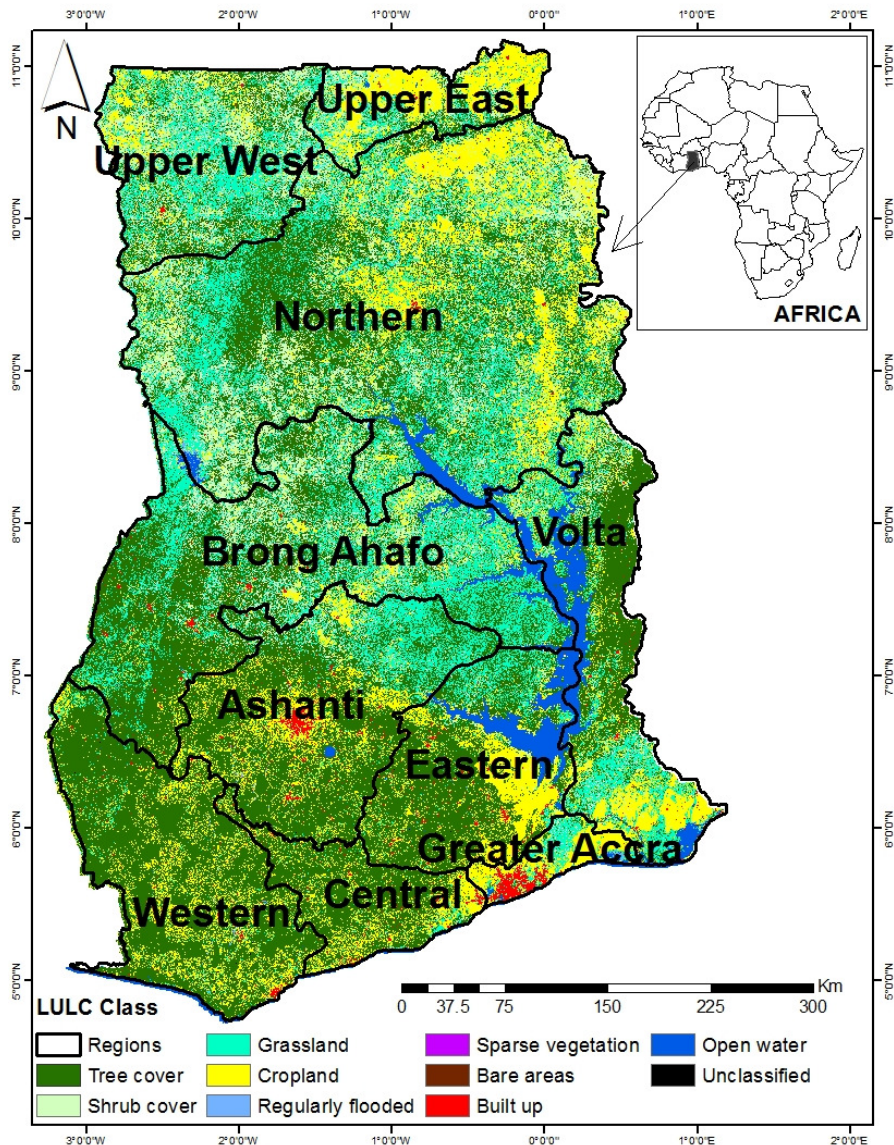


Fig. 1: 2016 20 m resolution land use land cover (LULC) map of Ghana (Source: prepared by authors with data from European Space Agency (ESA) Climate Change Initiative (CCI) 20 m sentinel land cover map of Africa)

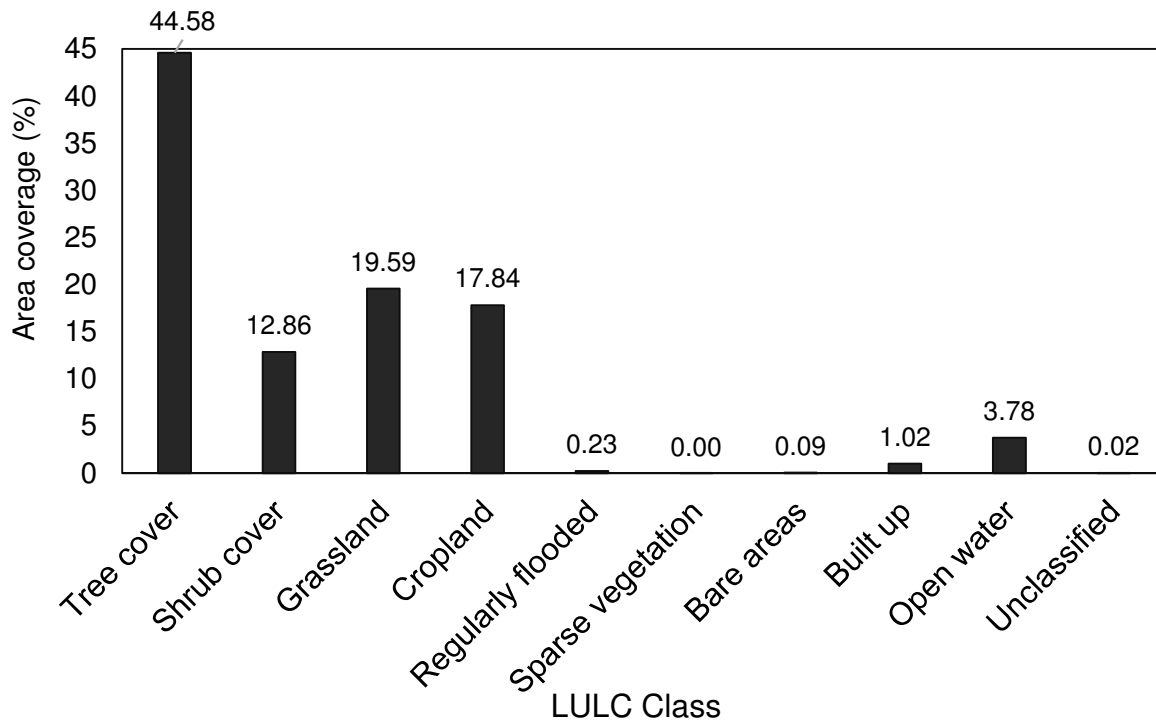


Fig. 2: Percentage coverage of land use land cover (LULC) classes in Ghana from the 2016 ESA CCI cover map

Although global deforestation rate has slowed down in the last decade (Brack and Bailey, 2013), Ghana ranks third after Togo and Nigeria out of 65 nations on deforestation rate of tropical forest (Tuffour, 2014). An estimated 78% of Ghana's tropical forest had disappeared by 1989 with the destruction of the forest at a rate of 1.3% annually for the period 1981–1985 (Appiah *et al.*, 2009; Repetto, 1990; Hawthorne, 1989; Repetto, 1988). Forest (tree cover) lost between 1990 and 2005 was about 26% (1,931,000 hectares) (Boafo, 2013) at a deforestation rate of about 3% (International Tropical Timber Organization (ITTO), 2006). Ghana's forest has been projected by ITTO to completely disappear in 25 years (ITTO, 2005). Currently, the rate of deforestation and forest degradation for Ghana stands at

2% per year (Forestry Commission, 2015; IUCN, 2016).

Forest resources are being lost at an alarming rate over the years. According to Wagner and Cobbinah (1993), one-third of Ghana's total land area of 23.9 million hectares was occupied by tropical natural forests at the beginning of the 20th century. The Global Forest Resources Assessment 2005 (FAO, 2006) indicated that Ghana lost an average of 135,000 hectares of natural forest per year between 1990 and 2000 at a deforestation rate of 1.7% per annum and a further 115,000 hectares between 2000 and 2005 amounting to about 26.0% of forest cover loss between 1990 and 2005 (Amisah *et al.*, 2009; FAO, 2005). The rate of deforestation from 1990 to 2000 for Ghana was 0.9%, 1.6% and 1.3% above the regional, Asia and South America's rate of deforestation

respectively (FAO, 2005). According to FAO (2010), forest cover loss from 1990 to 2010 was 1.96% per annum with the highest rate of 2.24% per annum occurring between 2005 and 2010. They further stated that the forest cover at the end of 2010 was 21.7% of the total LULC of Ghana with about 5% of this coming from tree plantations between 1990 and 2010 (FAO, 2010). The trend is confirmed by the Forestry Commission forest data from 1990 to 2010 (Figure 3). Primary forest area is sustained possible by the conservation policies and forest plantation increasing from 2000 to 2010. The decreasing trend of total and natural forest cover is in agreement with FAO findings (FAO, 2010, 2006, 2005). The 2016 LULC map (Figure 1 and 2) indicate that tree cover (not only forest) is 44.58% of the total land area of the country which could be attributed to the consideration of other tree factors such as the increasing

plantations across the country in the classification of ESA for tree cover in the 2016 LULC map.

Deforestation is a serious national policy challenge at present and the implementation of a viable national mitigation plan. Major factors contributing to the deforestation in Ghana are population growth, inefficient agricultural practices, wood fuel consumption (firewood and charcoal), indiscriminate logging, bushfires and mining activities (Afriyie, 1995). Disappearing forest cover significantly affects the NTFPs providing sustenance and income for 2.5 million people living in or near forest communities in Ghana (Acheampong and Marfo, 2011; Domson, 2007). Many of those living in these remaining forested areas have livelihoods predicated on the availability, access and utilization of forest products (Appiah, 2009; Asamoah *et al.*, 2007).

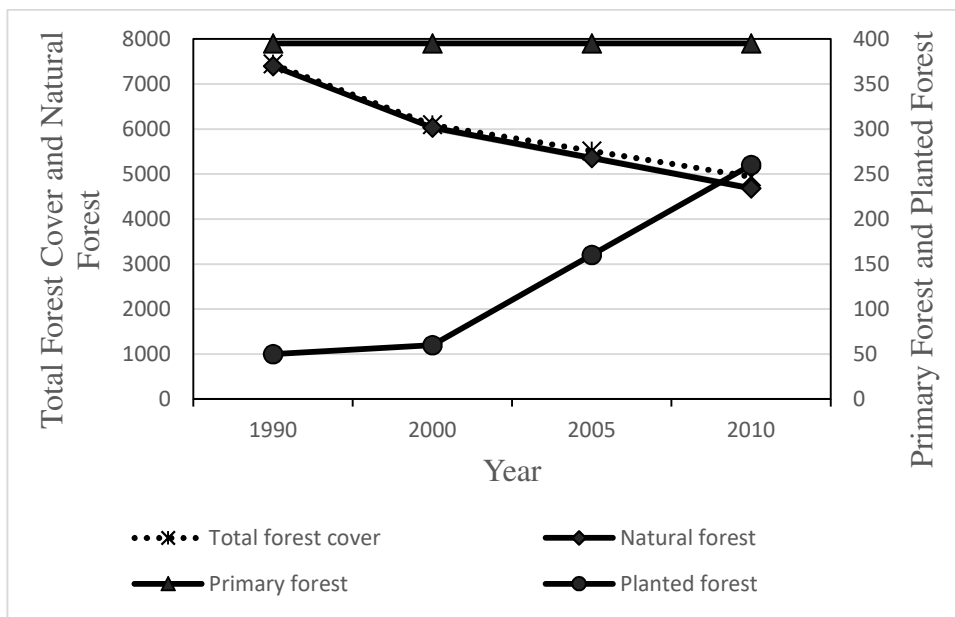


Fig. 3: Trend of forest cover change in Ghana. Total forest cover, natural forest (left) primary forest and planted forest (right).

Source (Prepared by authors with data from FC, 2016)

Principal Drivers and Causes of Deforestation in Ghana

In Ghana's Readiness Preparation Proposal, the major drivers of deforestation and degradation in descending order are identified as: agricultural expansion, wood harvesting, population and development pressures and mining and mineral exploitation (Figure 4) (Forestry Commission [FC], 2015). The major drivers of deforestation in Ghana can be identified as direct and indirect as asserted by (Quacou, 2016).

The expansion of agricultural land is viewed as the main driver of deforestation of tropical forests. In Ghana, the agricultural sector employs approximately 60% of the entire population, producing food crops and tree crops such as: cocoa, rubber, oil palm, coffee and mangoes (Quacou, 2016). One major agricultural practice often being reported as the cause of deforestation is shifting cultivation farming system. This type of agriculture is also known as the slash and burn agriculture and involves the clearing of forested land for crop production until the soil is depleted of nutrients and or the site is overtaken by weeds and then move on to clear a new site (Mohammed, 2014). The crops most heavily associated with deforestation at the global level include: soy, maize, oil palm, rice and sugar cane, (Brack and Bailey, 2013) whiles Ghana's deforestation is mostly for tree crops and maize.

Quacou, (2016) reports that "a total of about 249,846 m³ of timber worth €98.5 million was exported in the first three quarters of 2014 alone"-hence wood exploitation/harvesting standing as the second major driver of deforestation in the country at 35% (Figure 4). Attributed to the increasing exploitation of wood products are: the increasing demand for

quality wood species in the world market, growing global demand for secondary products such as chocolate, proliferation of chainsaws and small-scale mills and the attractive prices for the wood products outside the country (Forestry Commission, 2016).

Furthermore, to the growing demands of population contributes about 10% to deforestation in Ghana (Figure 4). Expanding cities and towns who require space to provide infrastructure end up clearing forests (Sands, 2005; Mather, 1991). Due to the development of facilities, increasing numbers of people migrate to the forest boundaries (Schneider, 1995). Whether supported or not by the governmental programmes, these settlers have usually colonized the forest by using logging trails or new roads to access the forest for subsistence land (Amor and Pfaff, 2008; Wilkie *et al.*, 2000).

Finally, most of the mining activities in Ghana take place in the Brong Ahafo Regions, Eastern Regions, Central Regions and Western Regions which also happen to be home to about 70% of Ghana's rainforests. Mining activities in these areas have led to the destruction of these forests accounting for about 5% of the causes (Figure 4). According to Schueler *et al.* (2011), surface mining resulted in about 58% deforestation and a substantial 45% loss of farmland within mining concessions in the Western Region of Ghana. Land destruction in the form of excavations are common (Yelpaala, 2004; Aryee *et al.*, 2003) and in some places, river banks mined to a depth of 35 m expanding about 60 m wide (Hilson, 2002). In recent times, weak institutional capacities, poor policies and corruption have led to mining operations permitted in forest reserves. The remaining vestiges of

forests reserves in Ghana are under siege from small scale illegal miners as well as large-scale exploration and production companies. About 15 forest reserves have been affected by mining, and an estimated 13,165 hectares of forest reserves are under mining lease. This trend is a major contribution to both diminishing the carbon sink and the ecological and social functions that the vegetation and forests provide for survival and development (Akabzaa and Hoetmer, 2011).

According to Boafo (2013), the drivers of deforestation vary across the various forest zones in the country. In the south, wood exploitation, mining and agriculture expansion have been identified as the dominant causes while, unsustainable charcoal and firewood production (wood exploitation), forest fires and agriculture expansion (again) are linked to the northern part of Ghana (Agyeman *et al.*, 2012).

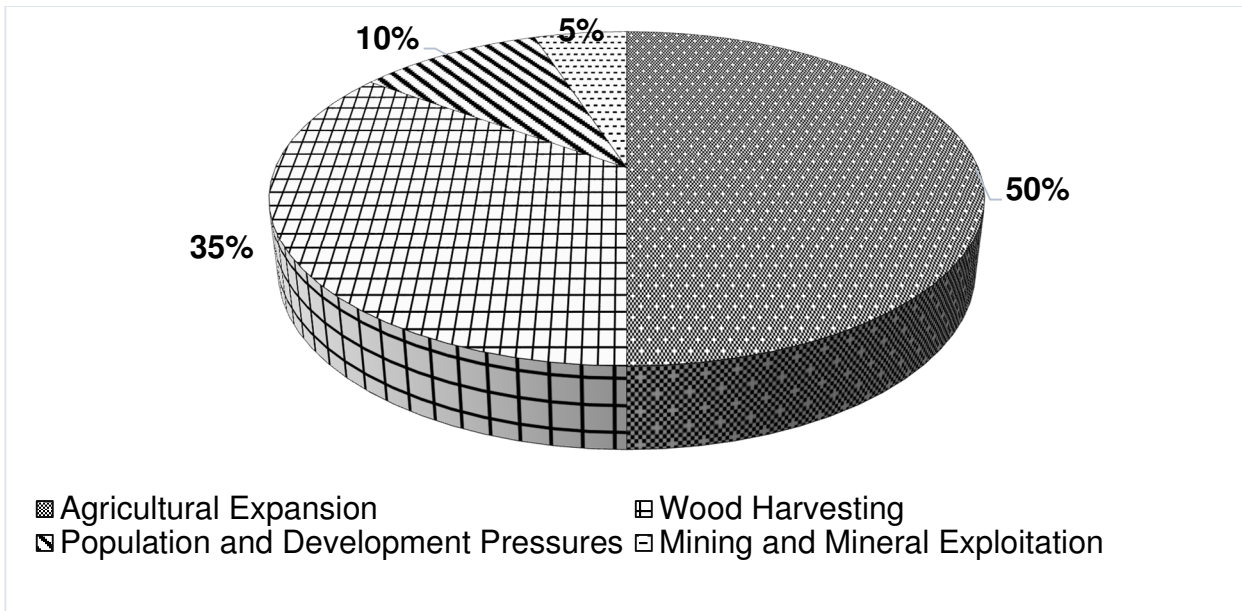


Fig. 4: Principal Causes of Deforestation in Ghana
Source: FC (2016)

Impact of Deforestation on Ghana's Economy and Resources National Economic Impact

Understanding the impact of deforestation on the livelihood and development of Ghana can be viewed in two broad ways; firstly, many of the ecosystem services and functions that support the country's predominantly agricultural economy are provided by the forest. Ghana losing these services, thus threaten the security of supply of some of

the most important foreign exchange earners in the country (Forestry Commission, 2015). Mohammed (2014) also stated that the annual destruction of tropical forests amounts to a loss in forest capital valued at US\$ 45 billion. The continuous drought (between 2010 and 2012) along the River Owabi which is a major source of water supply to Kumasi was further attributed to the deforestation activities undertaken along the head waters of the river. The resultant of this was the

shortage of portable water supply in the city (Quacou, 2016). Buttressing the above mentioned impacts, Acheampong and Marfo (2011) indicated that forest loss most importantly threatens the livelihoods and traditions of rural and forest dwelling people across the country.

Climate Change

Deforestation has been identified as a major global contributor to climate change through carbon dioxide emissions. Scientists estimate that forest loss has contributed to between 12-20% of the global greenhouse gas emissions, driving anthropogenic climate change emissions (Van Der Werf *et al.*, 2009; Solomon *et al.*, 2007). The projected increase in temperatures and rainfall patterns are but to mention a few of the threats climate change is expected to have on Ghana (Forestry Commission, 2015). Soil degradation and loss of biodiversity are serious negative impacts of deforestation under the increased global warming trend (Tindan, 2013). Deforestation exposes the surface of fertile lands to the harsh conditions of the atmosphere such as the ultra violet radiation of the sun and the blowing away of the top soils by heavy winds, thereby leaving surfaces of lands hard and bereft of plant nutrients. Many forest communities' farmlands are fragile and can be easily made non-viable by small changes in their ecology (Amisah *et al.*, 2009).

Deforestation disrupts normal weather patterns creating hotter and drier weather thus increasing drought and desertification, crop failures, coastal flooding and displacement of major vegetation regimes. The trends in carbon stock in the living forest biomass of Ghana decreased from 564 million metric tons in 1990 to 381 million metric tons in 2010 (Mongabay, 2010). In a survey conducted

by Tindan (2013) on the impact of deforestation in the Dwease and Praaso communities in the Ashanti region of Ghana, the local people affirmed the drying and dying state of crops on their farms, reduced soil moisture and general over heating of the air as evidence of global warming. This they perceived is due to the increased and continual loss of trees' cover. This is built on their comparative analysis of the micro-climate of the area over time, for length of their stay in the respective communities. Deforestation can further result in flooding. Trees absorb and store large amount of water with the help of their roots when it rains. Hence when they are cut down, the flow of water is disrupted and leads to floods in some areas and droughts in other areas.

Socio-economic Impacts

When trees are cut, the forests lose their ability to support wildlife. Also, forest resources may place its inhabitants at risk (Knox and Marston, 1998). For example, when there is forest cover loss, forest fringe communities who rely on such non-timber forest products such as snails, mushroom, and animals as their source of livelihood, turn to lose their livelihood. This is the case in most communities in Ghana living around or close to degraded Forest Reserves. Thus, the impacts of deforestation in exacerbating rural poverty are complex and widespread. Not only does forest loss reduce forest communities' contributions to national economic growth, but more critically, it threatens the livelihoods and traditions of rural and forest dwelling people across the country (Acheampong and Marfo, 2011).

Across Ghana, logging operations have also had negative impacts on the collection of NTFPs at the local community level. Forest dwelling or depending communities

rarely benefit from timber harvesting as concessions are reserved exclusively for corporate use (despite pervasive illegal tree cutting), while social responsibility agreements do not make adequate compensation provisions when forest dwellers' farming activities are destroyed in the process of timber harvesting (ITTO, 2005). It is estimated by World Bank (2004) that close to 60 million indigenous people greatly rely on forests while 350 million people highly rely on forest for their livelihood and income. A study conducted by Tindan (2013) in Dwease and Praaso in the Ashanti region of Ghana revealed that, the exploitation of forests through the collection of Non-timber Forest Products such as, bush meat, fire wood, herbs, etc.), have contributed to household livelihoods. It was also discovered that royalties paid to community chiefs serves as a source of income.

Forests Management Measures in Ghana

Tropical deforestation as a global challenge has gained attention in both research and policy (Tindan, 2013). The numerous services forests provide to the local people in Ghana has informed the government's efforts to protect forests and curb deforestation (Appiah *et al.*, 2009), targeting the promotion of economic development through engagement in reforestation and promoting sustainable utilization of natural forest resources with local involvement (Blay *et al.*, 2008). These approaches centre on the local people as key players in understanding their environment and judiciously managing the forests (Hares *et al.*, 2006). However, divergent views in terms of forest management goals, methods, utilization, and preferences have often bottlenecked these approaches (Appiah *et*

al., 2009). Despite these roadblocks, the government has undertaken some afforestation programs in order to revive the nation's degraded forest, a major one being the Ghana Forest Plantation Strategy for the period 2012 to 2040 (Quacou, 2016). This follows the XII World Forestry Congress in Buenos Aires in 2009 and the United Nation Conference on Sustainable Development in Rio de Janeiro in 2012 (Quacou, 2016). This program led to the formulation and revision of National Legal and Policy Framework to protect the environment in general and forests in particular.

Ghana's forest policies and resource management dates back to legislations enacted to control the felling of commercial trees in 1906 and the creation of the Forestry Department in 1908 as presented in Table 1 (Boon *et al.*, 2009). The Forestry Department (now Forestry Commission) was established to manage timber resources and to assist in conserving a well distributed area of forest throughout the country (Oduro *et al.*, 2011; Kotey *et al.*, 1998). Forest estates reservation and demarcation were largely completed in 1939 and a forest policy which remained in effect for forty six years was adopted in 1948 (Forestry Commission of Ghana, 1994). Throughout the years (from 1948), many laws, policies, reforms and programs aimed at forest and wildlife resources management in Ghana have been established (Table 1). Notable amongst these are the: forest ordinance of 1951; forest improvement Act of 1960; Wild Animals Preservation Act, 1961 (Act 43); Wildlife Reserves and Conservation Policy of 1974; Forest Protection Decree, 1974; Trees and Timber Decree 1974; Trees and Timber Regulation of 1983; Forest Protection (Amendment) Law, 1986, 1994; Forest and Wildlife Policy,

Timber Resource Management Act, 1997 - Act 547; The Forest Protection Amendment Act of 2002; Forest Resource Management Project (FRMP); Forestry Development Master Plan (developed in 1996); Forest Sector Development Project (FSDP-1) (launched in 1995 and expired in 1999), National Environmental Policy (developed in 1995); National Environmental Policy (developed in 1995); Forest Sector Development Project (FSDP-2) (launched in April 2000 and expired in 2006); Natural Resources Management Program (NRMP) (launched in September, 1999) and Protected Area Development Program Phase II with emphasis on Community Resource Management Areas (CREMAs) (Arhin, 2014).

Most of the early forest policies however, dwelt mainly on the sustainable supply of timber for the wood industry and thus promoted overexploitation resulting in the demise of unreserved forests. The government then, by 1978 placed approximately 3,267,250 hectares of forests under permanent forest estate (Boon *et al.*, 2009). According to Kotey *et al.* (1998) Many [forest] reserves had become badly degraded, the annual

allowable cut bore little relation to estimates of sustainable yield and some important timber species were threatened with commercial extinction in twenty years if current policies continued. The landholding authorities and local communities had become marginalized and alienated owners of the resource with few rights and even fewer responsibilities. There was overcapacity and waste in the timber industry. In certain quarters, patronage and corruption was rife.

Efforts to correct the situation with the Forest and Wildlife Policy of 1994 proved futile. A new Forest and Wildlife Policy was drafted by the government in 2011 to guide and help overcome many barriers to the country's forest conservation efforts. There have been several programs instituted to surmount the challenges of deforestation and degradation; Including the Natural Resources and Environmental Governance (NREG), Voluntary Partnership Agreement (VPA), Non-Legally Binding Instrument (NLBI), the Forest Investment Program and the REDD+ initiative under the Forestry Carbon Partnership Facility of the World Bank (Arhin, 2014).

Table 1: Key legislative and policy reform initiatives of the forestry sector (1948-2012)

Forest laws, policies and programs	Core objective (s)
1948 Forest Policy	Creation of permanent forest estates. Protection of forests. Protection of water catchment areas. Environment protection for ecological balance.
Forest Ordinance, 1951	Protection of forests. Protection of forest reserves.
Forest Improvement Act of 1960	Forest plantation development. Timber plantation establishment and management
Wild Animals Preservation Act, 1961 (Act 43)	Conservation of wildlife
Wildlife Reserves and Conservation Policy of 1974	Protection of wildlife resources. Species conservation. Wildlife conservation areas.

Forest Protection Decree, 1974	Protected areas development. Defined forest offences. Forest protection.
Trees and Timber Decree 1974	Logging guidelines for timber industry. Sanctions for non-compliance with the guidelines. Promotion of export of processed timber.
Trees and Timber Regulation of 1983	Regulation of felling of trees (chain saw). Forest plantations operation Regulation of logging activities. Defines forest offenses and penalties.
Forest Protection (Amendment) Law, 1986	Forest Protection. Protection of water bodies. Species conservation. Species conservation Regulation of timber harvesting. Development of cottage and agro-based industry
1994 Forest and Wildlife Policy	Community forestry and forest conservation. Deregulation and streamlining of bureaucratic controls on wood export marketing. Involvement community in conservation of forest and wildlife resources. Rehabilitation and development of degraded forests. Protection of forests.
Timber Resource Management Act, 1997 - Act 547	Timber utilization contract Offences for illegal logging. Protection of logging on farms and plantations. Community forestry and forest conservation. Protect forest and wildlife.
The Forest Protection Amendment Act of 2002	Reforestation and afforestation programs Forest offences penalties. Protection of water catchment area. Institutional strengthening of forest sector agencies
Forest Resource Management Project (FRMP) (Effective November 1989 to June 1997)	Development of policy planning, monitoring and evaluation and capability. Provide guidance towards reforms and initiatives to control deforestation in line with the Vision 2020.
Forestry Development Master Plan (developed in 1996)	To assist with the establishment of a forest service capable of effective and efficient implementation of forest policy.
Forest Sector Development Project (FSDP-1) (launched in 1995 and expired in 1999)	To transfer the then Ghana Forestry Department (FD) into an autonomous self-financing Forest Service (FS).
National Environmental Policy (developed in 1995)	Improving the general performance of the environment.

Forest Sector Development Project (FSDP-2) (launched in April 2000 and expired in 2006)	Control deforestation. Assist GoG and other stakeholders in the creation of an institutional framework that increases the sector's contribution to poverty reduction and sustainable economic growth.
Natural Resources Management Program (NRMP) (launched in September, 1999)	Assist GoG in implementing its policy of protecting, rehabilitating and sustainably managing national land, forest and wildlife resources by: (i) institutionalizing viable sustainable land, forest and wildlife management systems nationwide and (ii) establishing effective national policy. Ensure predictable and sustainable financing for the forest and wildlife sectors and effective law enforcement.
Natural Resources and Environmental Governance (NREG) (A five-year program which began in 2008)	Improve mining sector revenue collection, management, and transparency. Address social issues in forest and mining communities. Mainstream environment into economic growth through Strategic Environmental Assessment (SEA), Environmental Impact Assessment (EIA), and development of a climate change strategy.
Voluntary Partnership Agreement (VPA) signed in Brussels on November 2009	Provide a legal framework aimed at ensuring that all imports into the EU Community from Ghana of timber products covered by this agreement have been legally produced and in doing so to promote trade in timber products. Strengthen political commitment and action at all levels to implement effectively sustainable management of all types of forests and to achieve the shared global objectives on forests.
Non-Legally Binding Instrument (NLBI) adopted in April 2007	Enhance the contribution of forests to the achievement of internationally agreed development goals, including MDGs, in particular with respect to poverty eradication and environmental sustainability. Provide a framework for national action and international cooperation to implement the Instrument.
Protected Area Development Program Phase II with emphasis on Community Resource Management Areas (CREMAs) a continuation from Phase I (1996-1998) Reduced Emissions from Deforestation and forest Degradation (REDD+). (Engagement beginning in 2008)	Reduce poverty through enhanced conservation of the biodiversity heritage of Ghana. To enable the nation to meet its non-binding commitments under the UNFCCC/Kyoto Protocol frameworks.

Forestry Investment Program piloted in March 2010 and approved in November 2012

2011 Forest and Wildlife Policy

To reduce emissions from deforestation and degradation.

Securing the Integrity of Natural Forests and Woodland Resources Enhancement of Carbon Stocks.

Climate Smart Agriculture and Watershed Protection.

Manage and enhance the ecological integrity of forests.

Promote the rehabilitation and restoration of degraded landscapes.

Promote the development of viable forest and wildlife-based industries and livelihoods.

Promote training, research and technology development that supports sustainable forest management.

Promote information uptake both by forestry institutions and the general public.

Promote and develop mechanisms for transparent governance, equity sharing and citizens' participation in forest and wildlife resource management.

Source: (Arhin, 2014)

Forest and Wildlife Policy

The first formal forest policy statement made by the Government of Ghana to manage and protect the reserves, was formulated in 1946 and approved by the Governor-in-Council in 1948. The policy remained in force for nearly half a century and has had a pronounced impact on forest and people. The emphasis on protection of the reserves was due to the implicit expectation that all forests outside the permanent reserves would have ultimately been converted into agricultural land. The inability of the policy to explicitly state implementation measures coupled with inadequate resources for its implementation aroused public discontentment about the forestry policy in the 1980s, one of whose main consequences was an in-house Forestry Department review exercise that took place in 1984. In 1994, a new Forest and

Wildlife Policy covering both forest and wildlife conservation and management and sustainable development for maintenance of environmental quality and economic benefits for all segments of the society was adopted (FC, 2016). The Ghana Forest and Wildlife Policy 2012, is a revised form of the old policy to take advantage of these emerging opportunities to maximize the rate of social and economic development of the country and secure optimum welfare and adequate means of livelihood from the forestry sector to all Ghanaians.

The policy seeks to:

- I. Consolidate good governance through accountability and transparency
- II. Enhance active participation of communities and land owners in resource management and addressing issues on tree tenure and benefit-sharing

- III. Promote small and medium forest and wildlife enterprises as a means of job creation for the rural and urban poor
- IV. Increase biodiversity conservation
- V. Promote sustainable management of savannah woodland
- VI. Promote ecotourism development
- VII. Increase government commitment to degraded landscape restoration through massive forest plantation development schemes
- VIII. Improve research and application of modern and scientific technology in resources management
- IX. Develop climate change adaptation and mitigation measures, and
- X. Secure sustainable financing for the forest and wildlife sector.

The Modified Taungya System (MTS)

The Modified Taungya System (MTS) is an Agroforestry system, and a newly adapted version of the original Taungya system. It is a co-management arrangement between the Forest Commission and local communities. It was introduced in Ghana in 1930 (von Hellermann, 2007), however, little success was achieved under the traditional Taungya system as the government was unable to effectively manage huge plantations throughout the country. In addition, Ghanaian farmers had no tree ownership, no financial benefits accruing from the planted trees (Milton, 1994) and no decision-making role in any aspect of forest management (Birikorang, 2001). A lack of supervision and abuse of power by forest and public officials, especially in farm allocation were other issues identified by Agyeman *et al.* (2003). The system was consequently, suspended in 1984 (Witcomb and Dorward, 2009; von Hellermann, 2007). The Ghanaian government, within its 1994 Wildlife and

Forest Policy (WFP) and forest plantations development programme, reviewed and reintroduced the Taungya system in 2002 as the modified Taungya system (MTS). The objective of the MTS was to meet future demands for industrial timber, improving environmental quality through the restoration of degraded forest lands and increasing national food security through increased food production (FC, 2006).

National Forest Plantation Development Programme

The government launched the 'National Forest Plantation Development Programme' (NFPDP) in 2001. This programme encompasses three different strategies to reduce deforestation and to replant the degraded forests in the country via forest plantations in degraded forest reserves. In addition to restoring the forest cover in degraded forest reserves and improving environmental quality, the main goals are to decrease the wood deficit in the country, to create employment in rural areas with a view to improving the income of the rural communities and to increase the production of food crops (FC, 2013).

Ghana's Emission Reductions Programme for the Cocoa Forest Landscape

The degradation and deforestation in Ghana's High Forest Zone (HFZ) for nearly a century, have largely been driven by low-yielding, expansive agricultural practices predominantly cocoa coupled with the progressive growth of other extractive industries, like timber production. Hence the Ghana Cocoa Forest REDD+ Programme was designed as an approach to help reduce degradation and deforestation from agricultural expansion as well as illegal logging and illegal mining, in a manner that will secure the future of Ghana's forests (FC, 2016).

National Climate Change Policy Action Programme 2015-2020

The programme aims to establish stringent measures needed to address the challenges posed by climate change and climate vulnerability. The programme has focus on areas such as; improving governance, capacity and regulatory structures, securing the integrity of forest and other national ecosystems, sustainable wood-based fuel production and development for domestic energy supply, plantation development (Afforestation, Reforestation, and Forest Restoration), conservation of trees through Agroforestry and On-farm practices, and greening of urban areas (FC, 2016).

Challenges in Forest Management Policy Limitation

Forest policies can be regarded as an “imposition” of practices towards management of forest resources which in the end have a simultaneous influence on the livelihood of communities or individuals who solely depend on the forest. Since time immemorial, rural communities have been noted for the use of forest resources as a source of livelihood, however, policies are not designed to fit these indigenous people who are custodians of the forest (Démurger *et al.*, 2009). For instance, the 1948 forest policy performed made no provision for the commercial plantation development to include the local people (Ghana Forest Watch, 2006). The local communities were restrained from entering the forests while royalties due community Chiefs were under-paid (Teye, 2008). This deliberate side lining led to the situation where due to the lack of equitable sharing of forest proceeds, the local communities supported illegal chainsaw operators and illegal felling of timber resources. Although the amendment of this in the 1994 forest

policy to ensure equity and fair distribution of forest resources also became a mirage (Alhassan, 2010). In addition, the 1948 forest policy although was aimed at the regulation and sustainable supply of industrialized timber, it was reported to be very exploitative in nature by the CFMU (1999) and therefore lacked the efficacy and the efficiency. This is in conformity with a study conducted by Derkye (2007) who attributed the limitation of the policy to its protection and management of just 30% of the total forest tract as reserves while approving the use of the remaining 70% of the forest tracts outside the forest reserves for agricultural activities.

Limitation of Skills and Surveillance Instruments

It will be very discriminating to just look at physical instruments when it comes to examining the limitation of skills and surveillance instruments towards the management of Forests in Ghana. Not envisioning so far from the daily happenings in the country, Ghana’s forests for some periods now, are being used for economic and political interests of the political elite, high ranking officials of the Forestry Department and private timber contractors (Teye, 2008). Hence, award of concessions is usually not transparent. Indeed, resources exchanged within networks can be both "material" and "immaterial" (Scharpf, 1978) and this can be regarded as a major limitation. In addition to this, a review by the FC (2007) on the “existing business process” a system which monitors trees and logs at the various stages of harvesting and trade reveals several problems with the system, some of which are:

- Post-felling inspection which still allows for excessive damage to the forest, and overharvesting by removal

of trees that are not part of the yield list.

- Little time for monitoring and controlling the conduct of forest operations by forestry officials due to much time spent on data-collection tasks, with the Timber Industries Development Division staff checking the Log Measurement and Conveyance Certificate forms filled out by Forest Service Division staff.
- Personal friendship between staff and timber contractor drivers erodes the will to enforce regulations properly at the various fixed checkpoints.

Cultural and Customs Drawbacks

From time immemorial, Ghana has been conscious in the management of her forests through the application of indigenous knowledge in the form of taboos, belief in totems and the institution of sacred groves. To a large extent, Ghana's forests were preserved in the olden days before the advent of western perspective of development and nature. And since its introduction, there have been several debates on which among the two have been the most effective in conserving forests in Ghana. Kalu (2001) stated that Ghana's adoption of the western perspective of development is a principal reason for disregarding these indigenous knowledge of conservation in forest policies that were used by most ethnic groups in Ghana and hence seem useless and negligible as compared to the useful scientific knowledge (Luthfa, 2006). Consequently, decisions consistent with western scientific knowledge often prompt timely response and acceptance when observed alongside with indigenous knowledge and beliefs (Ali, 2003). It has led to conflicting views between economic developments and forest management in Ghana. These policies and approach

should be revisited in order to complement areas where the western perception of management falls short.

Climate Change

Ghana's forests without exception are prone to several disturbances such as fires, droughts, disease infestation among others. However, with emergence of climate change, these disturbances have the probability of increasing both in occurrence and intensity which can possibly exceed forest ecological resilience and result in permanently altering forests or shifting to non-forest ecosystems (UNFF, 2017). For instance, although the impact of forest fires coupled with drought in the year 1983 are argued to have caused loss of forests in Ghana and it is believed that, such loss actually served as the bench mark for increased deforestation in the country (Insaidoo *et al.*, 2012), there appeared to be a sharp increase in forest fires as the total area of plantation coupes affected by fire at the end of March 2014 stood at 3272 Ha (FC, 2014). According to Yang *et al.* (2014) continuous or increasing global warming could make primary fires caused by climate change the most important driver of deforestation, more significant than any other cause, such as the conversion of forestlands to agriculture.

Conclusion and Policy Implications

The continuous development and debate on policies to safeguard Ghana's forests will be meaningless, and the obliteration of Ghana's environment will remain unabated if these policies are not backed with actions. The future survival of a country, is dependent on the ability to efficiently plan and manage its environment resources. In our view, to shift from consumptive to non-consumptive use of these resources,

Ghana, needs to redefine some of her environmental policies to ensure that our quest to develop will not come with a great cost to the environment. Currently in Ghana for example, Indigenous knowledge is gradually becoming insubstantial such that communities around Forest Reserves and the public, as a whole, are using these resources in unsustainable way. Exploitation of forests and its resources is far reaching saturation point. It must also be noted that the measures to reducing deforestation in Ghana, must go hand in hand with improving the wellbeing of Forest Fringe Communities. Forest Reserves in Ghana have in one way or the other experienced some form of forest cover loss. We recommend that scientists scrutinize the extent to which the issue of deforestation has affected the country's economy and her environment, and policy makers revise and where necessary formulate new policies backed with effective actions that will help in the conservation of Ghana's Forests. We further recommend that attention is paid to the adoption of a bottom-up approach in forest resources management through proper inclusion and involvement of the various stakeholders in the conservation and management process.

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