Assessment of Forest Management Practices in Ghana - A Case Study of Some Forest Districts in Ghana

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Abstract

The factors that affect deforestation and forest management though complex and financially demanding were to a limited extent examined by this research. The overall objective of the research was to assess the effectiveness and efficiency of forest management practices in ensuring sustainability for the promotion of ecological and environmental conservation. The research revealed that conventional notions such as government policy, institutional/administrative weaknesses, indiscriminate bushfires, and agriculture impact significantly on forest management. The research, however, contradicts the conventional notion that factors such as population growth and physical infrastructure development strongly impact forest management. Currently, the impact is low but not significant as contended in the conventional notion on the causes of deforestation.

Government policies and stakeholder participation in forest management play an important role in forest management and requires much research into government policies for forest management. The creation of greater awareness and education on such policies among all stakeholders and a stronger government commitment to the enforcement of policies is vital in the success of forest management practices. Modifications in the system of ownership of forests also need to be reviewed. The community forestry concept is an example of a positive step the government of Ghana has taken to make forest fringe communities, the stewards and trustees of forests to ensure effective management. The inherent weaknesses of non - involvement of community members in the initial decision making process on forest management, requires an early review of the approach to decision making for the entrenchment of the meager achievements that has been made.

Keywords: forestry, deforestation, population growth, stakeholders

Introduction

Forests have since ancient times played an important role in the lives of people and environment in general. Forests provided and continue to provide numerous benefits to humanity. According to Chapin III et al. (2001), humans depend strongly on biological resources for food, construction materials, medicine and energy. In modern times, another benefit of forests (for recreation) is being given more attention than it did some fifty years ago. The recreational importance and its subsequent economic benefits are receiving the attention of governments in some developing countries as a means of improving their economies through
tourism activities. Human activity and technological developments are, however, posing a threat to the sustainability of forests and the subsequent benefits of forests. The rapid degradation of natural resources through human activities and other developments have resulted in doubts about the continuous availability of the benefits, particularly to future generations. According to Vitousek et al. (1997), the US Nuclear Regulatory Commission has stated that the expansion rate of human populations coupled with their increasing rate of consumption and technological development have led to two general environmental concerns. The concerns are the increasing impact of human on the earth’s environment and ecosystems, through changes in carbon pools of the biosphere, climate, as well as element cycling, and changes in the earth’s biota and communities. The concerns also include species introductions and extinctions and fragmentations of natural communities through changes in land use.

In recent years, conservation biologists and ecosystem ecologists have intensified their research efforts on forest management techniques in developing countries due to the dangers that forest depletion and environmental degradation have on human welfare and ecological systems in such countries. Through conservation research various techniques for managing forests have been developed. However, differences in ecological systems and the cost involved in using some of the techniques do not allow mass application globally.\(^1\) This requires that researchers take factors like affordability and ecological suitability into consideration in developing forest management techniques or practices.

In West Africa and Ghana in particular, a number of researches have been conducted into appropriate forest management practices. The need for conducting research into appropriate forest management is because forest resources play an important role in the economy by providing employment, foreign exchange earnings, and micro-climate protection. The low level of technological development limits the industrial sector from performing well in the economy as in the case of the western world. The inability of the industrial sector to perform effectively has resulted in the considerable dependence on forests for food, medicine, employment among others. Human activities such as farming are causing the loss of forest lands and resources.

Efforts at controlling forest degradation through forest management has not achieved the expected impacts and calls for a reconsideration of current forest management practices for the identification of weaknesses and the subsequent measures to address them.

This research assessed forest management practices in the Ashanti region of Ghana and suggested appropriate measures for complementing forest management practices to ensure sustainability.

**Hypothesis**

The research hypothesis was that, increased population growth (2.6% in Ghana) coupled with the overdependence on the forest for domestic fuel needs (75%), weak institutional/administrative systems, demand for wood and wood products (nationally and internationally), low stakeholder participation and physical infrastructure development impact significantly on forest management practices in Ghana. The hypothesis was tested using 12 communities around three forest reserves in the Ashanti region; namely, Tano Offin, Nkrabia and Afram Headwaters forest reserves. The maps of the reserves showing some of the communities as provided by the Forest Services Division are shown below.
Research Methodology

The research approach adopted was secondary and primary data collection methods. The secondary data collection involved the reading of literature on forest management and the management practices. Basically, chapter two contains most of the literature extracts. In the primary data collection, simple random sampling and stratified sampling research methods were used to select communities and wood processing industries from the three forest districts of the research area. The community survey was preceded by the selection of forest districts through the assistance of technical officers of the Forestry Services Division (FSD). The mode of selection of the three forest districts was based on the type of forest management purposes of the FSD. The purposes are namely, timber production management, fire prevention management and biodiversity management.

Following the selection of the three forest districts, each forest district was then divided into north, south, east and west depending on the alignment of the forest boundary. A travel or walking distance of 0.5 – 1.0 kilometer, 1.5 - 2.0 kilometers up to 4 kilometers was used to determine the proximity of communities to forest boundaries. The communities were then stratified into proximity to forests boundaries using the travel or walking distances. The closest communities of 0.5 - 2.5 kilometers from the forests in each of the divisions (north, south, east and west) per forest district were selected.

After the selection of communities, a reconnaissance survey was conducted. The reconnaissance survey involved familiarization of the community layout, a pre-testing of the questionnaires (to test the understanding of the people to the questions being asked) and the conduction of a house count per community. Following the house count from the reconnaissance survey, the simple random sampling method of data collection was used to select interviewees from different houses in the communities for the individual questionnaire survey. The simple random sampling of interviewees involved interviewing individuals from every other house. A total of 220 interviewees were interviewed from twelve communities of the three forest districts, shown above.

Unlike the forest fringe communities, the wood processing industries are located in Kumasi the regional capital. The wood processing industries were stratified based on the scale of their operation. The wood processing industries were stratified into small-scale (employing 1 - 10 people), medium-scale (employing 11 - 20 people) and large-scale (employing above 20 people). The simple random sampling approach was used to survey individuals from each of the stratified groups of the wood processing industries for the survey. A total of 30 interviewees were interviewed from the wood processing industries. The methodology adopted is depicted diagrammatically below.
Justification

The selected reserves and communities for the study are justified on the basis that Nkawie, Offinso and Bekwai forest districts are a few of the forests found in the deciduous rainforest belt of Ghana. The fertile soils in these forest districts attract both internal and external migrants from the northern regions of the country. The increasing population numbers from these areas is a threat to forest management activities in the three selected forest districts. Furthermore, the districts are deprived in terms of modern communication and other services available in big urban centers, which are disincentives to attracting skilled technical forest officers to work in the districts. Moreover, the offices are ill-equipped to manage and control the forest activities. Thus, illegal forest operators are able to operate easily without being caught. Involvement of the local people in the decision making processes concerning forest management in the area is low compared to others.

The research questions investigated in relation to the research hypothesis are as follows;

- What are the types of forest management practices/systems in use in Ghana and how effective and efficient are they in ensuring the forests sustainability?
- What are the problems inhibiting the sustainable management of the forests?
- Who are the stakeholders in the management of the forests, and what are their contributions to forest management?
- How effective are these contributions in ensuring the sustainability of forests in Ghana
- How can current forests management systems be managed sustainably in the long term?

Research Objectives

The overall objective of the research is to assess the effectiveness and efficiency of forest management practices in the study area in ensuring the sustainability of the forests and in promoting ecological and environmental conservation. The specific objectives are as follows; to

1) identify forest management practices in the selected forest districts of the Ashanti region of Ghana and would be used to;
2) evaluate the socio-economic and environmental impacts of these practices on communities within and around the study area;
3) evaluate the level of collaboration and involvement of stakeholders especially local communities in forest management in the selected forest districts;
4) identify and evaluate how the management practices are promoting women’s livelihoods and reducing poverty;
5) identify appropriate alternative income generating activities for local people to reduce their over dependence on forests for livelihoods;
Definition of forest management

Forests according to Evans (2001) have been managed by human societies all over the world long before writers started to write. Evans (2001) also wrote that many publications that purport to chart the history of forest management are really histories of silviculture which also try to narrow down silviculture as practiced by forestry professionals since the eighteenth and nineteenth century. From Evans’ assertion, the simple question one can ask is what then is forest management?

In Gregorich et al (2001) forest management is defined as the practical application of scientific, economic, and social principles to the administration and working of a forest for specified objectives. Particularly that branch of forestry concerned with the overall administrative, economic, social, scientific and technical aspects especially silvicultural production and forest regulation. Menzies (1995) defined forest management system as a set of rules and techniques that people devise to maintain forested land in a desired condition, including the processes through which the rules and techniques are adapted to deal with changing circumstances.

Various internationally accredited organizations have also developed definitions of forest management. The United Nations Framework Convention for Climate Change (UNFCCC) defines forest management as a system of practices for stewardship and use of forest land aimed at fulfilling relevant ecological (including biodiversity), economic and social functions of forest in a sustainable manner. The FAO also interprets the term forest management as dealing with the overall administrative, economic, legal, social, technical and scientific aspects related to natural and planted forests. It implies various degrees of deliberate human intervention, ranging from actions aimed, at safeguarding and maintaining the forest ecosystem and its functions, to favoring specific socially or economically valuable species or groups of species for the improved production of goods and services.

Another definition on forest management is that by the European Environmental Agency (EEA). According to the EEA, forest management is the application of biological, quantitative, managerial, economic, social and policy principles to the regeneration, utilization and conservation of forests to meet specified goals and objectives. From the different definitions listed above, the central understanding that is clearly represented by all the definitions is the need for forest management to fulfill specified objective(s). The objectives of management are however, defined by negotiations between different interest groups or the prioritized needs of a particular political leadership in power. Forest management would, thus, to a minimum extent involve the enforcement of boundaries, setting of yield levels for the harvesting and controlling of forest products and the allocation of costs and benefits obtained from forestry to society as a whole.

The most suitable working definition adopted for this research is a modified form of the definition by the EEA; the planning, implementation and application of a system of biological, quantitative, economic, social and policy principles for the stewardship, regeneration, utilization and conservation of forests to meet specified goals and objectives.

Concept of silviculture in forest management

Silviculture is a very important discipline in forestry. According to Belt and Campbell (2004), silviculture is the agriculture of trees; how to grow them, how to maximize growth and return and how to manipulate tree species compositions to meet landowner objectives and involves the managing and handling of the forest in view of its silvics.

The practice of silviculture can be divided into three areas; methods of production, intermediate cutting and protection of forests. The practice of replacing old trees either naturally or artificially is known as regeneration or reproduction. In intermediate cuttings, various types of cuttings are undertaken during the development of the forest, i.e. from the reproduction of the trees to the maturity of the trees. The cuttings also known as thinning is done to improve existing stands of trees, regulate growth and provide early financial benefits without the direction of efforts at regeneration of the forest.

From the definition and art of silviculture, silvicultural systems can be divided into systems that employ natural regeneration in which tree crops are renewed by natural seeding or occasional sprouts of regrowth and those involving artificial regeneration of trees through the raising of trees from seed or cuttings.
Forest management practices

Forest management practices can be said to be those methods used for the protection, production and harvest of timber and the wise stewardship of forest lands. The management of forests requires better understanding of forestry systems because of the effects that a selected management practice can have on wildlife and biodiversity in general. Forests naturally experience disturbances from insects and diseases and forest management practices can either speed up such natural processes of the disturbances or be used to tend the forest for productivity to be maximized. The objectives of a forest management plan can serve as a deterministic tool in selecting a forest management system or practice since each management practice benefits different groups of wildlife. The most common forms of forest management practices are:

- even - aged management (clear - cutting, shelterwood cutting and seed tree harvesting)
- uneven-aged management (group selection, and single tree selection) and
- reforestation (natural regeneration and artificial regeneration).

The basic introductions into the most common forest management practices listed include even aged, uneven aged and uniform systems.

Even – aged management

Even - aged system is a system in which the stand of all trees of approximately the same age in a given area are all harvested at one time or in several cuttings over a short time to keep the stand in approximately the same age. When the silviculture management is aimed at achieving even - aged stands composed of trees of generally uniform size, the silvicultural systems is termed uniform system. An even - aged system is undertaken commonly for shade - intolerant hardwood trees like oak. Trees in the same stand might have different diameter because the smaller tree may not have received enough sunlight, nutrients and water. The harvesting practices for even - aged management system are clear - cutting, shelterwood cutting and seed tree harvesting.

Uneven - aged management

The uneven - aged management is the silvicultural system of having classes of different tree ages in the same area or stand. The uneven - aged system maintains timber stands in many stages of growth through the cutting of selected groups of trees or of individual trees. The group selection method involves the selection of group of trees for harvest over several years until the entire stand has been cut over a period of 40 - 50 years or more. The group selection method is practiced mostly in bottomland hardwoods.

The single - tree selection method of uneven - aged management deals with the cutting of ready to harvest trees of low value. Through the single - tree selection method, timber is continuously produced as new seedlings constantly grow at the place of harvested trees.

Reforestation

Reforestation involves planning for the future growth of stand. The two basic methods of reforestation are natural regeneration and artificial regeneration. Natural regeneration is dependent on nature for the provision of seed for the start of new tree stands. The degraded land is left to fallow by allowing for the natural processes of forest succession, and for the re - establishment of healthy and resilient forest ecosystems. Forms of natural regeneration forest management practices are shelterwood cutting, single - tree selection, seed tree cutting and group selection. Natural regeneration though cheap can be practiced in places of low human population.

Unlike natural regeneration, artificial regeneration or assisted natural regeneration involves the planting of seedlings of genetic quality and species for future stand. Artificial regeneration involves the suppression of weeds around naturally established seedlings, protection of the area from fires and the planting of desired species. The problem with artificial regeneration is that it requires a lot of investment; it was used most often after clear – cutting.

In Ghana, the above mentioned forest management practices have been applied at some point in time in the country’s forest management history and some are continually in use which would be discussed below.

History of silviculture and forest management practices in Ghana

Forest management in Ghana especially in the high natural forest since the 1920s, has generally followed
the European uniform system, enrichment planting and selection systems. The uniform system, enrichment planting and selection systems are the silvicultural systems that have mostly been tested in Ghana.

**Uniform system**

The uniform system in Ghana was aimed at the production of an even-aged natural forest. The uniform system entails the removal of entire marketable standing stock to enhance the regeneration of economic species, thereby increasing the economic value of the natural forest. The process involves the gradual or sequential opening of the forest canopy by removing climbers, and undesirable tree species to favour the growth and development of economic trees. The uniform systems practised in Ghana include tropical shelterwood system and post exploitation system.

The tropical shelterwood system introduced into Ghana in the late 1940s was experimented in the Bobiri Forest Reserve in the Ashanti region and was later extended to some three other reserves; namely Asenanyo, Pra-Anum and Nueng forest reserves (Osafo, 1970). A series of operations covering a ten year period, were laid down to open up the canopy from below to induce natural regeneration for the growth and development of existing valuable species such as the Meliaceae, a tropical plant with medicinal properties used in soaps, lotions and toothpaste. The series of operations involved the cutting of lianas from the ground level as high as could be reached to free crowns of crop trees and reduce latter felling damages. Small unwanted under-story trees were manually removed by cutting and larger unwanted trees in the lower and middle canopies poisoned. Further poisoning was undertaken during the second year and the third years. The further poisoning was used to assess the cleaning of the regeneration. Mercantile species were exploited in the fifth and sixth years with clearing of climbers and coppicing of damaged regeneration undertaken in the seventh year. The final part, the cutting of climbers was done in the tenth year.

The uniform system failed to achieve the desired results of improving the growth of first class economic trees. The non-economic and lower economic tree species rather took over the fast growth of the first class economic trees. The uniform system was also expensive to operate (in terms of the acquisition of chemicals and tools for the poisoning) and was discontinued after twenty two years in 1960.

In the post exploitation system, the cutting of climbers, the clearing and poisoning of understory and non-economic tree species was done after timber has been exploited. The post exploitation was also discontinued after assessments showed that low class tree species and non economic tree species were growing faster than the first class species which were the target of post exploitation management system.

**Selection System**

The selection system is a system of forest cutting in which single trees (single tree selection) or small groups of matured trees (group selection) are harvested for the regeneration of a new age class of trees to replace the harvested trees. The selection system is aimed at inducing natural regeneration by retaining the uneven-aged structure of the natural stand but with more varied composition of tree species than the uniform system and more commercial species than the untreated natural stand (Dykstra et al., 1996).

The selection system was implemented in Ghana in the early 1950’s and was called the modified selection system (MSS). The modified selection system was a variant of the selection system which required better insight into the silvicultural requirements of each specie. However, information on the favoured economic species at that time was not known. The modified selection system was also called the combined operations, because the MSS was combined with stock survey of all Class I and II species (high valuable economic tree species) of 70 cm diameter at breast height (dbh) and above, (Baidoe, 1970). The aim of the MSS was to enable younger vegetation to mature and ensure that forest reserves have an average stocking of at least nine economic immature trees per acre and fifty to hundred trees per hectare (Baidoe, 1970).

The modified selection system involved two main activities; the preparation of a map for class I and class II stock of trees of 70 cm diameter at breast height and above indicating the location and girth of the trees, and improvement thinning. The stock map was used to select trees that would be exploited. The purpose of improvement thinning was to increase the survival rate of tree species and accelerate the growth of valuable tree species between 0.3 m and 1.5 m girth by reducing competition among the trees. Thinning was done after a 100 percent stock survey.
either before or after exploitation. The improvement thinning carried out before exploitation was combined with the stock survey in a single operation. In 1970, the modified selection system was discontinued for its ecological unsuitability, due to the application of sodium arsenate, which killed many species and led to genetic degradation of the species. More so, errors were made in field operations which made the data for the derived growth figures unreliable.

Enrichment planting

Enrichment planting is a combination of artificial and natural regeneration forest management techniques. Enrichment planting entails the propagation from local genetic stock of trees whose populations are low in number and the planting of these propagated plants within or adjoining existing stands to increase their size and long term viability. In most cases of enrichment planting, valuable tree species are introduced to degraded forest without the elimination of existing individual valuable trees. Enrichment planting was practiced in the 1940s and 1950s mainly in the moist forest zone of Ankassa, Subri and Tano - Nimri forests reserves in south western Ghana. The treatment process involved the felling of all marketable species, followed by climber cutting, poisoning of undesirable species to open up the canopy and finally the planting of main species like *Entandrophragma utile*, *Entandrophragma cylindricum*, *Tieghmella heckelii*, *Entandroghragma angolenses*, *Terminalia ivorensis*, *Hereteria utilis*, *Lovoa trichoides*. These tree species were planted in strips of 1.8 meters wide, 20 centimetres apart, but parallel to each other (Osafo, 1970). Climbing and cutting were repeated annually along the strips for a period of five years.

In the early 1960s, enrichment planting was also discontinued because of the problems of climber growth, poor growth of some of the species and destruction of the seedlings by insects and other animals.

Current forest reserve management in Ghana

Presently, forest reserves management in Ghana have been divided into two broad areas for management purposes, i.e. on - reserve management and off - reserve management. The current management of the forests are based on selective felling of individual trees of economic species scattered over a given forest area. Logging is regulated by restriction on felling limits for most trees with the felling limit range between 70 cm and 110 cm dbh. Management has been focused mainly on area management with the forests divided into Forest Management Units (FMU’s). Other management practices are concession - holding, plantation development, natural regeneration, coppice management, enrichment planting and community participation in forest management.

Off - reserve management

An off - reserve forest area is a piece of land outside of a protected forest zone interspersed with patches of naturally occurring tree species of economic or non - economic value and also consists of mosaics of intact forests. Off - reserve areas can also be referred to as patches of land interspersed with farm lands. The primary use of the land in the off - reserve is agriculture which makes it difficult for any form of sustainable forest management to be ensured. Efforts to maintain control over the exploitation of timber in the off - reserve has seen to the introduction of a system of regional and district quotas for timber exploitation. The quota system also known as the Annual Allowable Cut (AAC) provides the maximum amount of trees that can be felled in the off - reserve area in any particular district per year. The minimum felling diameter of 70 cm diameter at breast height is applied to the trees felled. The quotas are based on a planned life of 55 years. The quota system would be replaced with commercial plantations after the 55 years if the Annual Allowable Cut is adhered to.

On - reserve management

An on - reserve forest area is the opposite of off - reserve forest area. The on - reserve areas are protected forest zones. Primarily, the on - reserve areas are protective areas of biological, ecological, economic, research and environmental values. The current protected reserves forest management system in Ghana is a revision of the polycyclic selection system of harvesting which was designed to maximise yields. The old management system involved a number of processes for managing the forest reserves. A summary of the processes are as follows; formation of forest management units, formation of compartments generally in the range of 100 - 150 hectares (zoning is done on the basis of forest protection strategy), derivation of harvesting schedules based on the condi-
tion of the forest and previous logging history (100 percent stock survey) and the derivation of yield on species by species basis.

The processes have been reviewed to reflect the new timber utilization contract (TUC) for timber companies. The timber utilisation contract enables registered timber companies to enter into an agreement with the government for the exploitation of timber and the sustainable management of the forest through competitive bidding processes. The new arrangement seeks to ensure better selection procedures for contractors. Furthermore, the new arrangement places greater responsibility on the contractors in the planning process of timber exploitation in the on - reserve with improved monitoring done by the FSD. The details on the TUC can be found under section 2.7.1 a sub-section of stakeholder participation in forest management below.

Integrated in the TUC contract for exploitation of timber is the Social Responsibility Agreement (SRA), which defines the working relationship between contractors and landowners. The SRA is an agreement between a contractor selected for a timber bid and representatives of land owning communities. In the agreement, the contractor agrees to provide social amenities to the communities on whose land the exploitation of timber is done. The agreement thus, gives the communities the right to insist on the compensation for trees felled and the compensation is to be negotiated through the Community Forestry Committees (CFCs).

Current forest management is guided by the forestry and wildlife policy of 1994. Since forest management is guided by policies of political governments, it is necessary to discuss briefly forest policy developments in Ghana in relation to the political periods during which the policies were formulated.

Forest policy developments and the forestry and wildlife policy

There have been three official government forest policy statements in Ghana. The first forest policy was formulated in 1908 with the objective of ensuring the preservation of sufficient area of forest covered land to protect the headwaters of rivers for water supply. The other objective was to ensure the maintenance of the humid forest type of climate which was an essential factor in the growth of cocoa, kola and other crops upon which the prosperity of the economy depended. The 1908 policy was followed by the 1946 policy which was adopted by the then Government of the Gold Coast in 1948.

The thrust of the 1948 policy was to maximise the utilization of timber outside the gazetted forest areas prior to the conversion of such areas to agricultural lands, while putting emphasis on protection and management of forest reserves. The 1948 policy was adopted by the government after independence in 1957. The implicit expectation from the policy was that all forests outside the permanent forest reserves would ultimately, be converted to agricultural land through systematic removal of known timber species before lands could be taken over for farming. But the farmers took over the lands before the removal of the known timber species due to non availability of measures required to implement the policy. The 1948 policy served as the forestry policy for almost four decades after formulation. None of the military regimes and democratic governments that ruled the country after the overthrow of the first president in 1966 did make any reforms to the 1948 policy, although new constitutions were drawn under the different political leaderships. Public outcry on the failings of the 1948 policy in the 1980s during the rule of the Provisional National Defence Council (PNDC) led to the review of the 1948 policy by the then Forestry Department in 1984. But it was not until 1994, when the PNDC government was ruling under democratic political rule, that the third and current policy known as the Forest and Wildlife Policy was formulated.

The 1994 forest and wildlife policy is aimed at the conservation and sustainable development of the country’s forest and wildlife resources for the maintenance of environmental quality and the perpetual flow of optimum benefits to the whole society. The purpose of the new policy is to promote public participation in the share of benefits and responsibilities in forest management and encourage integrated and coordinated research in forest related issues. Current forest conservation and management is guided by the forest and Wildlife Policy of 1994 and the Forestry Development Master Plan (1996 - 2020).
The subsection below discusses the objectives in the new reformed 1994 forestry policy and the national forest management program aimed at achieving the objectives of the policy.

**The 1994 forestry policy reforms**

The objectives of the new forestry policy are 1) to ensure sustainable management of forestry resources and 2) to improve the country’s forest and wildlife resources for optimum benefits to the country and owners in particular. The policies include;

1) Transparent and efficient allocation of timber resources and control over cutting of timber.
2) Appropriate pricing of timber and other forestry based products in order to increase revenue and address the problem of under pricing of forestry resources.
3) Review of Annual Allowable Cut (AAC) as a transitional measure in order to salvage valuable timber being destroyed in off - reserve timber utilization contract areas (agricultural farmlands).
4) Mobilization of chain - saw operators into alternative productive ventures and control of illegal logging and illegal chain - saw lumbering operations.
5) Maintenance of log export suspension.
6) Rationalization of timber industry and adoption of fiscal as well as market based incentives to improve the efficiency of the timber industry and encourage the downstream processing of wood products.
7) Rationalization of timber industry taxation and other fiscal/ incentive regimes.
8) Increase stumpage fees for timber and improved revenue collection system.
9) Ensuring equitable distribution of benefits to communities, resource owners and farmers as a way of facilitating effective decision making and participation of all relevant stakeholders in the sustainable management and development of the resource.
10) Improved incentive structures to ensure sustainable forestry management and
11) Development of the forest plantations to cover the wood deficit in the timber industry and improve environmental quality

To ensure the effective and efficient adoption and implementation of the forest policy reforms, the forest sector reforms has also been undertaken through the adoption of specific measures for each policy objective. At the forest management level, programs and projects are being developed to be implemented at the operational level. One of such program is the natural resource management program explained below.

**Natural resource management program**

The natural resource management program is a comprehensive ten year adaptable program, for investing in the forestry sector and for pursuing a coordinated, country led technical assistance for the country in three phases of two years, four years and four years. The natural resource management program is a subset of the Forest Sector Development Master Plan, arising out of the medium term plan of the reformed 1994 forestry policy. The goal is “to protect, rehabilitate and sustainably manage national land, forest and wildlife resources through collaborative management and to sustainably increase the income of the rural communities who own these resources.”

The natural resource management program is made up of five components. The components are high forest resource management, savanna resource management, wildlife resource management, biodiversity conservation and environmental management coordination. Each of the components has a specific objective to address. For instance, the savanna resource management is aimed at creating an environment for poverty alleviation that enables local community participation in sustainable management of natural resources in the three northern regions of the country.

In the case of the high forest resource management, the objective is to establish the policy, legal, administrative and technical basis for sustainable forest management, including biodiversity conservation, collaboration, and efficient utilization of forest products by the private sectors and local communities within the high forest zone.

These five components would be implemented through the various forest management practices currently being practiced especially under the collaborative forest management with stakeholders such as timber companies and communities.

**Stakeholders’ participation in forest management**
Besides the Forest Services Division, the Forest Products Inspection Bureau and the Forest Research Institute of Ghana, the Ghana Timber Millers Organisation (GTMO), the wood processing industries and forest fringe communities are the main stakeholders currently helping with forest management in Ghana. The Forest Services Division has formulated policies and developed programs to collaborate with members of the timber industry and communities to manage the forests. To make forest management effective and efficient, a new process of timber exploitation has been developed under the trade utilization contract (TUC) and a community forestry program initiated for timber industries and communities respectively.

The timber utilisation contract (TUC)

There are about 250 logging firms, 130 veneers and plywood sawmills in the timber industry sector of Ghana. In addition, there are more than 200 furniture and wood working enterprises throughout the country. These activities are reported to employ some 100,000 persons, and provide a livelihood for about 2.5 million Ghanaians (Forestry Commission, 2004). Since independence in 1957, governments have promulgated legislations to regulate the activities in the timber industry sector and to generate revenue for national development. As an introduction to the TUC, a brief overview of some of the legislations on timber exploitation after independence is discussed.

As of 1974, timber industries were regulated by the Concessions Act (Act 124) of 1962. The Concessions Act (1962) vested the trust of control and permit of granting of concessions, timber leases and license from the government on behalf of the stools. The Act 124 was replaced in 1974 by the Forest Protection Decree 1974 (NRCD 343) following the overthrow of the 1969 democratic government through a military coup in 1972. The Forest Protection Decree permitted communities around forests to extract non-timber forest products (NTFPs) from the forests with permission from the Forestry Department, whereas all other uses required permission and payment of fees. Community ownership rights were however, abolished.

Following the transition to democratic rule in 1992, there were pronounced public outcry about the degradation of the country’s forest by illegal logging. In 1995, the public outcry compelled, the Ministry of Lands and Forestry to adopt an interim measure to control the increased illegal logging outside reserves. Round log export was also suspended during the period as a control measure and the annual sustainable yield system was revised. The high rate of illegal logging continued even with the suspension of the export of round logs making it necessary to formulate a comprehensive and appropriate law that can effectively address the problem of illegal logging. The 1997 Timber Resource Management Act was promulgated out of the necessity to address the high rate of illegal logging and deforestation.

The Timber Resource Management Act No.547 of 1997 was enacted in 1997 to regulate the logging of timber by allocating timber harvesting rights for both on and off - reserves to legitimate timber contractors. The Timber Resource Management Act introduced the timber utilisation contract (TUC) and the Timber Utilisation Permit. The TUC as explained below enables registered timber companies to enter into an agreement with the government for the exploitation of timber and the sustainable management of the forest through competitive bidding processes.

A Timber Right Evaluation Committee is the board that vets all timber proposals from timber contractors or companies based on laid out criteria. The evaluation committee is headed by the Chief Executive of the Forestry Commission. Prospective companies applying for the TUC are required to meet the laid down criteria before the submission of proposal for consideration. The criteria are as follows;

i) Reforestation plan or afforestation plan for the establishment and management of forest plantations at least 10 hectares for each square kilometre of the contract area.

ii) An undertaking to provide specific social amenities for the benefit of the local communities that live in the proposed contract area.

iii) Evidence of ownership or membership of a registered company relevant to forestry with relevant commercial certificate attached.

iv) Evidence of full payment of forestry levies where applicable.

v) Income tax and social security clearance certificates

vi) Evidence to undertake reduced impact logging

The Timber Resource Management Act of 1997 also introduced new stumpage fees for three different stumpage rates.
The Timber Resource Management Act of 1997 also introduced new stumpage fees for three different stumpage rates. Stumpage fees are prices charged or paid to the owner of a standing timber(s) before the tree(s) is harvested. The stumpage rates were classified into three:
1) High demand and depleted species - 20 percent stumpage rate.
2) Species in moderate demand and are available -10 percent stumpage rate, and
3) Species of low demand and in abundance - 5 percent of stumpage rate.

The 1997 Act also restricted timber companies from felling some timber species except with permission from the Chief Conservator of forests and the Forestry Commission.

In the context of the natural resource management program of the new forestry and wildlife policy, the TUC will be one of the main forest management approaches at ensuring timber industries’ commitment to better management of the natural forest and plantation development/establishment. Land owners and farmers have a right to veto timber harvesting on the off - reserve lands and communities are also required to negotiate Social Responsibility Agreements under the TUC.

Community forestry concept

The concept of community forestry is a forest management approach in which local communities are empowered and grassroots organizations strengthened and charged with the responsibility for the stewardship, management and reaping of benefits from forests and forest resources. The concept of community forestry can be broadly referred to as the efforts of communities who are motivated by a common purpose to manage and protect local forests for economic, social, cultural and environmental benefits. The Forest Services Division of Ghana refers to the concept of community forestry as a “collaborative forest management”. The FSD defines community forestry as a working partnership between the local people and the FSD to ensure that the management of all forest resources is equitable and more efficient.

Under the community forestry concept, land owning communities are to ensure in a secured manner a fair share of benefits derived from on and off forest reserves. Timber contractors are also responsible for the direct execution of development projects at the community level through what is termed the Social Responsibility Agreement (SRA). The FSD has instituted systems for the involvement of communities in decision making and the implementation of forest operations to promote efficiency in forest management. Community involvement in the forest management under the concept of community forestry has two levels of involvement; involvement of communities in decision making at the highest levels of policy and legislation formation, and in the execution of forest operations. The degree of community involvement can be in either of the levels shown in Table 1.

<table>
<thead>
<tr>
<th>Level</th>
<th>Extent of involvement</th>
</tr>
</thead>
<tbody>
<tr>
<td>Community control</td>
<td>Community in full control, technical advice from FSD available on request</td>
</tr>
<tr>
<td>Full community involvement</td>
<td>FSD increasingly seeding control e.g. trees on farms</td>
</tr>
<tr>
<td>Partial community involvement</td>
<td>Interested community members are involved in planning, implementation and management</td>
</tr>
<tr>
<td>Consultation</td>
<td>Communities actively encouraged to offer ideas</td>
</tr>
<tr>
<td>Information</td>
<td>Telling people what is going to happen</td>
</tr>
<tr>
<td>Persuasion</td>
<td>Securing as commitment to pursue community participation e.g. Social Responsibility Agreement and Timber Utilisation Contract allocation</td>
</tr>
<tr>
<td>Agency control</td>
<td>No reference to community in the scheme of issues e.g. Demarcation of the Special Biodiversity Protection Areas in forest reserves</td>
</tr>
</tbody>
</table>

Table 1: Hierarchy and degree of community involvement in forest management. Source: Forest Services Division, Kumasi in Owusu-Ansah, M (ed) (2000)

The process of involvement begins with the formation of Community Forest Committees (CFCs). The CFCs are to serve as the structure for spearheading community involvement in forest management. The CFCs are to ensure the formation and operation of the structures within their jurisdiction and also infuse local level structures through bye - laws and traditional governing structures in their operations. The membership of the CFCs is made up of broad - based and fair representation among community stakeholders. Members can stay in office for only a fixed period. The CFCs are to be the main medium through which the statutory forest management agency (FSD) would implement its collaborative forest management activities.
The CFCs involvement in forestry focuses around three levels of forestry, namely:
• Forest policy formation,
• Forest management planning, and
• Execution of forest operations.

The role of CFC in the execution of forest operations involves forest information acquisition, forest protection, forest regeneration, forest resource exploitation and commercial forestry operations.

With respect to forest information acquisition, FSD staffs are to tap the indigenous knowledge base of communities to acquire data for forest management planning purposes. Communities are to be recruited to spot trees or identify species during forest inventories and also called upon to assist in the location and assessment of non-traditional forest products (NTFPs) as well as the identification of any rare species the forest may harbour.

Traditional activities for the protection of forests which was formerly done by the FSD are now to involve the communities with regards to forest protection. Examples of the traditional activities that communities are expected to be involved in are demarcation, clearing and patrolling along forest reserve boundaries. The communities are to set aside portions of the forest reserve for protection purposes, such as special biological protected areas, hill sanctuaries etc.

The CFCs are to act as managers of community nurseries for the regeneration of forests through community plantation investment programs. The CFCs will provide training to community members on plantation development techniques after they have undergone training themselves. The CFCs are to play active roles in negotiations to ensure the fulfilment of community interests with respect to degraded lands in and off forest reserve areas, access to credits and grants, and the formulation of agreements.

CFCs role in forest resource exploitation is very crucial. The CFCs are to be consulted in matters pertaining to the award and monitoring of the TUC. The CFCs leading role in the operation of the TUC include:
• Determination of TUC coverage areas,
• Formulation of negotiations for the Social Responsibility Agreement and implementation of projects under the Social Responsibility Agreements,
• Monitoring operations of the TUC holders,
• Arbitration of cases of compensation payments,
• Negotiation for community access to timber for local use,
• Reforestation in connection with TUC requirements,
• Negotiation on incentive payments for farmers who tend timber trees and
• Management and production of non-traditional forest products

Under the collaborative community forestry concept of forest management, communities are now regarded as equal partners in forest conservation and management and they are to derive a fair share of benefits that accrue from forests. CFCs are thus, to explore possibilities of enhancing incomes of their communities through forest based livelihood activities. The activities may take the form of running of commercial nurseries, plantation investments, “Taungya” farming, contract works, small-scale timber conversion ventures, NTFPs processing and marketing and many more. However, the most important is for the CFCs to lead and mobilise the communities towards productive income generating ventures.

The collaborative forestry management concept with the full participation of communities is expected to help curb the fast rate of forest depletion by making the communities the custodians of the forest and also reap the benefits from it. Since 2000, the concept of community forestry has been on piloting basis in some forest fringe communities and other forest communities are being encouraged to join. If successful, the sustainability of forests and forest resources can be guaranteed. Selected communities that were interviewed for this research are taking part in the pilot projects. The findings of the analysed are discussed below.

**Findings**

The organizational aims for forest management are deforestation control, desertification control, climate change mitigation, ecological and biological conservation, and watershed protection.

The types of forest management practices in use are selective cutting, concession-holding (TUC, Permit and holding), plantation development/establishment, natural regeneration, enrichment planting, and
participation of stakeholder groups in forest management. These management practices have been adopted for their socio-cultural and ecological suitability. However, different forest reserves are managed for specific purposes such as fire prevention management, biodiversity management and timber production management. However, each reserve management programme includes other management purpose to ensure holistic management of the reserve. The forestry policy has been reformed to try and address current issues in forest management. Various programs and projects have been drawn for the achievement of the policy objectives, but the political will for the enforcement of the policy is low, thereby, threatening the achievement of policy objectives. Administrative and logistical resources for the implementation of the policy are also inadequate. Problems such as inadequate funds to procure logistics, low level of stakeholder commitment to forest management following from the low participation in decision making, illegal logging and encroachment on forest reserves are affecting effective forest management in the research area. Other problems identified to be limiting forest management practices are bush fires, inadequate manpower (in terms of quality and quantity) and weak institutional system for monitoring and implementing forestry decisions. In addition to the listed problems, poverty and land ownership system are retarding the achievement of progress in the forest management objectives.

Involvement of stakeholders in decision making is mainly during the stage of implementation, but this is not adequate to promote the level of sustainability needed for forest management. FSD hold meetings with stakeholders only when the necessity arises. The survey showed that improvement in community involvement in forest management requires involvement of the local people in decision making and the provision of sustainable income generating activities. However, not much is being done to provide alternative income generating activities to the local people. Collaborative measures between the FSD and communities through the formation of Community Forest Committees, “Taungya” system of farming and community and individual plantation establishment are being undertaken to promote efficient forest management.

The wood processing industries interviewed said their sawn woods for production are obtained from reliable and certified sources. According to interviewees from the wood processing industries, illegal logging is common because a sizeable number of the wood processing industries depend on the illegal loggers for the supply of sawn wood for production, because of the inadequate supplies from the large sawmills for the local market. The large sawmills for economic reasons prefer to produce for the foreign market. Only 3.3 percent of timber industries are establishing private plantations for the future supply of timber for industrial production. This implies that there is over reliance on the natural forest for timber which is harmful for the conservation of endangered species such as mahogany. The wood processing industries reported that inadequate capital to procure inputs and the high prices of logs and sawn timber are the main problems affecting their production. The high prices of logs and sawn wood on the local market are a result of increased exportation of processed timber and bad road conditions linking the forests. The non-reliability of the rail network makes it difficult the timber companies to transport logs from the forest sites. The local market demand for processed timber is not fully met due to the preference of companies to trade on the international markets, where prices are high compared to prices on the local market. The inadequate processed timber on the local market has lead to the adoption of lesser known species like Ofram for furniture production. Thus, reducing slightly the exploitation of high grade...
Training in better utilization of logs and wood waste and training in value adding to wood products are contributing to reducing waste in the timber industry and promoting efficiency in forest management. But the development/establishment of private plantations by timber industries is still low.

Companies with concessions in off-reserve forest sites do not strictly comply to the stipulated regulations which mandates the companies to re-afforest lands from which timber have been harvested. Farmers thus encroach on such lands for farming. The reason for the non-compliance to the regulations is as a result of administrative weaknesses in terms of inadequate staff and logistics which affect supervisory activities of the FSD.

There is a substantial collaboration between the FSD and the wood processing industries. The collaboration is in the form of organization of meetings and training programs on wood waste utilization, as well as the provision of technical advice on plantation development. The collaboration has led to an improvement in the knowledge and skills of members of the wood processing industries in better utilization of timber. However, there is dissatisfaction with the FSD’s approach to decision making which does not inculcate the views of the association in forest management.

To conclude, the research has shown that some success is being achieved with the new forestry and wildlife policy but commitment of all stakeholders in the implementation is necessary for entrenching or consolidating the pilot implementation achievements. If full stakeholder commitment is achieved, biodiversity conservation, sustainable development of the countries’ forest and wildlife resources, and the promotion of environmental quality for optimum benefits to all segments of society would be ensured. Educational programs on family planning need to be intensified for communities living around the reserves to prevent increases in their populations and its attendant impact on forest management. It is essential that members of communities who have been provided with training in soap making, bee keeping, batik making among others are provided with start-up capital or basic equipment to put the skills acquired into use, thereby providing alternative incomes to reduce over reliance on the forest for incomes.

**Recommendations**

The process of elections for positions to the CFCs should be transparent and representative of the different groups in the communities to ensure the participation of all community members in forest management. Community members should be made to contribute their views at the CFC meetings. Furthermore, more education should be provided on the benefits of community forest management to the communities for a better understanding, appreciation and adoption of the concept.

Voluntary forest guards should be provided with logistics to make their work effective. Nevertheless, the voluntary forest guards should be reintegrated into the FSD following an assessment of their performance during recruitment exercises. Reintegration into the FSD will discourage the voluntary forest guards from becoming illegal chain-saw operators or from conniving with chainsaw operators to destroy the forests due to financial reasons. Providing job opportunities in the mainstream FSD, can also serve as an incentive to attract more youth in the communities to voluntarily assist in guarding the forests from illegal chainsaw operators.

The FSD should adopt a business approach to its operations in order to generate enough revenue for the acquisition of basic logistics. For instance, the Wood Training Institute Center of the FSD can reduce the fees charged per trainer in order to enable a substantial number of individual small-scale wood processing industries to participate in training programs on better utilization of wood and wood waste. By so doing, more revenue can be generated as the low fee will attract a larger number of wood processors who would otherwise be discouraged from participation due to the high fee charged per participant. Fees charged should however, be economic by equalizing the cost of training inputs to the marginal cost of the last person trained.

A compulsory policy that makes timber contractors to invest in private plantation development need to be promulgated and enforced. The private establishment of plantation should be well supervised and coordinated. The provision of technical advice by the FSD has the potential to ensure effective and efficient
forest management and should be continued. The current forest ownership system needs to be changed. A gradual shift of ownership of forest from government to private individuals and communities is required for achieving greater efficiency and effectiveness in forest management. But private management of forests should be regulated by government regulations and standards. The FSD should liaise with other universities internationally to recruit students for internships or volunteer activities to tap the knowledge and skills of these students as a temporary measure to solve the problem of inadequate technical staff. Staff members with low professional qualifications should also be sponsored to upgrade their knowledge and skills in forestry.

Joint stakeholder discussions for all stakeholders should be organized to discuss the interrelationships between the activities of all stakeholders on forest management.

Environmental Non - Governmental Organizations should step up their activities on the sensitization of the public on government commitments and the communities’ responsibilities to the environment. Public awareness on government responsibilities as well as those of the communities will enable governments keep to their environmental responsibilities. More environmental clubs and environmental action groups should be formed in schools, universities, organizations and communities for educating and communicating the importance of forest management and natural resource management to the populace. The clubs should also serve as a watchdog group on the government, agencies and institutions, whose actions or activities harm forest management.

Unemployed men and women as well as the youth in forest fringe communities in the region need to be trained in income generating activities such as snail and mushroom farming. Marketing avenues need to be provided for the activities that the communities would be trained in, for the sale of their products.

Notes
2. Source: http://unfcc.int/cop4/misc01-2.htm
3. This is the specific interpretation of the term by the FAO. In some cases, the FAO modifies and uses the definition of the UNFCC to make it applicable for all purposes.
4. Centre for Agriculture, Natural Resources and Community Development - West Virginia University Extension Service website. 20th August, 2004 http://www.wvu.edu/~agexten/forestry/silvics.htm. The year of the publication is my own based on date the information was extracted.
5. Polycyclic selection system silvicultural system, in which logs harvested are cut from specified size-classes and species of trees at intervals which are about one-half of the growing period needed to reach industrial log sizes.
6. Definition taken from a workshop report of the FSD in Kumasi titled “Piloting collaborative forest management systems in off-reserve areas in southern Ghana” Owusu Ansah, M. (ed.) pp 26
7. Detail explanation to the meaning and practice of Taungya farming can be found in section 4.7 of chapter four.

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