

UNIVERSITY OF CAPE COAST

**AFFORESTATION IN THE AJUMAKO-ENYAN ESSIAM
DISTRICT IN THE CENTRAL REGION OF GHANA**

BY

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**THESIS SUBMITTED TO THE INSTITUTE FOR DEVELOPMENT
STUDIES, FACULTY OF SOCIAL SCIENCES, UNIVERSITY OF
CAPE COAST IN PARTIAL FULFILMENT OF THE
REQUIREMENTS FOR AWARD OF MASTER OF
PHILOSOPHY DEGREE IN DEVELOPMENT STUDIES**

JULY, 2011

DECLARATION

Candidate's Declaration

I hereby declare that this thesis is the result of my own original work and that no part of it has been presented for another degree in this university or elsewhere.

Candidate's Signature:Date:.....

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Supervisors' Declaration

We hereby declare that the preparation and presentation of the thesis were supervised in accordance with the guidelines on supervision of thesis laid down by the University of Cape Coast.

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ABSTRACT

This study examined afforestation in Ajumako-Enyan-Essiam District (AEED). The study was cross-sectional as well as descriptive and made use of interview schedules and questionnaire to collect data. The simple random, quota and systematic sampling techniques were used for household respondents, while the purposive and simple random techniques were employed in getting responses from departmental heads and tree growers respectively. Questionnaires, interviews, focus group discussion and observation guide were used for data collection.

The study revealed a low community participation in forest activities and management in the district. There was also low women participation in afforestation. A number of factors were given by respondents for the low level of participation. These included logistics constraints, inadequate incentives, shortage of seedlings and improper distribution of seedlings. Choice of seedlings, property rights and right of access are three main motivational factors for improving afforestation in the area according to the study.

The thesis ends with some recommendations to stakeholders to promote effective afforestation in the district. Increased budgetary allocation for afforestation, coordinated approach to forest issues and the institution of motivational packages for tree growing were some of the suggestions proposed to enhance afforestation in AEED. There is also the need to consider the documentation of forest sites in various parts of the district to determine their conservational status and the challenges facing them. The production and use of bamboo need to be encouraged as it has many advantages.

ACKNOWLEDGEMENTS

In a work of this kind, there are usually many people to appreciate. I am particularly grateful to my supervisors: Dr. Patrick K. Agbesinyale and Prof. J.V. Mensah of the Institute for Development Studies, University of Cape Coast for their untiring effort and direction, which has brought me this far in this work. Their invaluable contributions and suggestions have greatly helped in shaping the content and quality of this work.

I thank the Ajumako-Enyan-Essiam District Assembly (AEEDA) and its staff for their cooperation and assistance during this research. The District Coordinating Director, the Planning Officer and the Personnel Officer deserve special mention for their profound interest in the research and for their support. The cooperation of Tree Growers Association in the district, caretakers of groves, the Wood Carvers Association is appreciated. The coordinating role of Uncle Ato and Mr. Biney is also acknowledged.

I am also very grateful to my friend Mr. Victor Kanor-Teye for his support and encouragement throughout the preparation of this thesis. The Librarian of the Institute, Mr. Emmanuel Abakah deserve special thanks for his assistance in helping me find useful books and other material for the course and for his cooperation in the use of library material during the preparation of this thesis.

DEDICATION

To Jane and Promise

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LIST OF ACRONYMS

ADRA	-	Adventist Development and Relief Agency
AEED	-	Ajumako Enyan Essiam District
AEEDA	-	Ajumako Enyan Essiam District Assembly
CBOs	-	Community based organisations
FAO	-	Food and Agriculture Organisation
GDP	-	Gross Domestic Product
GLSS	-	Ghana Living Standard Survey
GPRS 1	-	Ghana Poverty Reduction Strategy 1
GPRS11	-	Growth and Poverty Reduction Strategy 2
GSS	-	Ghana Statistical Service
GTZ	-	German Technical Development for Cooperation
HIPC	-	Highly Indebted Poor Countries
ICRAF	-	International Centre for Research in Agroforestry
IFAD	-	International Fund for Agricultural Development
JICA	-	Japan Agency for International Cooperation
MDGS	-	Millennium Development Goals
MOFA	-	Ministry of food and agriculture
MTS	-	Modified Taungya System
NDPC	-	National Development Planning Commission
NGOS	-	Non-Governmental Organisations
TFAP	-	Tropical Forest Action Plan
SPSS	-	Statistical Product and Service Solutions

UNICEF	-	United Nation Children Fund
UN	-	United Nations
UNCED	-	United Nations Conference on Environment and Development
UNDP	-	United Nations Development Programme
UNRISD	-	United Nations Institute for Social Research Development
USA	-	United States of America
WCED	-	The World Commission on Environment and Development
WHO	-	World Health Organisation
WRI	-	Water Resource Institute

CHAPTER ONE

INTRODUCTION

Background to the study

Forest cover is central to the existence of humankind. The survival and well-being of majority of people in Ajumako-Enyan-Essiam District (AEED) depend on the forest. This work examines the problems confronting forest regeneration in the AEED since majority of the people derive their livelihood from the forest and its produce.

Forest plays a vital role in regulating climate, controlling water run-off, providing food and shelter for wildlife, and purifying the air. The forest has scenic, cultural and historic values. Wood from the forest plays an essential role in the modern economy more than any product. Total wood consumption in the world is about 3.7 billion metric tonnes per annum, estimated at over \$100 billion (Cunningham and Saigo, 1997). This high consumption of wood has led to a depletion of over 500 million hectares of tropical forest cover since 1961 (Food and Agriculture Organisation, 2000), while the consumption of forest produce has risen by 50% within the same period (Gardnor-Outlaro and Engelman, 1991).

The depletion of forests is therefore seen as a major challenge to the survival of all people in the world. Scholars have estimated that the world's tropical rain forests are disappearing at the rate of 7.3 million hectares a year

(World Rainforest Movement, 1989). The Food and Agriculture Organisation (2001) however puts the figure at 14.5 million hectares per annum globally. The estimate revealed that much of the world's genetic diversity is concentrated on only 6% of its land surface, mostly in tropical forest and that if present trends are not reversed, humankind may witness the elimination of one million out of the planet's 5-10 million plant and animal species by the end of the 21st century.

In Asia, Latin America and Africa, degradation of forest reserves has reached alarming proportions. Brazil stands out as the highest exporter of forest products in the world, placing her on top of the list of countries that degrade forest the most. Haiti has lost over 80% of its forest cover. India, Japan, South Korea, Madagascar, Cameroon, Cote d'Ivoire and Indonesia have also lost much of their forest cover. Mangrove trees are under threat in Indonesia, which is host to half the world's population of mangrove trees. The rate of depletion of these trees for paper manufacturing is of great worry to many environmentalists (World Rainforest Movement, 1989). Some countries such as Japan and South Korea have made attempts to replace 70-80% of their lost forest, but this is not the case with many developing countries.

In Ghana, the natural resource depletion rate arising from the activities of mining and agriculture alone amounted to 4% of Gross Domestic Product (GDP) in 1988 (Micah, Kendie, Agbesinyale and Anokye, 2000). When other variables are considered, the figure could double. Ghana's forest of 8.2 million hectares at the beginning of the 20th century has reduced to 1.7 million hectares. This means that 90% of Ghana's forest has been logged (Sayer, Blocchus and Dillenbeck,

1992). Given that about 11 million people in Ghana live within the forest areas and that its degradation could affect their livelihoods and non-forest areas significantly, there is the need for proactive measures to protect the forest.

Before the 1970s, many people thought that the forest and its resources were in abundance and that nature itself was capable of regenerating and replacing its loss, far more than the rate of depletion. Forest depletion in many areas, however, provides a dramatic example of the “blind faith in the reproductive capacity of nature” (Kendie, 2000: 129). That is why issues of afforestation must be at the heart of all individuals, groups, non-governmental organisations (NGOs) and governments and, therefore, every policy and action needs to take into consideration the forest resources. Suffice to say that any country that plays down on the protection of its forest may face obstacles in its poverty reduction programmes.

Community involvement and commitment in afforestation plays a key role in poverty reduction in rural areas in many ways. The forest provides food for the poor and facilitates agricultural production by improving soil fertility and rainfall amounts. Meat from game constitutes the major source of protein to villages. Fifty percent of meat in Botswana, for example, is obtained from the forest (Pearce & Warford, 1993). The figure may be higher in some countries.

Forest degradation leads to poor crop yields and food shortages causing rural-urban migration. This deprives communities of potential skills and energy for work. Degraded lands cannot sustain any meaningful economic activity and therefore poses a problem to poverty reduction programmes.

Statistics have it that the poor uses 50% of the energy obtained from wood. This means that the more poor people we have, the higher the level of land degradation. About 2 billion people in the world who depend on fuel wood as a primary source of energy have less than what they need. The poverty of many poor people is therefore exacerbated by shortage of firewood. With current trends, the annual wood deficit is likely to increase from 400 million cubic metres in 1995 to 2,600 million cubic metres by 2024 (Cunningham and Saigo, 1997).

The role of forest in environmental protection and biodiversity has become the focus of local and international players. At the same time, forest's critical role in the livelihood of the poor is also being widely recognised. Indeed, rural poverty is increasingly concentrated in areas with the most threatened forest biodiversity. As we begin the 21st Century, the debate is intensifying, especially in developing countries, over how to reconcile the seemingly incompatible goals of conserving the forests, meeting market demand, and promoting broad-based sustainable development that reduces rural poverty.

Ajumako-Enyian-Essiam District, which is the focus area for this study, has had its fair share of forest degeneration and attempts to reforest lands have been slow and unenthusiastic. At the launch of the World Environment Day in 2004 in Ajumako, the former District Chief Executive for the Ajumako-Enyan-Essiam District, Mr. Kenneth Obrempong, lamented the loss of forest cover and urged the people to give serious thought to afforestation, noting that there was sufficient proof that poverty and poor health, which the district was grappling with, had links with environmental destruction.

Statement of the problem

In Ghana, various governments tried different kinds of afforestation programmes. The colonial authorities established the Timber Protection Ordinance and subsequently the Department of Forestry in 1908. In the 1980s, a ban was placed on the exportation of raw timber logs. Ghana has also set aside 10% of its total area of forestland as wildlife and plant reserves. Other measures include tree-planting exercises, environmental education, research programmes to find new varieties of disease resistant and fast growing forest seedlings.

The School of Forestry and the Forestry Commission have also been set up to assist in afforestation, but much remains to be done. Of late, the policy direction of government is shifting towards forest co-management by government and other stakeholders including communities with potential for successful afforestation. The failure of many of these programmes on afforestation is due to the top-down approach adopted in the implementation of many forest programmes. In other words, attempts to deal with the issue of afforestation are not succeeding because the people who are to help the programmes succeed are not often involved from the onset.

Over the years, communities have been uncertain concerning the benefit they would derive from participating in forest management. There is also the problem of what share they are entitled to for extracted timber and how much of the income from the forest will go into roads and other infrastructure for the benefit of the community.

Villagers who invest money and time in forest conservation often have no property rights over forests. They can even do nothing or little against the continued extraction of large amounts of wood by logging operators who penetrate into communities with or without authorisation or logging permits. Current attempts at afforestation are driven more by commercial reasons, that is, commercial plantation for export rather than a desire to grow trees that are important to rural communities and hence crucial for poverty reduction.

The AEED has a large stretch of secondary forest, which contains some economic trees such as wawa, ofram and mahogany. The reduction in the number of these trees is due to the effects of some of the traditional methods of farming, indiscriminate felling of trees and the absence of systematic re-afforestation programmes. This has serious implications for major economic activities essential for life support in general and nature cover in particular.

Research objectives

The main objective of the study is to examine afforestation in the Ajumako-Enyan-Essiam District. The specific objectives are to:

- assess the benefits of forest to community members within the district.
- identify the problems of afforestation in the district.
- analyse the causes of deforestation.
- assess the contributions of community members and other stakeholders to afforestation in the district.

- assess the motivational packages that can encourage community members to participate in forestry programmes.
- make recommendations for improving afforestation in Ajumako-Enyan-Essiam District.

Research questions

To achieve the objectives of the study, the following research questions were formulated:

- What are the benefits of the forest to people in the district?
- What are the problems facing tree growing in the Ajumako-Enyan-Essiam District?
- What are the causes of deforestation in the district?
- How do individuals and other stakeholders contribute towards afforestation in the district?
- How can community members be motivated to participate in afforestation programmes?

Scope of the study

The aim of the research is to examine at afforestation in the Ajumako Enyan-Essiam District in the Central Region. As a result, the study was limited to communities and tree growers within the AEED. The results brought out the problems of afforestation, and how they can be addressed.

Relevance of the study

The Central Region of which the AEED is part is the sixth poorest region in Ghana (Ghana Statistical Service, 2002). The district itself ranks high in terms of poverty in the region. Recent developments in terms of forest degradation in the area are threatening nature cover and this has the potential of aggravating poverty further. There is so much that the forest can provide for rural poor communities such as, food, medicine, energy, meat, income among others that has the ability to reduce poverty. This work has clearly outlined the importance of afforestation to the people of AEED.

This work has also demonstrated that successful tree-planting programme could minimise the advancement of the savanna and its direct effect on rainfall amounts, weather, climate, erosion, agricultural and incomes of farmers. Though, the area is still far from the impact of the Sahara, a considerable knowledge and awareness on the important of trees and negative consequences of their loss will instill some culture of tree growing in the youth and create better environment for a successful and sustainable forest management.

The study provided information useful to the district in its planning processes .This would enable the district plan, allocate funds and monitor forest activities. This thesis could also serve as a reference document for further research on afforestation or add to existing knowledge on tree planting in the district.

Trees are important for individuals, communities and nations as a whole. The level of forest cover in an area can significantly determine its well-being and

level of development. This study has brought out the problems of tree planting and tree growers in the district. It has also brought out suggestions as to how to resolve some of the problems in order to improve afforestation. The AEED and other stakeholders could therefore adopt some of the motivational packages proposed by community members to address problems of low community involvement in afforestation in the district.

Limitation of the study

The study did not cover the entire population of AEED and its tree growers. Only samples were used due to financial and time constraints. However since the population is homogenous, proper sampling would adequately represent the population of the area and give similar results.

Operational definition of terms

Afforestation: Afforestation is planting seeds or trees to make a forest on land which has not been a forest recently, or which has never been a forest (Wikipedia Encyclopedia, 2010).

Deforestation: It is the complete clearing of tree formations (closed or open) and their replacement by non-forest land use (Food and Agriculture Organisation, 1988).

Tree growers: People who plant, nurture and protect trees up to maturity.

Tree Growers' Association: A voluntary association of people who share the vision of growing trees and nurturing them to maturity in AEED.

Household: A household consists of a person or group of persons, who live together in the same house or compound, share the same house keeping arrangements and are catered for as one unit (Ghana Statistical Service, 1992).

Sustainable development: Development that meets the needs of the present without compromising the ability of future generations to meet their needs (World Commission on Environment and Development, 1987).

Community participation: Active community interest and participation in afforestation. It is used in the same sense as community involvement.

Forest management: It involves planning for sustainable harvests, with particular attention paid to forest regeneration; that is, preventing fires, insects and diseases from damaging the forest (Cunningham and Saigo, 1997).

Modified Taungya System: A new taungya system introduced in Ghana whereby the proceeds from the forest programme is shared between the grower, community and the government.

Forest: Any land with more than 10% tree cover of trees and more than 5 metres tall. Not only closed forest but also savanna woodland is therefore included in their estimates (Food and Agriculture Organisation, 2001).

Motivation : It is used to describe those processes, both instinctive and rational, by which people seek to satisfy their basic drives, perceived needs and personal goals, which trigger human behaviour (Cole, 1995).

Young people: Persons between 18 and 50 years who have the necessary strength

to partake in afforestation.

Organisation of the study

This study is organised in five chapters. The first chapter covers the background to the study, statement of the problem, objectives of the study, research questions, scope of the study, relevance of the study, limitation of the study, operational definition of terms and organisation of the study. The second chapter reviews literature on deforestation, afforestation, sustainable development, history of forest management, the concept of motivation, forest policy in Ghana and case studies of community involvement in afforestation. Chapter Three outlines the methodology adopted and used for the research work. Chapter Four contains the results and discussion while Chapter Five presents the summary, conclusions and recommendations.

CHAPTER TWO

REVIEW OF LITERATURE

Introduction

Much documentation already abounds on community afforestation programmes in many parts of the world. This chapter reviews the existing literature under the following headings:

- Deforestation
- Afforestation
- Sustainable development
- History of forest management
- Community participation
- Forest and forest management
- The concept of motivation
- The Expectancy Theory of Motivation
- Case studies of afforestation programmes

Deforestation

Examining deforestation in a work that seeks to highlight afforestation may appear unusual, but this treatment is justified in the sense that one cannot

effectively tackle afforestation without identifying the root causes of deforestation or what has necessitated the need for afforestation. In many areas that deforestation has become rampant, afforestation programmes can be greatly affected. The intensity between afforestation and deforestation therefore determines to a large extent the forest cover in a particular locality.

There is also considerable debate about current rate of deforestation in the tropics. This uncertainty again comes from divergent definitions of deforestation. Some insist it means change from forest to agriculture, urban areas or deserts. Others include any area that has been logged even if the cut is selective and growth would be rapid. There is also the difficulty of interpreting satellite images, but the FAO (2001) estimates of 14.5 million hectares per annum is generally used. The current deforestation rate in Ghana is estimated to be 220 sq. km per annum (Republic of Ghana, 2002). Some have also indicated that a third of Ghana's forest disappeared in 17 years between 1955 and 1972 while 75 percent of land area originally covered by forests had been cleared by 1987. In any case, the uncertainty of the rate of deforestation does not prevent us from knowing that the problem exists.

The Food and Agriculture Organisation's (1988) definition of deforestation says that, it is a complete clearing of tree formations (closed or open) and their replacement by non-forest land use. This definition is weakened by its exclusion of the removal of plants association not classified as forests. It also overlooks serious forest damage caused by excessive logging, wood gathering for both domestic and commercial purpose, fire and livestock grazing.

In other words, this definition does not meet the expectation of biologists, ecologists and conservationists of forest. In order to satisfy the view of many, Barraclough and Ghimire (1990) concluded that deforestation should encompass the following:

- Depletion of forest biomass, not just tree-cover.
- Degradation of forest in all ecological zones, not only in tropical areas but in high mountain and arid regions.
- Conversion of forests to other land uses, both permanent and periodic, as well as the serious deterioration of the quality and productivity of existing forests.

Scholarly discussion on the subject of deforestation in literature abounds but, nevertheless, poses considerable confusion. The difficulty in establishing what constitutes deforestation equally affects any discussion on the real causes of deforestation. It is safer to allude to the fact that, what causes deforestation in one area or region may not necessarily account for deforestation in others due mainly to climate differences, nature of occupation, education, history and culture.

New and persuasive factors are being unearthed daily by scholars that place technical questions on the old fashion and acceptable view that, population growth and poverty are mainly to be blamed for deforestation, especially in the developing world.

According to Barraclough and Ghimire (1990), the facile explanations that deforestation is primarily caused by poverty or population growth or wasteful consumption pattern are tautological. Poverty, profligate consumption by the

better-off and rapid population growth are all systems of unequal exploitative development, as is indiscriminate deforestation itself. To confuse these symptoms of styles of development with causes of deforestation tends to be unhelpful in suggesting practical solutions in concrete situations. This is not to exonerate poor peasant farmers from the harmful effects of their farming systems and other activities. Excessive or careless exploitation of forests for wood and timber, slash and burn practices, including shifting cultivation have had damaging effect on closed forests. Half of all the wood harvested in the world is established to be used as fuel, primarily in developing countries.

The Food and Agricultural Organisation (1981) has estimated that 70 percent of recent disappearance of closed forests in Africa, 50 percent in tropical Africa and 35 percent in Latin America can be attributed to its conversion to agricultural uses mainly by hungry landless farmers seeking newer and fertile lands and in some cases using clearing of forest as the pre-requisite for full ownership of land.

But to blame poor migrants for destroying the forest is like blaming poor conscripts for the ravages of war (Myers, 1984). The questions that need to be asked are: what are the cleared lands used for? Who pays for the clearing of the lands? In addition, who benefits more from the output of the cleared land? It is when these questions are fully answered that the blame on deforestation can be fully apportioned. Much of the foods produced by rural poor ends up in the market for urban rich, who sometimes take the best farm produce. In Africa and especially in Ghana and Cote d'Ivoire, land clearing for cocoa production and

other cash crops, though carried out by poor peasants, serve the needs of rich urban dwellers. The cultivation of other cash crops like groundnuts, cotton, and coffee provide little benefit for the poor who are only paid to clear the lands.

Related to crop agriculture is animal husbandry, which though catered by poor farmers belong to rich urban dwellers. In Latin America and Botswana, where cattle ranching and commercial production of cattle have been a major cause of deforestation, the benefit, in terms of cash and meat end up in urban and foreign markets. The failure of various governments in West Africa including Ghana to curb the negative effect of cattle herded by Fulani herdsmen is that 70 percent of the cattle belong to rich urban dwellers and influential powerful political figures. UNRISD's research on food systems in Tabasco, Mexico and other areas indicated that 90 percent of the region's tropical rain forests were destroyed for pasture for cattle.

Economic factors also account for deforestation. Structural adjustment programmes in many countries in Africa have thrown breadwinners out of work. With little skills and few employment alternatives, retrenched peasants resort to traditional farming systems and the cutting of firewood and production of charcoal for a livelihood.

One major forest-degrading agent that has been overlooked for a long time is mining. The search for mineral resource has been very much relaxed in developing countries both for legal and illegal operators. Prospecting mining companies clear enormous amount of fertile lands for mineral extraction without making provision for the regeneration of the forest. Their waste products also

pose further danger to human, animal and plant life. Alternative livelihood programmes for indigenous people is limited and on a small scale. While the royalty from mining companies is small, it seems not to be getting to the right people. Agbesinyale (2003) notes that community members in Wassa West District as having two regrets for mining operations in their area. First, it is the large scale land alienation by the mining companies, with legal and institutional support from the state and second, the way rural livelihood systems built by local communities on their natural environments several decades ago have come to be severely disrupted, and impaired through extensive gold mining operations which affected crop that form the livelihood of the people.

External indebtedness also deserves to be blamed for deforestations. Africa remains the most indebted continent in the world owing over 200 billion dollars. When donors or creditors demand for their monies, governments sometimes overlook the real benefit of forest to rural people to the direct desire for hard currency to satisfy international donor standards. Cutting of timber and vigorous extraction of minerals remains the major source of earnings for repaying foreign debts. Angelsen and Kaimowitz (1999) quoted Burgess (1991) as confirming that there is a positive correlation between external indebtedness and deforestation. Higher timber prices in the world market could further intensify its depletion rate.

Angelsen and Kaimowitz (1999) further observed that higher incomes/wages within certain level and especially among urban dwellers could spark demand for things made of wood such as roofing wood and furniture. But

affluence and higher wages in the developed countries could also provide money for the implementation of forest management policies in poor countries.

Good road network, availability of improved technology, market prices of timber and agriculture products, and land ownership including natural causes such as erosion, climate change and rainfall also need to be considered in any discussion on deforestation.

Another frequently cited reason for deforestation is the desire to secure or claim property rights. Angelsen (1999) identified three reasons why forests may be cleared beyond the point where the current net benefits are zero. First, even though profits may be negative in the first few years, technological progress, and construction of new roads can make cultivation profitable in the future. Second, land prizes may reflect not agricultural potential but rather speculation that the purchaser would profit from selling the land in the future. Third, in times of conflict and competition between government agencies and communities, there may be incentives to clear the land oneself in order to squeeze out the competitor.

The effectiveness of land planning units in many countries needs to be re-assessed. The socio-economic and technical criteria used to determine what land should be designated for forest use and what should be reserved for agricultural purposes and others is often poorly done or never done. When they are done, it goes to favour urban rich and those with political prowess. Moreover, those local social groups most affected because they directly and indirectly depend on the forest for their livelihood are seldom consulted. It is becoming a modern

phenomenon for the rich to graze more land than they need while land hungry farmers are blamed for the clearing of a few forest for subsistence living.

It is therefore time to rethink the causes of deforestation and redirect research to focus more on issues such as the impact of credit markets, technological change, poverty reduction, and land tenure on deforestation. Technologies such as irrigation that require substantial infrastructure and that benefit farmers with access to markets are particularly likely to reduce pressure on forests (Angelsen and Kaimowitz, 1999).

Afforestation

According to the Wikipedia Encyclopedia (2010), afforestation is planting seeds or trees to make a forest on land which has not been a forest recently, or which has never been a forest. Afforestation should be distinguished from reforestation, which means the reestablishment of a forest after removal, for example from a timber harvest. It therefore means that all kinds of trees can be used for afforestation: rubber trees, palm nut trees, timber species, fuel wood and fruit trees.

Afforestation is crucial because in some places forest needs help beyond planting seedlings to reestablish themselves because of environmental factors; for example once the forest cover is destroyed in arid zones, the land may dry and become inhospitable to new tree growth. Others factors like overgrazing by livestock which may lead to desertification, and, therefore, forest cannot grow until the long period of soil creation has been completed. When there is durirest or

duripan it effectively seals off soil to water penetration and root growth (McBeath and Leng, 2006). This clearly shows that afforestation is more than just providing seedlings to community members to plant, it involves disseminating technical knowledge and expertise so that afforestation becomes exiting and sustainable.

Suryakumari, Rao and Vasu (2009) did some work for the Centre for People's Forest in India and concluded that sustainability of community forest involves two things. First, sustainability of community institutions and second, the sustainability of the management of forest allotted to the communities. The communities need to learn the skills from environmental NGOs and the Forestry Commission (and other governmental institutions) while institution can also draw lessons from traditional preservation strategies which can be improved upon and incorporated into forest programmes and this calls for a good working relationship among them. The Centre for People's Forest recommendations are the results of a study of 80,000 households covering three geographic regions of the State of Andhra Pradesh, India.

According to Mishra (2009), in all afforestation schemes Joint Forest Management seems to be successful than other forms of forest management and likely to bring about sustainable development and community participation because of the following:

- It conforms to ethos and values and total cultural system of communities.
- The change agent is known and mostly dependable.
- The programme does not give rise to apprehension or feeling of insecurity.

Sustainable development

The need for sustainable development cannot be overlooked when dealing with issues concerning afforestation. This is so because forest resources are declining at a very fast rate, especially in developing countries. That is why there are calls for traditional resource sustainable techniques to be recognised and incorporated into current sustainable management programmes in developing countries for better success.

Sustainable development is said to be development that can be continued. This view is, however, vague in the sense that development itself remains difficult to define. Besides, it is doubtful whether there are no limits to human development. Some have also viewed the term simply as growth in material consumption (presumably indefinitely) but this view is becoming unpopular because it contradicts the general recognition that there are limits to growth. Growth in human wealth, which is unaccompanied by continuous restoration measure, cannot be regarded as sustainable development.

Lele (1991) notes that sustainability has to do with the existence of ecological conditions necessary to support human life at a specific level of well being through future generations. The question however remains as to how such a measure can ensure intra and inter generational equity.

The World Commission on Environment and Development (WCED) (Brundtland Commission's Report) has reawakened interest in environmental issues by their definition of development. World Commission on Environment and Development Report (1987: 43) defines sustainable development as

“development that meets the needs of the present without compromising the ability of future generations to meet their needs”.

The Brundtland Commission’s Report identified two key concepts in sustainable development policies (Soussan, 1994). First, the basic needs of all people must be met in a way that provides for their needs with security and dignity. Second, there are no absolute limits to development. Development potential is a function of the present state of technology and social organisation, combined with their impact on environmental resources. Soussan (1994) described the Commission’s Report as bold and ambitious as it contains fine statements, which are impossible to disagree with, but too vague to be translated into concrete actions. Despite these criticisms, there is no doubt that the report set the ball rolling for more work on sustainable development.

Central to sustainable development is the study of environmental economics. Pearce and Warford (1993) advanced three precepts that lie at the heart of any sustainable development approach. First, there is need to give proper value to the environment because past misuse of the environment has been attributed to the fact that the true value of environmental resources was not really known.

Second, there is the need to extend the time horizon over which development policies are viewed: the notion of futurity. Should the concern be short term, medium term or long-term decisions, to include the intergeneration effects on our grandchildren? How much is to be utilised and how much is to be

reserved for future generations? Moreover, there is the problem of whether the resources in use now may be valuable in future.

Third, there is the need to provide for the needs of the least advantage in society (i.e. intra-generational equality). This involves policies, which require society to sacrifice economic growth to diminish the gaps between rich and poor at local, national and international level.

The shortcoming of environmental economics is clear. There are technical as well as ideological difficulties. Nevertheless, sustaining the environment including forest and its resources has become a major global issue. Managing forest resources in order to satisfy present consumption without denying future generations the benefits of products of that forest has led to the introduction of various forms of forest management programmes in many countries. This is how the idea of community participation in afforestation gained its roots.

History of forest management

Many developing countries including India and Ghana have gone through a series of programmes in an attempt to protect their forest cover. The era immediately preceding independence and the early part of post independence period, emphasis was placed on policing the forest to prevent intruders. Controls were, therefore, put in place to prevent local population from accessing the forest. As expected, local communities distanced themselves from the Forest Department, which assumed the policing role. Local lands were degraded leading to greater demands mainly because the community members were seen as

offenders and not associates of the Forest Department. The first phase therefore did not yield any significant result.

The second was in the 1960s and 70s, when the foresters realised the futility of the policing approach and saw the need to involve the local people. They saw that forest extension was only possible if the indigenes were involved. This brought about the introduction of benefits and welfare schemes to encourage participation and to restore ties with villagers. These benefits included a share of the revenue from the forest, food aid, social security programmes and planting on private lands. The successes of these programmes were also short-lived due to lack of emphasis by successors, political interference and bureaucracy.

This gave rise to a change in policy in 1988 by the Indian government particularly to encourage joint management of the forest with communities. The policy states that, “The holders of customary rights and concessions in forest areas should be motivated to identify themselves with the protection and development of forest from which they derive benefits. The rights and concessions from forests should primarily be for the bonafide use of the communities living within and around forest areas, specially the tribals” (Mishra, 2009: 3). In 2000, Ghana initiated the Modified Taungya System (MTS) in selected areas in the country. The system allows for the sharing of benefits between government and local stakeholders. This is expected to yield better results than previous policies.

Community participation

Community participation in the management of forests and their woodlands is important as there is a clear relationship between human beings and forests. Mensah (2003) has explained that the extent to which people may exhaust a natural resource or participate in its regeneration and protection depends on the people's perception of that resource. This is because perception guides and determines the way individuals or communities treat those resources.

If people perceive forest cover as belonging to them and benefiting them; today or future, their attitude, conduct and care for it will be quite different from looking at it as having no immediate use or largely to the benefit of others. Investment in natural resources under open access with no property rights will only then lead to the use of rates that are unsustainable and this will eventually deplete the asset (IFAD, 1995 cited in Mensah, 2003).

Mounting evidence has shown that when people have secured rights and adequate stocks of assets to deal with contingencies, they tend to take a long view, holding on tenaciously to land, protecting trees and seeking to provide for their children. Secured tenure or property rights to resources and adequate livelihood are therefore prerequisite for good husbandry and sustainable development (Hoff, 1993).

One of the best ways people can owe natural resources is through participation in regeneration and use of that resource. The idea of all community members partaking in what belongs to all however lends itself to abuse and excessive exploitation. It was to prevent the unforeseen consequences of group

ownership of resources that Hardin (1968) concluded that, such a system could extinct common resources. He therefore proposed state intervention or privatisation of property rights to preserve common-pool resources.

Hardin, like other property rights theorists such as Demsetz (1970) and North (1990), argued that common property resources would be exploited as demand rose unless the ‘commons’ were protected by strict state regulation. This view, according some scholars, generated a great deal of pessimism in multilateral development institutions about the viability of local collective action in the provision of public goods and created a strong impetus for state provision of public goods, state regulation of “common-pool” resources, and an emphasis on the development of private property rights.

Though the “Tragedy of the Common” had profound influence on development work, its general acceptance was being questioned by the 1990s. Ostrom (1990) and others shifted from this prescription of the management of common-pool resources to the potential for collective action in poor communities. For them, Hardin’s theory could not survive general application because in real life, we can improve the capabilities of those involved in the destruction of common resources.

Ostrom and others assembled enormous wealth of evidence from case studies, which showed how indigenous institutions often managed common-pool resources very successfully. They concluded that Hardin’s “open access” was not the universal mode for managing common-pool resources and that “remorseless tragedies” were not an inevitable outcome. Studies by Jodha (1987) show how

land reforms in Rajasthan (India) led to the neglect of village pastures that were well maintained under the earlier feudal structure. Similarly, communal irrigation tanks in Tamil Nadu in India fell into disrepair with the reduction in the feudal powers of village landlords; the idea that privatisation and social equity automatically ensure environmental sustainability can no longer be justified. Dasgupta (1982), for example, has given a devastating critique of Hardin's arguments based on the ways in which market-based mechanisms could be used to manage the commons rather than ruin it.

Chambers (1983) therefore suggested capacity development of local people rather than top-down approach to development. Arguments in favour of "participatory development" subsequently led to its use as a means of allowing the poor to have control over their own decisions as to how best to manage common-pool resources.

Popular participation in public works or communal activities aimed at improving their condition will depend on certain factors. The extent to which these factors prevail or are lacking can be a deciding factor in the success of participatory processes. Local participation is an important factor in promoting project success in afforestation leading to an increase in income for foresters.

Popular participation has become a household word and its use in rural development programmes, particularly in the developing world has received greater attention in literature as a sure way of ensuring inclusiveness and effectiveness in projects and programmes targeted at the poor and vulnerable. Donor institutions as well as governments in their attempt to develop and make

better the livelihood of local communities have appreciated the potential of the “participatory approach”.

Participation processes have become necessary in building democratic governance and implementation of projects as it allows beneficiaries participate in decision-making as well as control over their resources. UNRISD (1989) definition of participation therefore focuses on giving the people power, for without power, it becomes difficult to access and control their resources. UNRISD therefore sees participation as the organised efforts to increase control over resources and regulative institutions on the part of groups and movements of those hitherto excluded from such control. This presupposes that in the past local communities had nothing or no control of their own resources.

Barracough and Ghimire (1990) have intimated that in many studies carried out on the success of community based forest projects, those that failed were not participatory because they did not fully take into account socio-economic conditions and hence did not coincide with the direct forest management objectives of local people. Participation therefore help enhances these local people’s capabilities and awareness and make supervisory institutions of government policies co-partners and not as ‘masters’.

Linking community participation to effective afforestation as a poverty reduction measure may therefore be a better option for environmental management rather than a total ban on the use of declared forest reserves. It is becoming a known fact that local people cannot do without resort to forest resources for survival. Environmental problems must be re-defined not just in

terms of the defence of the environment against human use, but how natural resources can best be managed and exploited creatively for peoples' benefit to optimise their usefulness to present and future generations (UNRISD, 1989).

Participation has become essential in afforestation in many ways. It reverses the power relations in a manner that creates room for the voice of the poor. Communities may become more encouraged to initiate their own programmes as a way of demonstrating to outsiders their capabilities in effecting local programmes.

Participation processes in forest management are however still at their infancy in many developing countries, and viewed with suspicion by politicians and other scholars. One difficulty has been how to understand, bring together and reconcile the interests of all parties with legislative interest in forests and their resource into an acceptable whole, and how to get funds to make state forestry organisations more participatory.

Others argue that participation is embedded in socio-economic factors including gender, age, wealth and history. Poor households may therefore not benefit from community forests as much as affluent households when it comes to the distribution of forest products. Decisions by influential groups and the opportunity cost of participation could yield disinterest in participation (Ojha and Bhattarai, 2000).

Some also contend that ethnic composition, political ideology and culture within the community could create problems at the user group level if care is not taken to ensure individual equal rights. Many politicians feel very uncomfortable

with its use in areas regarded as strongholds of the opposition. The uncontrolled use of participatory processes could undermine legitimate elected governments as the opposition may capitalise on it to rock good plans for their own vested political interest to the detriment of the larger society (Summers, 2001).

Mosse (2001) identified several problems with participation and contended that even in projects with high level of participation, what seems like “local knowledge” was often a construct of the planning context and cancelled the underlying politics of knowledge production and use.

At local/community level, participatory exercises are often public events and the decision as to who to invite and not to invite remains open and easily manipulated by politicians. Local powers and authorities, and gender therefore influence the selection of participants. Facilitators somehow ensure that outsiders’ agenda are expressed as local knowledge and indirectly provide a way to legitimise projects previously established priorities and donor needs (Mansuri & Rao, 2004).

There is also the problem of what a community means, because the common view that a community is a culturally, politically, administrative homogenous social system and internally cohesive is seldom the case. Having these weaknesses or challenges of participation only serve to enhance the need for the adoption of more practical and functional community participatory programmes which can overcome the difficulties above.

If community afforestation programmes are to succeed, there should be a way to include the usually excluded in society, such as women, children, the poor,

the elderly, minority ethnic groups, people with HIV/AIDS and the disabled. Participatory community afforestation programmes can only succeed if there is political will on the part of government, not only to commit funds but also to hold institutions charged with the responsibility of carrying out and implementing such projects accountable.

There should also be clear rules governing forest access. It is crucial that the choice of trees is sensitive to local needs and desires and which are customarily friendly. Above all, there should be well-planned motivational packages to encourage and sustain participation.

Forest and forest management

The Food Agriculture Organisation (2001) defines a forest as any land with more than 10 percent cover of trees and more than 5 metres tall. Not only closed forest but also savanna woodland is therefore included in their estimates. This definition is certainly important since it enables us to take cognisance of small bushes and plan very well for every bit of tree cover.

Fairlead and Leach (1998) contend that the extent of the forest area at the turn of the 19th and 20th centuries has been over-estimated and that this has contributed to a false view of deforestation levels. This wrong estimation, according to Poorter, Bongers, Kouamé and Hawthorne (2004), resulted from incorrect interpretation of pioneer bush vegetation and of secondary forest. These were often interpreted as a forest degradation phase instead of a forest colonisation phase of the savanna.

The differences in the level of forest cover therefore depends on the sources relied upon. Within Ghana, the level of forest varies from region to region as a result of the Sahara, climate and rainfall. Nevertheless, exploitation, farming practices, habits and perception continue to account greatly in influencing forest size in many areas. Ghana has an annual deforestation rate of 1.7% (1990-2000) compared to a sub-Saharan African average of 0.8 percent (World Bank, 2004).

Tropical forests and other woodlands are fundamental to the economic and livelihoods of millions of rural people in the developing world. Forest provides people's energy needs: fruits, nuts, leaves, oils, roots, game and firewood. Animals also depend on fodder from forest for survival. Many rural people also rely on forest for water supply, material for house construction and herbs for medicinal purposes.

Literature has shown that overgrazing, forest clearing, conversion of natural landscapes to agriculture, and other forms of human activities are destroying potentially valuable food species. A study in 1975 by the National Academy of Science in the United States found that Indonesia alone has about 250 edible fruits but only 43 have so far been widely cultivated (Cunningham and Saigo, 1997). There is need therefore to preserve the forests, which is host to these plants, for posterity. Studies of Adventist Development and Relief Agency's activities in fruit production in some rural communities in Ghana have demonstrated clearly that it can make a great difference in the living standards of poor rural folks (Quartey, 2008).

Human life is inextricably linked to ecological services provided by other organisms. Soil formation, waste disposal, air and water purification, nutrient cycling, solar energy absorption, and management of biogeochemical and hydrological cycle, all depend on the biodiversity of life. About 95% of the potentially dangerous pests and disease-carrying organisms in the world are controlled by other species that prey upon them or compete with them in some way for life support, thus reducing their number and rate of increase. These species live mainly in the forests and the destruction of the forests can lead to a significant reduction in their number and increasing risk to human existence.

One cannot also overlook the economic, physical, psychological and emotional benefits that forest brings to many people. Nature appreciation is economically important. According to the United States Fish and Wildlife Services, Americans spend 18 billion dollars every year watching wildlife. Nations with well-established and nurtured forest can therefore improve their foreign exchange earnings through forest conservation practices. There is therefore the need for greater effort to reduce the rate of deforestation in the country. That is why various countries have adopted forest management schemes to maintain or regenerate their lost forest.

Forest management systems vary from country to country, as there are various forest management practices. These practices depend on local capacity, political will, education, and level of advancement and the financial strength of that country. Traditional simple societies had their own forms of forest management. Certain groves, temples, cemeteries, among others were preserved

by local custom to serve as the storehouse of medicine, wildlife and other endangered species.

According to Cunningham and Saigo (1997), forest management involves planning for sustainable harvest, with particular attention paid to forest regeneration. The process involves preventing fires, insects and diseases from damaging the forest. It extends to man's controlled use of forest products selective through some mechanism.

Gebremedhin and Dalton (2003) have observed that at the community and local level, forest management must include several things in order to succeed, such as weeding the forest at least once a year as well as being involved in decision making and unrestricted access. Well-defined property rights give users incentives to work on common property and adopt appropriate technology to increase long-term benefits (Arnold, 1995). This has led to the issue of how to motivate communities to participate in afforestation.

The concept of motivation

Every human being needs some motivation to empower him/her to put in their best in their endeavours or in this case participate in afforestation. The idea that when people are well motivated they are able to put in their maximum effort to achieve results is well-known throughout human history. This motivation can be in various forms: material and non-material. It could be directed mainly at that person or for the benefit of the public.

Human motivation studies therefore try to discover what triggers or sustains human behaviours. Put differently, what makes people do certain things very well when they anticipate favourable rewards? In looking at how communities can be encouraged to participate in afforestation, one cannot therefore overlook the key issue of motivation. According to Cole (1995), motivation is used to describe those processes, both instinctic and rational, by which people seek to satisfy their basic drives, perceived needs and personal goals, which trigger human behaviour.

Motivation theorists are of two kinds. First, there are those who consider motivation as a process. They focus on how and by what goals people are motivated. Process theories of motivation look at what people are thinking about when they decide whether to put efforts into a particular activity. One of these is the Expectancy Theory. The second category is the content theories of motivation. These theories suggest that people have certain needs and / or desires, which are internalised as they mature to adulthood. They therefore look at what is in certain people that makes them do or do not do certain things. Maslow's Theory of Needs is an example of the content theories of motivation. According to Maslow, the desire to satisfy specific groups of needs, such as physiological, safety, love, esteem and self-actualisation needs, motivate many people to work.

Expectancy theory of motivation

The expectancy theory fits very well into strengthening community participation in afforestation, because community members expect certain

benefits and support in order to engage or participate in afforestation. Vroom (1964) who developed the central theme of this theory contends that an individual's behaviour is not formed from objective reality but his or her perception of that reality. He tries in the theory to establish a relationship between effort, performance and rewards.

According to Vroom (1964), there are three crucial factors: expectancy, instrumentality and valence that motivate individuals to engage in any activity, as shown in Figure 1. Expectancy is the extent of the individual's perception, or belief, that a particular act will produce a particular outcome. Instrumentality is the extent to which the individual perceives that effective performance will lead to

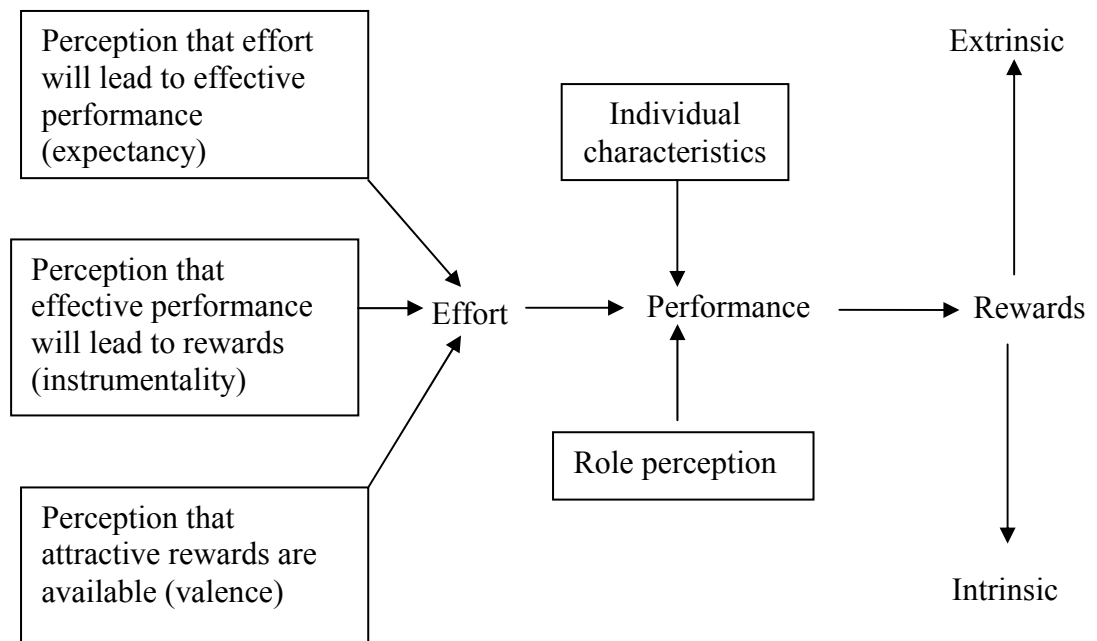


Figure 1: Vroom's Expectancy Theory

Source: Vroom (1964)

desired rewards. Valence, on the other hand, is the strength of the belief that attractive rewards are potentially available. These three factors combine together to create a driving force, which motivates an individual to put in an effort, achieve a level of performance in order to obtain the desired rewards. Vroom suggested that Force was a multiple of Expectancy and Valence (encompassing Instrumentality) as in the formula: $\text{Force} = \text{Expectancy} \times \text{Valence}$. If things seem reasonably likely and attractive, we know how to get there and believe we can “make the difference” then, this will motivate us to act to make this future come true. Other supporting factors necessary for effective performance to attain these rewards are the individual characteristics such as knowledge and skills, constraints of the job and role perception.

Linking the theory to afforestation, one can easily see a quick link. Literature is full of cases where people’s desire to plant trees is affected by their belief that their action may not produce any results due to inaction by district assemblies, destruction of trees by deers, diseases, livestock, fire outbreaks, chain saw operators and farmers practising shifting cultivation. In 1994 alone, the United States spent over one billion dollars and lost 38 lives in effort to stop forest fires (Cunningham & Saigo, 1997). Given these challenges, it is not surprising that many potential tree growers are hesitant to go into tree planting.

Again, the attitude of tree growers could further be affected by their perception that even when they put in their best to protect the trees, their future benefits are sometimes not fully known or guaranteed, because they may not be given property rights, right of access, and all they are entitled to as revenue. They

also may be reluctant when they cannot say for sure the percentage of the products they are entitled to, at the end of the day. Even where property rights are guaranteed and the amount to be given to the farmer is known, there could still be constraints regarding markets depending on the produce of the tree grower, for example, fruits, timber logs or firewood.

Other factors that could affect afforestation are availability and suitability of seedlings, knowledge and skills in tree planting, ability to deal with constraints and fatigue demanded by tree growing, political environment and the general attitude of people or community to afforestation. It is against this background that appropriate motivational packages and joint forest management are becoming the policy focus of forestry in many parts of the developing world.

The Expectancy Theory and the poverty and afforestation debates

There have been several attempts to link afforestation to poverty reduction in many rural communities (Reardon & Vosti, 1995). This is due to the immense role it plays in the daily life of rural folks. Rural folks will support an afforestation scheme that would reduce their poverty. If a system of afforestation will only exclude them from their source of livelihood and enrich the rich outside their communities, then little support will come from the communities. Government policy focus needs to address the issue of afforestation because of its potential at reducing rural poverty. This is because people's participation in forest activity is determined by whether it can reduce or affect their poverty. It is easy to show how environmental degradation induces poverty.

The poorest people in the world depend directly on natural resources for their food, energy, water and income. When grasslands are degraded, livestock suffer, and income and protein are lost. The cutting of woodlands and forests result in scarcity of fuel wood. The erosion that follows reduces land productivity and crop yield. The destruction of medicinal plants can increase health budgets. Logs cut can threaten the provision of adequate and affordable shelter for rural and urban poor.

World Commission on Environment and Development (1987:43) acknowledges the vicious cycle of poverty when forest cover is lost in this description of the Sahel region, “no other region more tragically suffers the vicious cycle of poverty leading to environmental degradation, which leads in turn to even greater poverty”. This is something that is known to the poor themselves but they have no alternative. Absence of alternative livelihood programmes and safety nets therefore appears to be what compound the problem of deforestation.

According to Kaimowitz (1996), many national poverty reduction strategies and government policies often overlook the importance of the forest in sustaining the lives of millions of rural poor. Some policy-makers still think of forests as an environmental issue rather than its contribution to national import.

Kendie (2003) sees the poverty-environmental-poverty cycle challenges of developing countries on two fronts: there is the issue of poverty leading to extreme reliance on nature for sustenance, and also the fact that in a bid to export more (largely primary products) these countries often leave large areas of land degraded. Another difficulty is that the emphasis has been on measuring poverty

rather than on explaining why people are poor, and the role played by environmental conditions or degradation.

Poverty alleviation is crucial because of its links with the environment, especially that of forest resources. Lele (1991) cited in Reardon and Vosti (1995) has noted that, the link between poverty and environment is often mentioned in the 'sustainable development' debate but is seldom systematically explored. In exploring the discussion on poverty and the environment, there is the need to look at the various types of poverty instead of looking at it as a single concept. It is when this is done that we can know clearly whether that type of poverty actually causes some environmental damage.

According to them, it is also important to isolate the type of environment change when making any discussion, so as to determine the aspect of the environmental damage that that kind of poverty causes. For example, environmental damage can be land/soil, water, ground cover and biodiversity.

Reardon and Vosti's (1995) treatment of the poverty-environment link is refreshing because of its assertion that categories of poverty determines categories of environmental degradation and that these must be separated and dealt with for a meaningful discussion on the link between poverty and environment. Beside the use of levels of consumption and expenditure, that is welfare poverty in the discussion needs to be reviewed if improvement in resources management is to be attained. For them, poverty is usually treated as a single concept. Rarely asked is how the type of poverty influences the poverty-environment link. But the range of

types of poverty is the range of lack of the various assets, land and income derived from them:

These assets include:

- Natural resource assets
- Human resource assets
- On-farm physical and financial assets
- Off-farm physical and financial assets

It is possible for households to be well endowed in one asset and poor in another and this can affect the environment. Apart from welfare poverty, there is what Reardon and Vosti (1995) classified as “investment poverty”, that is the inability to make minimum investment in resource improvements to maintain or enhance the quality of the resource base to prevent or reverse resource degradation. According to them, households above the ‘welfare poor’ can still be investment poor in four ways:

- If market conditions are such that the household cannot convert its assets or products into enough cash to make conservation investment.
- If the household can obtain the cash but cannot buy labour or other inputs needed for conservation measures because their supply is constrained.
- While household income may be somewhat above the welfare poverty line, it is not sufficiently above it to generate an adequate surplus for conservation investment.
- Household may choose to use surpluses for consumption, saving or investment of other types.

In any case, if a household is investment poor and not welfare poor, it may lead to natural resource degradation that eventually causes the household to become welfare poor. Certain important themes appear from the discussions that are crucial for policy direction:

- Not all types of poverty cause environmental degradation. The level, type and distribution of poverty determine the link.
- Not all environmental degradation is caused by the poor, so reducing poverty may not necessarily reduce pollution or use of agricultural chemicals.
- Reducing poverty can reduce resource degradation where poverty is driving the poor onto fragile hillsides or forests. But alleviating poverty will not necessarily lead to less resource degradation where the only insurance available is investment in more livestock, and insurance demand increase with household income.
- Enhancing the natural resource base can reduce poverty where soil degradation is reducing yield but it can also increase poverty where poor households are barred from access to wild flora and fauna, which they depend greatly as a key income strategy for survival.
- There is need to appreciate the important role of conditioning variables such as markets, price, infrastructure, population and technology on the poverty-environmental link.

Forest policy in Ghana

Realising the importance of forest management, Ghana has adopted a number of forest management policies and systems at various times. The forest management systems so far adopted include Taungya system, community forestry, social forestry, fuel wood plantation, forest enrichment plantation and the silvicultural systems. The forest policy of Ghana has been revised severally to bring it in line with current developments. More innovative strategies continue to be developed but difficulties on the field have become apparent. This is not surprising because local communities and donor agencies are sometimes divided over modalities.

It is no secret that external donors including the World Bank and international development agencies sponsor many current forest management programmes in Ghana. The unfortunate aspect of this external sponsorship is that, donor or funding concerns have more say on forest policies than local needs (Hanna & Boyson, 1993).

Consequently, the strong involvement of international interest results in the top-down approach pursued in the implementation of projects in Ghana. This can result in applications that promote elitist agenda but do little in support of grassroots participation. Local involvement can be enhanced through capacity building, education and allowing for local initiative and financial support.

In Tanzania, the National Forestry Action Programme has been criticised for giving too much concern to commercial forests. Critics have noted that this heavy emphasis on commercial forestry in a country with so little forest gives rise

to considerable concern, that social and environmental considerations are being subordinated to national economic goals (Barraclough and Ghimire, 1990). Our discussion on Ghana forest policies attempts to look at the various policies to see how they tried to improve forest management over the years.

Until 1948, there was no policy to guide forest development in Ghana. The Forest Ordinance (Cap 157 of 1927) governed the constitution and protection of permanent forest reserves. The 1948 forest policy sought to improve upon the previous guidelines in the sense that it, among other things, allowed for the conservation and protection of the forest environment, and promoted research in all aspects of scientific forestry. It, however, fell short of expectation because of excessive centralisation and failure to see wildlife conservation and management as an integral part of forest resource management. No provision was also made for peoples' participation, especially in commercial plantation. These weaknesses informed the redrafting of a new forest policy in 1994.

The 1994 forest and wildlife policy marked the beginning of political attempt to involve communities into forest policy planning. Attention was to be given to public education and to make communities aware of forest issues. The policy further began the decentralisation of forest programmes from national to regional and district levels as a sustainable management strategy for the forest. Of particular importance was the attention given to wildlife, vital soil, water resources, and biological diversity as components of sustainable development. The current Forest Plantation Development Programme is a further improvement of this policy.

According to Professor Dominic Forbih, a former Minister for Lands, Forestry and Mines, 32,032 people in forest fringe communities of the country are engaged in full-time jobs under the on-reserve Modified Taungya System (MTS). Another 1,040,833 people are doing part-time jobs in boundary clearing, nursery development and others. The cabinet had approved a new benefit-sharing scheme, which generates to farmers 40 percent shares in plantation developed under MTS, 15 percent to traditional authorities, 40 percent to Forestry Commission and five percent to the community (Ghana News Agency, 2005).

The Republic of Ghana (2003) acknowledges the need to plant trees in abandoned mining areas, degraded forests and woodlands. Tree planting around water bodies, catchments areas and high slopes are also to be encouraged. An environmental tax on mining and timber firms to raise funds for afforestation programmes is also proposed. However, the difficulties that followed discussion in parliament on the new mining bill and the pressure from civil society, which forced the withdrawal of the bill for further consultation shows that more needs to be done to save the forest and the environment.

Republic of Ghana (2006) made further policy directions on environment. These proposals are meant to minimise or reverse the impact of bad practices on the environment and to meet the Millennium Development Goal 7 (MDG 7). Specifically the policy statement aims at achieving the following:

- Promote the use of environmentally friendly technologies and practices.
- Enacting relevant environmental laws to protect the environment and enforce existing legislations.

- Encourage reforestation of degraded forest and off-reserve areas.
- Promote the development and use of alternative wood products as well as plantation/woodlot development among communities.
- Manage permanent estate of forest and wildlife protected areas.
- Develop a sustainable forest and wildlife to support eco-tourism and generating foreign exchange.

Ostrom (1990) quoted in Gebremedhin and Dalton (2003) admits that collective action is affected by the size of the regime, dependency on the forest resource, and understanding of the value of the resource by users. Collective action is successful if users see high economic potential in forest activities, when users have authority to determine harvesting rules and when they have access without external influence.

Afforestation can register high success by not only good policies but also appreciating the cultural aspects of peoples' life. This requires working with traditional rulers and institutions to agree on the forest strategy that can yield maximum results. A gap, however, appears to exist between formal and traditional Ghanaian institutions (though some chiefs like the Okyehene are actively involved in afforestation programmes). There is need for chiefs and traditional institutions to be involved for greater success.

In many areas for example, the official forest management institution (Forestry Commission) is seen in many ways as a relic of British Colonial Administration. In Northern Ghana, the manner in which that institution resorted

to forced labour and punishment to accomplish its tree planting exercises has left a bad history of its activities in the minds of people.

Tree planting was not seen as a crucial part of human activity but more as an imposition for the benefit of 'outside' powers. Groves and other preservation sites have been cleared for roads and buildings in the name of development, without taking the feelings of local people into consideration. Trees are planted on people's lands at times without any notice or even some education as to its essence. Rural people take this as a gradual usurpation of their land and, therefore, employ subtle measures to thwart the maturation of trees.

In arid regions, additional provision should be made for ample, regular and accessible water supply to make forest management feasible. Dams as well as wells construction must be incorporated into forest plans for reasonable success. Agbesinyale (1992) has observed that an irrigation and water conservation system remains a powerful tool for progress in both arid and rain-fed regions for agriculture and in forestry.

The Forestry Commission therefore faces the problem of recognition and hence do not command the loyalty of all the local people. On the contrary, traditional institutions are rooted in customary practice, values and beliefs, and one can count on legitimacy and self-enforcement. This is evident in many communities where customary prohibitions are taken seriously. For effective forest management policies, both modern and traditional institutions need to cooperate.

In rural Ghana where most forest resources emanate and where urbanisation, formal education and contact with popular cultures are greatly reduced, tradition and custom shape the life of the people. Preference for the use or non-use of natural resources is often based on customary interpretations and rituals. The planning and management of land and associated resources in many villages are circumscribed by customs, taboos and rules, which among others support the principles of sustainable development and ecological preservation (Kendie, 2000).

Many land-based resources are believed to possess spirits that must be appeased before such resources might be harvested. Recent participatory programmes of integrating traditional resource management practice into modern planning models arise from this recognition (Oakley & Marden, 1984). According to Wade (1987), an increased understanding of traditional African institutions and of the ways they operate to control resources exploitation in the past have generated awareness about the potential contributions of such institutions to the preservations of local forest.

Social forestry programmes consume a lot of rural time and the opportunity cost of caring for trees could reduce man-hours on agriculture activities. Time is needed to water trees, remove weeds and drive away stray animals. There may be the need to provide protective cover. In areas where a greater proportion of agriculture work is carried out by women, who also from available evidence are the ones committed to the provision of water for households and for tree watering, the pressure could be very great.

Policy makers therefore need to have knowledge of local, social, economic and cultural relationships and constraints in order to encourage afforestation. If the extent to which the forest activities being introduced will compete for the time of the peasants and his family, especially in the farming season is not properly considered, seedlings may not survive. In the dry seasons when the hunger of rural communities becomes conspicuous, food aid or rationing of meals could be an encouragement as well as a source of energy for extra work on forest trees.

Case studies of community involvement in afforestation

A number of case studies are available which demonstrate the ability of indigenous people to develop and manage forests if well motivated; even though, it must be admitted that there is no forest management scheme that has no defects. However, the benefits far outweigh the defects.

Taungya system

As the name implies, it involves allocating land-use rights to local people in order to gain their collaboration in growing trees. This system allows the farmers to grow crops on the land while taking care of the trees until they are relatively grown. The land allocation can be permanent or temporary.

The Taungya system was developed in Burma in the 1950s and has been adopted by many countries including Java, Thailand and Kenya in 1910, Nigeria and Liberia in 1974, and Ghana in 1978. It is generally upheld by governments for

its considerable low cost than other methods as the forestry commission spends less or nothing on the seedling and care of trees.

The system has its own problems. There is always competition between the farmers who benefit from food crops and the forest department whose concern is with growing trees. The difference becomes intense as trees grow older, and farmers are expected to leave for newer lands. In some cases, farmers who fear ejection simply cut down trees to prolong their stay on the land.

The incentives to farmers include provision of water, health services, education, and housing, among others. Prabhakar (1998: 78) notes that Taungya cultivators in India have described the scheme as not providing the necessary motivation:

“...What does the cultivator get apart from his crop”? He gets very little. The usual inducement that are offered consist of land for erecting temporary hutments, some inferior timber and thatching material, and a hand pump for potable water. Sometimes we are given the right to manufacture charcoal from stumps, which are too big to be removed and have to be dug out by the cultivator at the expense of considerable labour, elementary education for his children and nominal medical facilities. There may or may not be an elementary community organisation and small credit facilities. These incentives are primarily linked with benefits to the forest crop rather than with the welfare of the taungya cultivators, and are given to them at the minimum possible scale....”

Community/Social forestry

Another forest management practice often used in rural areas is social forestry. This system makes use of public lands as against private lands for growing of trees. It is communally owned because they are intended to provide benefits to the entire community. Every member of the community can access the products such as firewood as far as there is no over-exploitation. It is a sure way of enabling the weak and poor to partake in forests produce. It provides an opportunity for the community to help in afforestation. This way, misuse of common property could be minimised. Some of these programmes are specifically designed to target the alleviation of poverty.

Usually, the responsibility in providing the necessary facilities such as funds, fertilizers, seedlings and water inputs rests on the forestry commission with community members providing land, labour and water. Community programmes can use both commercial and non-commercial incentives as a way of enhancing local participation. In all cases, the key to success lies in persuading local people that the programme is in their interest and that the benefits promised are secured.

Furthermore, it is important to identify the needs of every community as different communities have different needs. The gender considerations are also important to ensure that the needs of the area are balanced. Community forestry programmes have been successful in China, South Korea, India and Tanzania. Even though extremely beneficial, they can be very difficult to handle. In the Sahel regions, its introduction has yielded little results. Prabhakar (1998) has

noted that where village woodlots have succeeded, it had succeeded because it was planted and managed by the Forestry Commission using paid labour.

Little success in community forest programmes can be attributed to the cost involved. Nevertheless, it also hinges on distrust of local communities, administrative weakness in the forest services at the local level, non-delivery of seedlings and inputs, inappropriate location of plantations and lack of satisfaction of local needs. With increasing scarcity of land, it has become very difficult to get large track of land for such projects especially where there is widespread lack of local enthusiasm for communal tree planting. Improvement in incentives coupled with active local participation can greatly enhance the success of community forestry.

Farm forestry

Another way communities can participate in afforestation is farm forestry. This refers to forest management programmes, which promote commercial tree growing by farmers on their own land. In areas that have ready market, it can become a very lucrative business venture, and sometimes compete favourably with fertile agricultural lands. The system has been tried in the Philippines with great success and in India to a considerable extent.

The system has a great future because of the private ownership and its commercial viability. The state also expends little on inputs like seedlings as farmers themselves may want to choose a variety that gives them the best returns.

The system, according to Prabhakar (1998), has been identified with three strong criticisms worth considering in detail.

Firstly, the system has been criticised as very unfair as it amounts to subsidising the rich. The critics have argued that the benefits from farm forestry tend to be appropriated by the larger farmers. Wealthier farmers are more easily able to access the incentives provided for the programme such as seedlings. Such a practice if not carefully monitored could further widen the gap between the rich and the poor in rural communities.

Secondly, the system has been accused of failing to provide the necessary social and environmental benefits that each forest management programme should bring along. The system is purely commercial and in particular, where silvicultural practices are in place, there could be serious environmental defects when the entire trees mature and are harvested. Poor indigenes may also be prevented from getting charcoal and firewood, and are further pushed into other reserved forests. Farm forestry may therefore provide few direct benefits to local consumers who are not in a position to plant trees themselves, or who are too poor to buy firewood.

Thirdly, the system is said to harm the poor. Farm forestry use less labour than other forms of forest management programmes and could reduce labour force and hence bring unemployment. It also reduces the local availability of fuel and fodder needed by the poor. Nevertheless, the system has succeeded in other areas. There can be a mixture of other systems to give it a better acceptance.

Indeed no one system has ever been implemented in isolation. It is normally a combination of several types.

Woodlots

The programme generally gives encouragement to the public to plant trees not because of commercial reasons but as part of measures to satisfy the specific needs of individuals of the community. Even though there is the intrinsic desire in every community to have trees, such desires need to be awakened through educational and promotional programmes. Before the start of the programme, it is expected that the needs of the community should be known. For example, people may be interested in trees that provide firewood, poles, fruit, shade, boundary protection, wind protection and erosion prevention.

The extent to which promoters understand local needs can influence greatly on the success of the programme. Many programmes have failed due to perceived needs of local people. According to Prabhakar (1998), the assumption that people would be willing to plant trees for fuel wood has underpinned a number of forest programmes. Experience has however shown that even in areas where the fuel supply is not seen as an immediately serious issue, people are usually uninterested in growing trees exclusively for fuel wood. Indeed, even in areas where fuel wood is seen as being in short supply or at least becoming scarce, it rarely seems to be sufficient motive to persuade people to grow trees.

A recent survey of people's attitudes in Malawi has shown that though people said they were aware fuel wood was becoming scarcer, they were most

concerned with the shortage of building poles. It seems certain that trees, which provide a variety of different benefits, are the most attractive to local tree farmers. Because of its non-commercial nature, there will be people who may opt out of tree planting for their own reasons. In areas like Costa Rica, India, Tanzania, Niger and Kenya, the practice has been accepted and implemented with great success. A striking feature of this programme is the level of protection and care that individuals provide to their trees especially protection from animals and provision of water. In Costa Rica, almost 50,000 trees were planted in 1982 using this method alone (Pearce & Warford, 1993).

Agro forestry

Related to this is what has come to be known as agro forestry or social forestry in India. The suitability of this forestry programme is its ability to combine tree growing, animal rearing and crop growing in an integrated manner for the benefits of the farmer. The International Centre for Research in Agro Forestry (ICRAF) defines agro forestry as the collective name for all land-use systems and practices in which woody perennials are deliberately grown on the same land management unit as crops and / or animals. This can be either in some form of spatial arrangement or in a time sequence. To qualify as agro forestry, a given land-use system or pace must permit significant economic and ecological interactions between the woody and not woody components.

Cook and Grut (1991), however, see this definition as limiting and extended agro forestry to include many different activities involving the

incorporation or retention of trees or shrubs into agricultural or pastoral systems. Such activities may include planting fruit trees around a homestead, growing trees in woodlot to produce fuel wood or building poles, or intercropping trees with other crops on a farm plot, and passive systems that are geared towards protection and natural regeneration of indigenous trees.

Agro forestry in its broadest sense can be seen everywhere in Africa. Cook and Grut (1991) enumerated the various types to include grazing or farming under savanna trees, coffee and cocoa grown under shade trees, planting of individual trees or woodlots by farmers, intercropping between young plantation trees or grazing between older ones. It also involves the sowing of tree seeds on abandoned fallow lands to speed up the restoration of fertility, the “garden” type of agriculture in fertile and densely populated area where trees, shrubs, and annual crops are grown on the same piece of land, and modern forms like alley cropping.

Tree crops like oil palm, rubber, mangoes, and the traditional migratory slash-and-burn agriculture, are also forms of agro forestry. In many cases, trees used for agro forestry are multipurpose species, and are used for food, shade and restoring soil nutrients.

According to Cook and Grut (1991), trees can only qualify for agro forestry if they possess the following qualities:

- Non-competition with field crops;
- Fixation of atmospheric nitrogen;
- Low fibre content in litter;
- Fast growth and easy management;

- Ability to regenerate and coppice;
- Easy monitoring of shade;
- High production and higher profitability;
- Multiple uses of wood and foliage;
- Social acceptability;
- Ability to fulfill specific objectives for which the afforestation programme is undertaken; and
- Suitability to local soil, moisture and climatic conditions.

Joint forest management (JFM)

Joint Forest Management programmes (JFMPs) are designed to entice villagers formally into forest management systems and to make the production system more responsive to community needs, thereby ensuring sustenance of the resource (Mishra, 2009). JFMPs started in India in 1991. Within a short time it became the framework for creating massive involvement of the people in the participation of forest programmes through village committees for the protection, regeneration and development of degraded forestlands. By August 2001, 14,254,845.95 hectares of forests lands in India have been brought under JFMPs through 62,890 committees.

The programmes have also been implemented in Guatemala, Tanzania and Ethiopia under the name Farm Africa. In Tanzania and Ethiopia where less than 3% of forest is remaining, the project enables the forest to provide wood, honey

and other products to 66,000 people in 18 local villages and water to a further 110,000 people (Mishra, 2009).

Conceptual framework for afforestation

According to Miles and Huberman (1994), a conceptual framework explains, either graphically or in a narrative form, the main things to be studied, namely: the key factors, constructs or variables and the relationship among them. The conceptual framework for afforestation looks at the key issue of afforestation and factors that are likely to improve afforestation in a community, among others. It shows the relationship between the key concepts of the study which include: causes and effects of deforestation, the mitigating measures, motivating factors for afforestation and benefits of afforestation.

The framework for the study, Figure 2, recognises that the issues associated with afforestation are not a free flow chart, but face many challenges in the process. Afforestation and deforestation are two sides of the same coin. That means that the action of one affects the other. If one is able to reduce deforestation, one is on the right path to resolving the challenges confronting afforestation.

The following causes deforestation: bush fire, mining, agriculture, foreign debt, and indiscriminate fuel wood and timber cutting. To overcome deforestation, there is the need for mitigating measures such as bye-laws on afforestation, sanctions against and punishment for offenders, selective cutting of forest trees, and intensification of fuel wood production. Deforestation generally

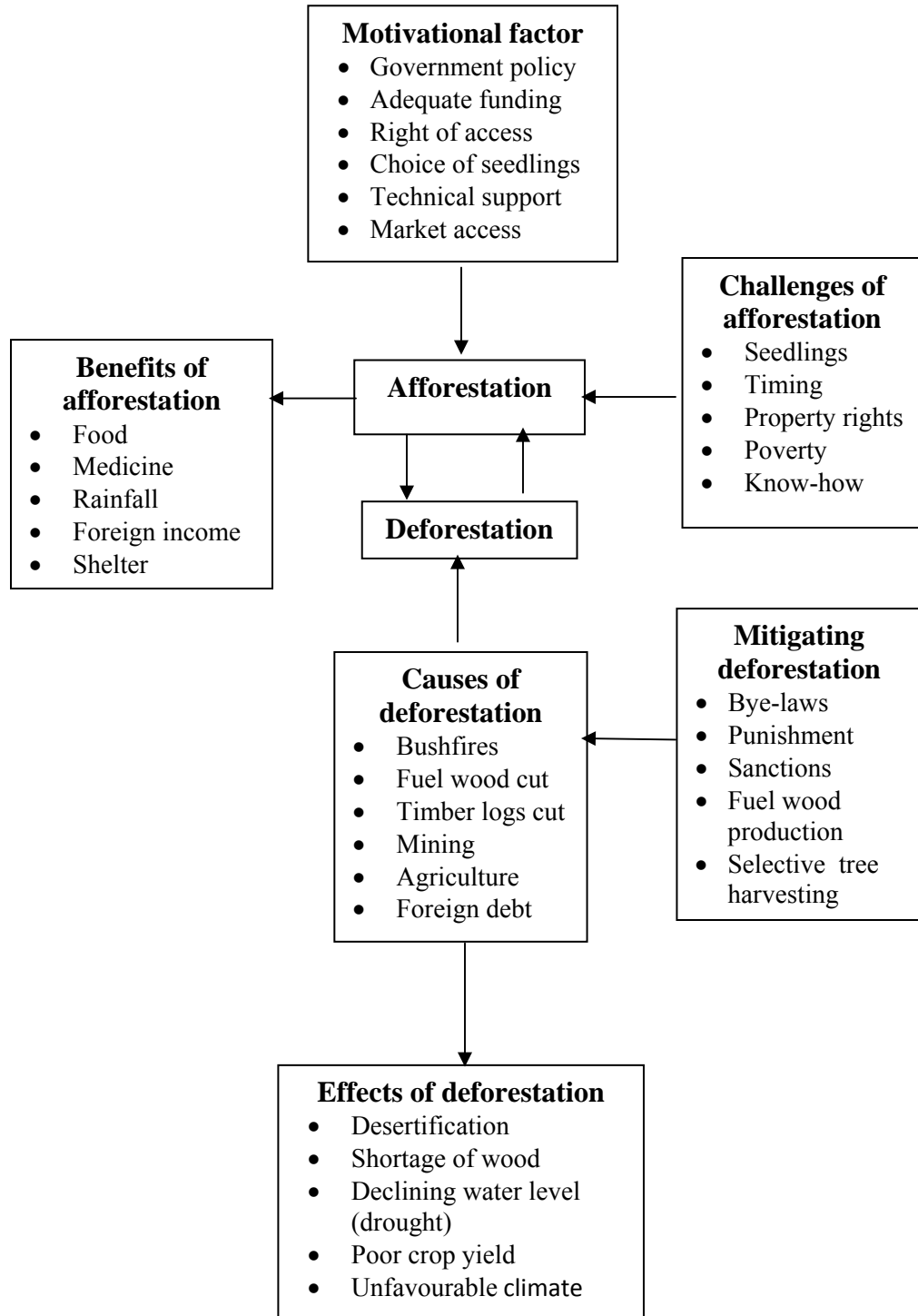


Figure 2: Enhancing afforestation

Source: Author's Construct (2006)

leads to desertification, shortage of wood, decline in water level (drought), poor crop yield, and unfavourable climate condition.

It can be deduced from Figure 2 that the implementation of the mitigating measures would help in improvement in afforestation. However, implementing these mitigating measures are challenged by inadequate supply of seedlings for planting, timing of afforestation programmes, property rights, poverty, and limited access to appropriate forest technology.

To overcome the challenges to afforestation, there is need for stakeholders to consider the introduction of motivational factors such as: appropriate government policy, provision of appropriate seedlings, adequate funding, providing technical support and facilitating market access for tree growers' produce.

Sustained implementation of the above measures will greatly enhance afforestation and thereby bring about improvement in the availability of forest food. This will reduce the cost of living and enhance the living standards of the people. A good vegetative cover leads to a good climate that will induce ample rainfall for crop production. Farmers, fuel wood harvesters, hunters, traders of forest food and fruits, and all those who depend on the forest for employment would also improve their livelihood.

CHAPTER THREE

METHODOLOGY

Introduction

This chapter looks at the process used for collecting data under the following headings: study area, research design, study population, sampling procedures, sources of data, data collection instruments, pretest, fieldwork and data processing and analysis.

Study area

The study took place in the Ajumako-Enyan-Essiam District (AEED) in the Central Region of Ghana. The district has a total land area of 541.3 sq. km, representing about 5 percent of the total land size of the Central Region. The local Government Legislative Instrument (L1 1383, 1988) which established the AEED divided the district into nine Zonal Councils namely: Ajumako, Bisease, Mando, Brema Essiam, Enyan Abaasa, Enyan Denkyira, Enyan Main, Etsii Sunkwa and Baa. These zones consist of 184 communities. The district capital is Ajumako.

The district had a population of 91,965 made up of 42,395 males and 49,570 females (Ghana Statistical Service, 2002). However, the growth rate of the population stands at 1.5 percent, which is lower than that of the regional and

national average of 2.5 percent per annum. Nevertheless, there is still the need to view it in relation to the resources available in the area.

The Ghana Statistical Service (2002) put the density per square kilometre at 169.9 from 77 in 1970. This increase has serious consequences on economic activities and the lives of the people. A sharp increase in the youthful population will mean increased demand for educational and health facilities all over the district. It also has the tendency to increase the dependency ratio. Where poverty is predominant, it could result in increased school drop out rate, unemployment and increased crime rate which can affect gainful economic activities.

The forests used to contain significant amount of economic trees, but there are signs of great decline due to over exploitation and unplanned logging. The gradual deterioration of the forest continues to impact greatly on rainfall amounts and forest cover in the area (AEED Water and Sanitation Agency, 2005).

Some of the most visible economic activities in the area include farming, manufacturing, extraction industry and services. About 80 to 90 percent of people in the district depend directly and indirectly on agriculture for their livelihood. Total cultivatable land is estimated at 74,400 hectares, but only 37,200 hectares are yet under cultivation. The main crops grown in the district are cassava, maize, plantain, citrus and vegetables. Non-traditional fruit crops such as cashew and pineapples are becoming a common produce of Mando and Enyan Abaasa. Besides cropping, some residents engage in livestock farming. The rearing of animals like sheep, goats and pigs is on the increase.

The manufacturing, extraction, and processing industries are also increasing in number in the district. Oil palm extraction, cassava processing and woodcarving have offered employment to many indigenes. Onwane and Essama are known for edible oil processing; and Ochiso inhabitants engage in local soap making. There are some gari processing centres at Mando, while weaving and carving is common in Mando, Kokoben, Enyan-Main, among others. Bread baking remains a major economic activity of residents of Ajumako and Bisease.

Forest resources such as Odum, Wawa and Emire, are logged and exported or used locally. As part of measures to increase the stock of forest resources in the district, the assembly supplied about 5,000 improved seedlings of citrus to farmers in 2004. The reactivation of the Nkwantanum West Africa Fruit and Food Processing Factory, need to be seriously considered to encourage fruit production in the district. Mining has commenced on a small scale for minerals such as mica, kaolin and gold. Kaolin is present in Ochiso, while gold is mined at Ekwamase in the Enyan Main zone. There is a stone quarry at Bedukrom in the Sunkwa zone.

Other emerging economic activities are the carving and service sectors. Wood carvers, masons, carpenters and auto mechanics are putting up small-scale workshops along major commercial streets. Sewing centres, hairdressing shops, barbering shops, telecommunication services and other provision shops are also emerging in the district capital.

Research design

The study was largely cross sectional and descriptive. The cross sectional approach was necessary because the work covered many communities within the district. Information was required from the various areas to make meaningful conclusions. Apart from that, the study obtained responses from both males and females to show their peculiar problems with regard to afforestation in the district. This facilitated the appropriate recommendations that were made. The study was also descriptive because a number of issues had to be observed and described. The study described the various concepts and subjects that came up in the course of the work. The study also described the various forest conservation practices in use all over the world as well as those recommended by community members.

According to Leedy (1989), descriptive study is used to process information that comes to the researcher through observation. It can be quite different from historical data, which comes to the researcher through written records. The nature of this research did not necessitate the use of historical or experimental surveys.

Study population

The study population was from Mando, Enyan Main and Enyan Abaasa. Tree growers in the district were also included in the study population due to their experience in tree growing. The last category was the staff of the District Assembly and some opinion leaders from the district. The views of the tree

growers, staff of the District Assembly and opinion leaders were needed to compare with the findings of the household results.

Sampling procedures

The study made use of simple random sampling, purposive sampling and quota sampling in the choice of respondents. The simply random sampling technique was used to select respondents for the tree growers' survey. The number of tree growers in the district stood at 47. Their names were written on pieces of paper and 18 respondents selected. Four women tree growers were selected using purposive sampling to ensure that women were included in the sample.

The purposive sampling technique was used to select the District Coordinating Director, the Planning Officer, the District Coordinator of the National Disaster Management Organisation and two opinion leaders in the area to answer questionnaire designed for organisations and opinion leaders. They were given two weeks to provide answers to the questionnaires. These were completed and returned in the third week.

The simply random and quota sampling techniques were employed to select respondents for the household survey. The AEED is divided into nine zones. Each zone is further divided into communities. The study therefore adopted quota sampling to select respondents for the household survey based on their population proportions.

The sampling process began by selecting the three zones using the simple random sampling. The names of the nine zones namely Ajumako, Bisease, Breman Essiam, Enyan Abaasa, Enyan Denkyira, Enyan Main, Entsii Sunkwaa, Mando and Ochiso Ba were written on pieces of paper and mixed together and the three zones: Mando, Enyan Main and Enyan Abaasa selected. This was necessary in order to reduce the population to manageable level. A total of 375 respondents were used for the household survey. In order to provide equal opportunity to community members to participate and make the sample representative, the number of houses in each community was calculated and every sixth house chosen and included for the interview. The first adult to meet in each house who was 18 years and above and willing to be interviewed was interviewed. The 375 respondents were divided among the three zones selected for the study according to their populations. The same process was used to select respondents from the various communities as shown in Appendix VI. This brought the entire sample size for the study to 402 respondents made up of 22 tree growers, 5 administrators and opinion leaders and 375 household respondents. According to Sarantakos (1998), the sample size for research depends on the nature of the population as well as the type of analysis employed in the project but that many researchers agree on a minimum of 100 subjects as adequate to make statistical inferences. A sample size of 402 was therefore seen as adequate for the study in the area. The populations of the three zones sampled and the actual number of respondents who responded to the household survey are presented in Table 1.

Table 1: Study population and number of respondents

Zone	Population	Sampled respondents	Respondents who Responded
Mando	8,429	137	106
Enyan Main	8,214	121	100
Enyan Abaasa	7,272	117	61
Total	23,915	375	267

Source: Field Survey, 2006

Sources of data

Primary and secondary data were collected for the work. The primary data were obtained from respondents for the household survey and interviews with tree growers, as well as the key informants. The secondary data came from books, journals, articles, the internet and the District Assembly.

Data collection instruments

Five sets of instruments were used for the data collection. They included household interview schedules, tree growers' interview guide, focus group discussion guide for wood carvers, questionnaire and observational guide. The household interview schedule was used to collect data from community members. The tree growers' interview guide was also used to obtain special information from tree growers. The questionnaires were administered to some staff of the District Assembly and opinion leaders, while the observation guide assisted in

recording information that was observed. The chiefs' permission was sought to visit certain preservation sites and groves such as the Enyan Denkyira and Kromain forest reserves to observe the level of forest cover. The traditional forest reserve at Kromain considered the largest stretched about two kilometres of complete thick forest. There were also visits to some tree growing sites at Bisease, and to the wood carvers at Kokoben where there was a focus group discussion.

Pretest

The research instruments were pretested at Ajumako and Bisease. This revealed a number of gaps resulting in the reframing of certain questions and the complete deletion of those found to be repetitive or irrelevant. It also brought to the fore some of the likely problems to encounter on the field in order to adequately prepare for the task ahead. The pretest was also to ascertain the validity and reliability of the research methods to be used. It further provided an estimate of the time required to administer interviews so that the right time could be allocated for field work. Ten household respondents and two tree growers were involved in this exercise.

Fieldwork

The main fieldwork covered eight weeks starting from the first week of July to the fourth week of August in 2006. Four field assistants were trained to participate in the data collection. Twenty-two tree growers were interviewed using the tree grower interview schedule in the first week of the data collection.

The 267 household interview schedules took five weeks to administer. The questionnaires were given out in the second week of August, and taken back at the end of that month. The focus group discussion with the wood carvers at Kokoben took a day to complete.

A major problem was how to contact respondents in dispersed communities in their homes. It took a lot of time and financial resources to accomplish this task. The collection of the data in the rainy season made matters worse. The promise by the District Assembly to accommodate students who came to carry out research was not well planned and never implemented. For many of us, it was a daily travel to the district from the University of Cape Coast campus.

Data processing and analysis

Data was edited and coded after collection. The Statistical Product and Service Solutions (SPSS) version 13 was used to generate frequencies, percentages, tables, graphs and pie charts for the write up.

CHAPTER FOUR

RESULTS AND DISCUSSION

Introduction

This chapter considers the characteristics of respondents and their effect on participation on forest activities in the district. It also outlines the benefits of trees and forest to the people as well as some of the threats posed to afforestation. The chapter also considered some suggestions that can motivate community members to participate in forest activities.

Characteristics of respondents

Sex of respondents

The sex distribution of respondents in the study is shown in Table 2. There were more males (72.5%) than females (27.5%). This is due to the dominance of males in the afforestation programme in the study area. The data portray that the household respondents had more males (71.2%) than females (28.8%). Similarly, among the tree growers there were more males (81.8%) than females (18.2%). All the key informants were males. Thus, there was no female key informant.

Table 2: Sex of respondents

Sex	Households		Tree growers		Key informants		Total	
	N _o	%	N _o	%	N _o	%	N _o	%
Male	190	71.2	18	81.8	5	100.0	213	72.5
Female	77	28.8	4	18.2	0	0.0	81	27.5
Total	267	100.0	22	100.0	5	100.0	294	100.0

Source: Field Survey, 2006

Age distribution of respondents

The age distribution of respondents in the survey ranged from 18 years to over 60 years and were classified as follows: 18-30, 31-40, 41-50, 51-60 and above 60 as presented in Table 3. Field data indicate that the majority of respondents were below 60 years and therefore within the age group that could assist in afforestation. The dominant age group for both the households (35.6%) and the key informants (80%) was 41-50 years, whereas half (50%) of the tree growers was within the age group of 51-60 years. Ironically, none of the tree growers was within the age group of 51-60 years. Ironically, none of the tree growers was below the age of 31 years. The mean age for the household respondents was 38.4 years, whereas that of key informants and the tree growers were 33.6 years and 48.7 years respectively. This indicates an ageing workforce for the tree growers.

Even though the participation rate for young people is currently low from the study, there is great potential in terms of getting adequate human resource in the future for any tree planting exercise. About 37.7 percent of respondents were

between 18 and 40 years and this can be targeted to enhance afforestation in the district. According to Demers and Long (1999), the average age for foresters is 21 years. Communities with such youthful population have great potential in afforestation because of what they called the age pyramids, which signifies that in a generation or two to come many of them would have given birth and this has the effect of making available young people to support afforestation. This contradicts the findings of this study which puts the average age of the respondents at 42.3 years.

Table 3: Age distribution of respondents

Age groupings (in years)	Households		Tree growers		Key informants		Total	
	N _e	%	N _e	%	N _e	%	N _e	%
18-30	31	11.6	0	0.0	0	0.0	31	10.5
31-40	75	28.1	4	18.2	1	20.0	80	27.2
41-50	95	35.6	5	22.7	4	80.0	104	35.4
51-60	53	19.8	11	50.0	0	0.0	64	21.8
Above 60	13	4.9	2	9.1	0	0.0	15	5.1
Total	267	100.0	22	100.0	5	100.0	294	100.0
Mean (years)	38.4		48.7		33.6		42.3	

Source: Field Survey, 2006

Level of education of respondents

Table 4 indicates that the dominant level of education attained by the respondents was tertiary (33.4%). This was followed by secondary education (24.8%), basic education (22.1%), and no formal education (19.7%). Whereas the majority (80%) of the key informants had tertiary education, only 35% of households and 4.6% of tree growers had tertiary education. Nineteen percent of households and 31.8% of tree growers had no formal education, while the rest of respondents had had some form of education. The dominant level of education for the households was tertiary (35%), but that of the tree growers was basic education (40.9%). All the key informants had at least secondary education. One would have thought that with the high number of educated respondents, the level

Table 4: Level of education of respondents

Level of Education	Households		Tree growers		Key informants		Total	
	N _o	%	N _o	%	N _o	%	N _o	%
No formal education	51	19.0	7	31.8	0	0.0	58	19.7
Basic	56	21.0	9	40.9	0	0.0	65	22.1
Secondary	67	25.0	5	22.7	1	20.0	73	24.8
Tertiary	93	35.0	1	4.6	4	80.0	98	33.4
Total	267	100.0	22	100.0	5	100.0	294	100.0

Source: Field Survey, 2006

of participation in afforestation would have been greater as they could appreciate the importance of tree growing in the district. The data revealed that formal education alone does not guarantee increased participation in tree growing. Support for tree growing should therefore be directed at community members who are more engaged in land and agriculture activities, in order to improve afforestation.

Length of stay in the study area and tree planting

The study also considered length of stay and tree planting of indigenes and settlers. From Table 5 it can be seen that 40.4 percent of household respondents had stayed in the district for over 31 years. This was followed by 28.8 percent for those who had stayed for 21-30 years, and 17 percent by those who had stayed for 11-20 years. The data further shows that the highest number of respondents who had planted trees was actually those who stayed in the area for more than 20 years, that is, 66%. Thus, the study revealed that length of stay alone was sufficient to increase participation in tree growing. In other words, the longer the stay of a person in a particular area, the higher the chances of planting trees.

Many people perceived trees and lands as permanent investment, and usually for those who were indigenes or intended to stay for long periods in a particular locality. There was the need to design schemes to see tree growing as a business, so that in the absence of the owner it could still be managed profitably. It should also be possible to transfer ownership when the owner was leaving the

district permanently. This could encourage afforestation. According to Hoff (1993) as cited in Agbesinyale (2003), little economic activity would occur in the absence of rights, powers to consume, obtain income, and transfer assets, which are directly related to the length of stay in an area. In other words, people would only engage in tree growing as an economic activity if only it is possible to acquire ownership and subsequently transfer it when he/she desired to move to another location.

Table 5: Length of stay of households and tree planting in study area

Length of stay (years)	Households		Households who planted trees	
	N _e	%	N _e	%
1-10	37	13.8	10	11.0
11-20	45	17.0	22	23.0
21-30	77	28.8	30	32.0
31 and above	108	40.4	32	34.0
Total	267	100.0	94	100.0

Source: Field Survey, 2006

Main sources of fuel energy

The majority (74%) of the respondents from the field survey indicated that their main sources of energy for cooking were from firewood and charcoal. This corroborates the findings of a study from the Dangme West District of the Greater Accra Region, which put dependence on fuel wood for energy at 83 percent of the

population (Agbesinyale, 1992). According to the study, the overall per capita consumption of firewood in the district was 921 kg or 1.24 cubic metres per annum, and that of charcoal stood at 174.9 kg. This means that every person who used charcoal in the district required 3.5 bags every year.

With a total population of 79,704, the total amount of firewood consumed in the district was 69,550.73 tonnes or 93,893.5 cubic metres per annum; and for charcoal it was 10,176.37 tonnes. Converting charcoal into wood (1 kg of charcoal requires 4 kg of wood cut) and adding the outcome to the amount of firewood cut, rounded up to 110,256.21 tonnes or 148,845.88 cubic metres. In effect, the amount of wood consumed by each person for energy purposes in the district in a year was 1.38 tonnes or 1.86 cubic metres (Agbesinyale, 1992).

Figure 3 gives the dependence of respondents on various energy sources in the AEED. The other sources of energy for the respondents included gas (16%) and electricity (9%). The high demand for fuel energy in rural areas was not surprising because of the extreme dependence of rural areas on fuel energy.

Makhijani (1976) has identified ten principal uses of firewood in rural communities:

- Agricultural fuels (irrigation, draught power, fertilizer, manufacturing of implements, crop processing, food storage and transport);
- Energy for cooking;
- Energy for providing clean domestic water supplies which, in some places, includes energy for boiling drinking water;
- House heating and warming water for bathing in cold climates;

- Hot water and soap for washing clothes;
- Energy for lighting (households or community);
- Energy for personal transport;
- Energy for processing and fabricating materials needed for the house: pots, pans, clothes, tools, and bicycles;
- Energy for transport of goods; and
- Energy needed to run local health services, schools, government businesses and other community uses.

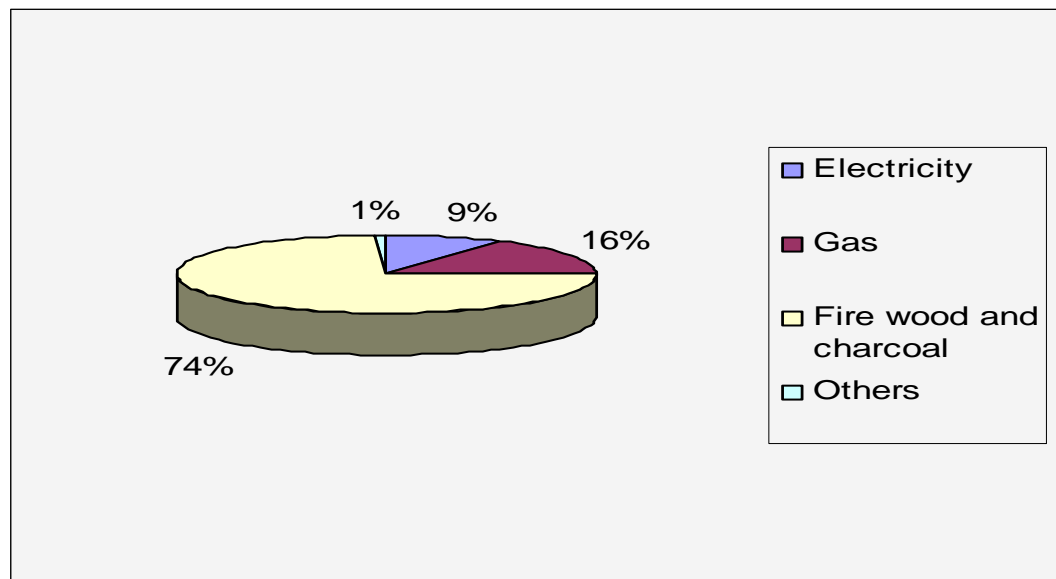


Figure 3: Main sources of fuel energy

Source: Field Survey, 2006

With such a dominant dependence of the rural areas on fuel wood, it is important to replenish the source in order to preserve the forest. One issue that came out from the field study was that 71 percent of the respondents knew that

reliance on fuel wood could threaten the forest, but there were no easy alternatives. About 65 percent indicated that they could not stop using firewood and charcoal because they had no money to fund alternatives; besides fuel wood was readily available. This validates the account of the World Commission on Environment and Development (1987) that poor people are caught up in a vicious cycle of poverty which they find difficult to escape.

According to one of the key informants, a former forester and a tree grower, the consumption of fuel wood and charcoal in the district was very high. What has actually helped the district was the transportation of charcoal from Mankessim and other environs to supplement what was produced in AEED. If these sources are exhausted and the entire district is to depend only on the forest in the study district for their entire fuel energy needs, the rate of deforestation would be great.

Other residents in the area were encouraged to join the Tree Growers' Association, as tree growing could be profitable. It was noted that one reason for the lack of interest in tree growing was the long period it took trees to mature before one began to benefit from investment in trees, and that is where the technical expertise of the environmental NGOs and the forestry department becomes essential (Suryakumari, Rao, and Vasu, 2009).

Participation in tree growing

Participation of community members in afforestation is critical to its success. This is because they stand to gain more from the produce of the forest.

They are also the ones who can help protect growing forests. The study tried to examine the level of participation in forest activities by looking at the number of respondents who had ever planted trees, among other things.

The study revealed that the rate of participation in forest programmes in the area was very low. Participation in this context included planting trees and nurturing them to reach maturity. Table 6 shows the distribution of household respondents, according to those who had ever planted trees, and those who had never planted trees in the area. Only 35 percent of the respondents had ever planted trees, while the majority (65%) of the respondents had never planted trees. More than 70 percent of respondents who had never planted trees were men. This indicates a low community involvement in afforestation at the individual level. When asked further about their views on the level of community participation in afforestation in the district, about 54.9 percent of the respondents acknowledged that there had been low community participation in forest activities.

The literature has demonstrated that the extent to which promoters understand local needs can have a great influence on the success of afforestation programmes. The assembly has intimated that most of the seedlings provided were mainly related to wind breaks and firewood and this seems to confirm Probhakar (1998) assertion that many forest programmes have failed due to perceived needs of local people. According to Prabhakah, the assumption that people would be willing to plant trees for fuel wood has underpinned a number of forest programmes and that this has never been successful even in areas where fuel wood is in short supply.

Table 6: Household respondents' involvement in tree planting

Responses	No	%
Never planted trees	173	65.0
Ever planted trees	94	35.0
Total	267	100.0

Source: Field Survey, 2006

Reasons for low participation in tree growing and problems faced by tree growers

Among the reasons given for low community participation in tree planting were lack of time, difficulties in accessing land, inadequate incentives, and lack of support from the government and the District Assembly. Table 7 presents the reasons given by household respondents for not participating in tree planting.

From Table 7, a greater percentage of those who indicated that they had never planted trees gave lack of technical knowledge (29.6%), insufficient logistics and lack of land (13.8%) as some of the reasons for not growing trees. Again, 27.2 percent of the respondents said they could not access seedlings, especially those of their choice, as one of the major reason for their failure to plant trees, even though the District Assembly was on record to have supplied 5,000 seedlings for planting in 2004 and continued to do so yearly. Other reasons included poverty (10%), lack of time (10%), no introduction of tree planting in the area (5%), and lack of incentives (4.4%).

Table 7: Reasons for not planting trees according to households

Reasons	No	%
Lack of technical knowledge	95	29.6
Lack of seedlings	87	27.2
Lack of land	44	13.8
Poverty	32	10.0
No time	32	10.0
Not yet introduced	16	5.0
No incentives	14	4.4
Total	*320	100.0

*More than the number of respondents because of multiple responses.

Source: Field Survey, 2006

Almost 30% of respondents indicated that they require technical knowledge. This appears as a flimsy excuse for not planting trees, but this affirms information from the literature (McBeath and Leng, 2006), that in many areas forest needs help beyond planting seedlings to re-establish themselves because of environmental factors. According to them, once a forest is destroyed beyond a certain level, the land may dry and become inhospitable to new tree growth. Afforestation should therefore go beyond providing seedlings to community members to involve disseminating technical knowledge.

The problems working against tree growing in the district were comparable to those identified in other regions as reported by Prabhakar (1998) that people only participate in tree growing, if they meet local aspirations or at

least if the individual desires are met. It is, therefore, important that our educational activities be accompanied by his suggestion that seedlings that met local expectation be provided to enhance afforestation. If not, there would always be a gap between the supply of seedlings and their use.

Another important issue was that of land. Land remained a critical ingredient in afforestation. Many people were not able to plant trees simply because they did not have large hectares of land to spare for tree growing. This might be a serious issue for those who intended to go into large scale production.

The results suggest that many people had not understood the importance of trees in their lives or that measures taken to encourage them to plant trees had not been sufficient. An intensive public education would help many to appreciate the importance of trees and to know that one does not need a special kind of knowledge to plant trees. Ostrom (1990) has intimated that collective action is successful if users see high economic potential in forest activities. If people do not see great economic potential in their efforts tree growing exercise will remain low.

Poverty, with 10 percent score, was also given as an important reason for not planting trees. This confirms the assertion by Reardon and Vosti (1995) that households who are not classified as poor but are 'welfare poor' may not be able to make any meaningful investment in resource preservation, even though they are the ones that depend more on the forest for their livelihood. About 14% of tree growers also indicated lack of land as a reason for not planting trees. This further

affirms Reardon and Vosti assertion that it is possible for households to be well endowed in one asset and poor in another and this can affect the environment.

The research has also revealed that there were only 47 registered tree growers in the district with an adult population of over 42,929 people (Ghana Statistical Service, 2002). This again demonstrates a low interest in tree growing in the area. Tree growers also faced many problems. It was therefore not surprising that many people in the district did not know of their existence and activities.

Eighty percent of the household respondents did not know of the existence of the Tree Growers' Association in the area. Those who knew about their existence could say very little of their activities and achievements in the district. About 68.9 percent of the respondents did not know of the existence of Icare, a local environmental NGO operating in the district. The District Assembly itself had no experimental tree planting reserves. This was very worrying. Mishra (2009) has demonstrated that the secret of forest regeneration in India lies in the hard work and strength of community groupings like tree growers and other environmental NGOs. The evidence also contradicts strategies that have enhanced afforestation in many areas. According to Suryakumari, Rao and Vasu (2009), sustainability of community forest involve two things. First, sustainability of community institutions and second, working closely with environmental NGOs and the Forestry Commission. The absence of environmental NGOs and lack of knowledge of the only one in the district has hindered the acquisition of technical knowledge and support which would have propelled afforestation as indicated by

Surykumari and others. Again, the problems of afforestation are further compounded by the absence of a permanent forest officer. This has made forest activities quite challenging than in Andhra Pradesh, India.

In the midst of this low participation, there were also problems confronting those who had the desire to grow trees. Figure 4 shows the main problems facing tree growers in the district. The dominant problem was land (46%). Land was a major problem because people did not want to use their fertile land to grow trees since they were not adequately certain of its potential to provide for their future needs. Thirty-three percent of the tree growers also complained of lack of incentives while some saw deer attacks (13%) and bush fires (8%) as some of the challenges facing them in their activities.

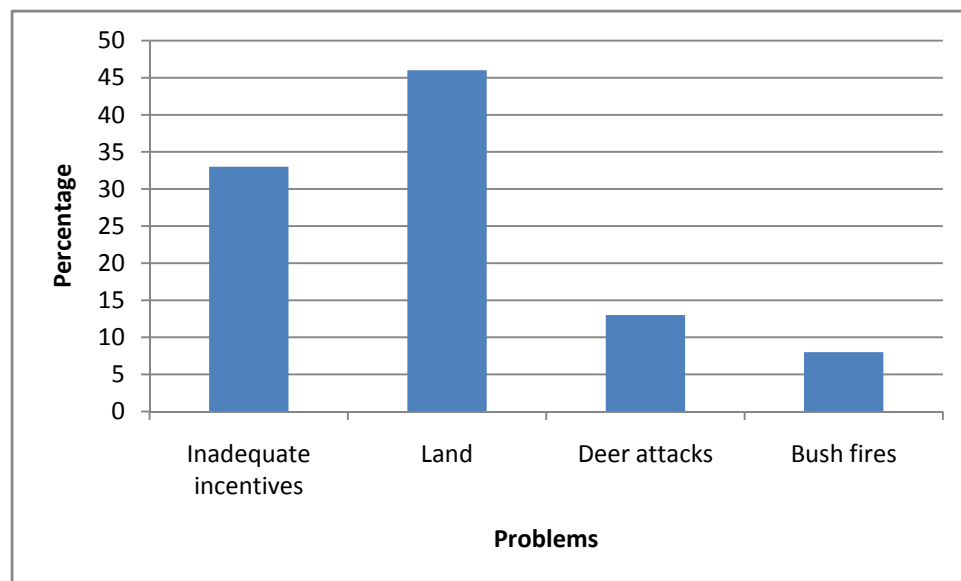


Figure 4: Problems faced by tree growers

Source: Field Survey, 2006

The survey does not only depict individual apathy towards tree growing, but also institutional incapacity. NADMO and other institutions mandated to assist in tree planting said they could not do much work due to lack of funds and logistics. When household respondents were asked to indicate the level of involvement of the District Assembly in tree planting, 83 percent of respondents said the government and the District Assembly were not doing well in afforestation in the area. More than 51 percent of the respondents believe that the District Assembly could do more to support tree growers and tree growing in the district.

Luckily, there were indications that the trend could change with sufficient motivation and education. Most respondents (65%) indicated that they would actively participate in future tree growing exercises if the District Assembly provides the necessary motivation (Vroom, 1964; Cole, 1995). Some however indicated that they were going to commence tree planting, because of the dwindling number of trees in the area and the consequences it has brought to bear on the climate and crop yield in the area.

Many respondents said they would like to see the supply of more economic tree seedlings such as fruit and timber trees that could give them some income in future. More than 80 percent of the tree grower respondents expected to see the government playing a major role in afforestation. The results indicated that many institutions and assemblies still saw afforestation as an environmental issue rather than a poverty reduction strategy (Kaimowitz, 1996).

Women factor in tree growing

The field data indicate that 79.8 percent of the household respondents who said they had ever planted trees were males while the rest (20.2%) were females. This shows that more males planted trees than females. The low levels of women participation in afforestation in the district partly accounted for the low levels of afforestation in the district since the success of many forest programmes has been attributed to women. This is because women are mostly stable at home and can therefore drive away stray animals and prevent them from destroying young trees. The watering of tree seedlings also fit into the traditional role of women as the providers of water and firewood for household chores. Hence, a high rate of women participation in tree activities generally leads to significant success (Agbesinyale, 1992).

The women explained that they were constrained by time due to domestic and other productive roles, and difficulties in accessing land and capital to plant trees. They also intimated that credit facilities for investment in tree growing were not available, and their husbands and other relations were usually reluctant to grant land to women purposely for tree growing. This reveals that women's access to and ownership of land was still a challenge in many rural communities. For tree growing to be successful land reforms were needed. This does not mean that women were not involved in tree planting as some men admitted that their wives and children helped them in the care of trees planted by them.

Seventy-five percent of the 77 women household respondents had never planted trees on their own. This was a serious drawback. There was therefore the

need to develop policies that would tackle women's peculiar problems in tree growing to enable them participate in tree cultivation. The current situation is even more worrying when viewed against the background that more than half of the population of Ghana is female.

The active involvement of women is crucial to ensuring greater participation in afforestation. Only nine percent out of the forty-seven registered tree growers in the district were women, according to the research. This is not very good given the potential of women in tree care. According to the household survey, 13 percent of the respondents gave lack of land for not participating in tree planting. The data further showed that more than 60 percent of the respondents who complained of land were women.

Agbesinyale (1992) has noted that women participation in development programmes is crucial if sustainable development is to be attained. Greater encouragement of women participation in tree growing would enhance success in forest programmes partly because of their greater dependence on the forest and its resources, and the role they play in the family. This view remains very true in afforestation in the rural areas of Ghana.

Fuel wood gathering for household energy, for example, remains the traditional preoccupation of rural women, as they use the fuel wood to prepare the daily meals for the family. Women are also engaged in small-scale businesses such as "chop bar" keeping, kenkey making, gari processing, bread baking, fish smoking, vegetable oil extraction, and also pottery and ceramics, which require enormous wood / fuel energy either in the form of firewood or charcoal. They

also engaged in farming activities and varieties of works, which had direct effect on the environment. It was therefore important to identify the rural woman folk as target group and crucial starting point in any environmental conservation strategy.

Strengthening the role of poor rural women in afforestation also implies assisting them to pursue their economic and household activities in a more conservation-conscious way. This is particularly relevant when poverty and degradation of the environment are very much linked in the everyday life of poor rural women. Women were forced by the pressing needs of their families to make intensive use of natural resources whether land or forests and this could result in environmental degradation.

According to IFAD (1995), women's lack of access to appropriate technology, inputs and credit could also lead to undesirable farming practices that degrade the environment. Time and labour saving techniques for women, training in water management and bringing water within easy reach of the household, as well as introducing collective facilities such as community woodlots and grain mills were crucial factors for success in women's participation in afforestation.

Involvement of institutions in tree planting

Respondents were also asked to rank groups and institutions that seriously supported tree planting in the district in order to assess the contributions of these stakeholders to the regeneration of forest resources. Churches, schools and the government were seen as pioneers of afforestation in the district and are still ahead of others in tree planting as presented in Table 8.

About 44.6 percent of the respondents saw schools as doing well in tree planting followed by the churches (21.4%), the government (13.6%), farmers (12.2%), tree growers (1.4%), and NGOs (1%). Individual tree growers might not have the capacity to grow trees on large hectares of land and be able to care for them. That is why the idea of forming the Tree Growers' Association in the district became necessary. Unfortunately, membership was not encouraging and that accounted for their low level of visibility in the district. The rather limited

Table 8: Institutions involved in tree planting

Item	Frequency	Percentage
Schools	132	44.6
Churches	54	21.4
Government	37	13.6
Farmers	36	12.2
Tree growers	4	1.4
Environmental NGOs	3	1.0
Total	*296	100.0

*More than the number of respondents because of multiple responses.

Source: Field Survey, 2006

success of tree growers in the study area as compared to other areas in India is due to the fact that tree growers and the other institutions in this part of the world are doing afforestation single-handedly. The challenge therefore confirms Mishra's

(2009) assertion that Joint Forest Management schemes seems to be most successful than other schemes.

Measures, support and motivational factors to improve participation in afforestation in the district

Table 9 presents the various measures the respondents expected the government, the District Assembly, the NGOs and other stakeholders to implement if tree growing was to be successful. Overall, 31.9 percent of respondents were in support of joint forest management schemes, while 25.2 percent and 23.1 percent advocated for direct government involvement and public education respectively. Again, 12.3 percent of the respondents, however, proposed that making ready market available to tree farmers both locally and internationally could promote tree production. The rest (7.5%) affirmed the need for credit (loan) facilities to assist them nurture the trees into maturity. This is because they claimed they were financially handicapped.

Whereas joint forest management was the dominant measure suggested by both households (32%) and tree growers (40.9%), the topmost measure proposed by the key informants was public education (80%). This was not surprising because the key informants had higher levels of education that thrived on acquisition and dissemination of knowledge.

Table 9: Measures to improve afforestation in the district

Measures	Households		Tree growers		Key informants		Total	
	N _e	%	N _e	%	N _e	%	N _e	%
Joint forest management scheme	85	32.0	9	40.9	0	0.0	94	31.9
Direct government involvement	67	25.0	6	27.3	1	20.0	74	25.2
Public education	64	24.0	0	0.0	4	80.0	68	23.1
Ready market	32	12.0	4	18.2	0	0.0	36	12.3
Loan facilities	19	7.0	3	13.6	0	0.0	22	7.5
Total	267	100.0	22	100.0	5	100.0	294	100.0

Source: Field Survey, 2006

One issue that came out strongly from observation was the economic potential that exists from organised afforestation with communities as the lead factor. Many communities were already into the use of forest products for their livelihood, and therefore stakeholders convincing / educating them to go into tree growing especially those that will serve their needs, will not be very difficult. One perception that came up was that tree planting was the responsibility of

government. Thus 25 percent of the respondents expected government to employ paid personnel to plant trees.

It was also revealed that there was a gradual decline in the population of bamboo trees in the area coupled with the lack of knowledge of its economic potential to the economy of the district. The majority (67%) of respondents admitted that bamboo production was on the decline. It was important that in trying to increase participation, emphasis needed to be placed on economic and fast income yielding varieties. This would excite the youth to join in tree growing. Some respondents saw some potential in the growing of bamboo due to its ability to satisfy a variety of needs. Bamboo presents advantages in relation to other construction materials for its lightness, high bending capacity and low cost (Mensah, 2006).

The suggestions given by respondents for improving participation in afforestation confirmed those contained in the literature review. For example, choice of seedlings, involvement of traditional authorities, respect for custom, property rights, restricted access to forest resources, and the provision of poverty alleviation trees are issues that are mentioned in both the literature and the field survey.

There was the need to support and motivate community members to improve afforestation in the area. One key issue that came from respondents was the lack of incentives to support people who want to grow trees. Motivation from the District Assembly and government was considered to be very low. The majority of the household respondents were dissatisfied with forest programmes

in the district. They were not satisfied with the type of seedlings supplied for planting, technical support to tree growers, afforestation policy, time of afforestation, moral support, and the work of environmental NGOs.

The respondents to the household survey were asked to give some of the factors that would motivate them participate actively in afforestation. Their responses are summarised in Figure 5, where choice of seedlings (28%), property rights (24%), provision of logistics (11%) and non-political interference (11%) were the four most important motivational factors for improving

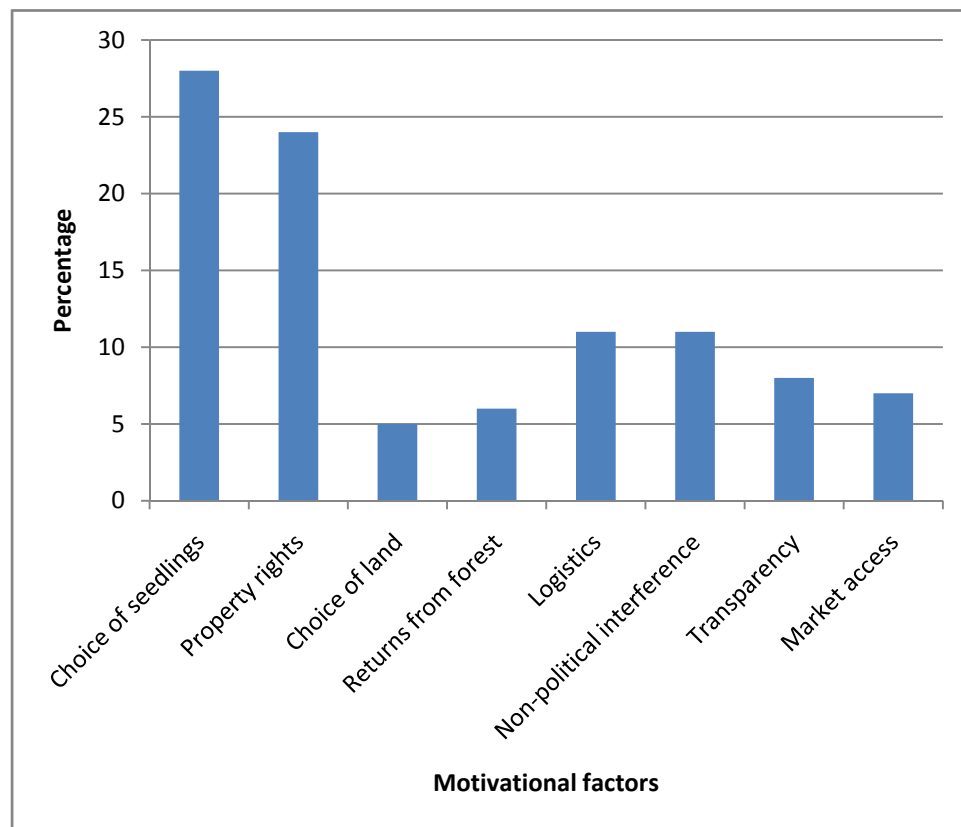


Figure 5: Motivational factors to improve participation in afforestation

Source: Field Survey, 2006

participation in tree growing in the area. The other motivational factors included transparent and accountable system (8%), market access (7%), rate of return from the forest (6%), and choice of land (5%). The respondents' desire for motivation to entice them to participate in tree growing corroborates those enumerated in the conceptual framework and similar to Vrooms (1964) assertion that motivation seems to be the major driving force behind people's involvement in many activities.

The opinion leaders suggested that the District Assembly needed to liaise with the regional forestry office to post a substantive District Forestry Officer to the area to help supervise forest activities. The assembly should further establish environmental desk to enable them coordinate forest activities holistically in line with cabinet directive in March, 2002 to district assemblies to establish environmental desks.

A systematic woodlots system should be put in place to grow trees such as acacia (botanical) that grows quickly for firewood and charcoal production. A well organised large scale production of acacia could put an end to the cutting of economic trees for that purpose.

Forest management practices and suggestions for the district

The majority (70%) of the household respondents acknowledged that they were aware of some traditional methods that were used in managing the forest and urged the government to employ some of these techniques to conserve the forest. According to them, these measures included designating forest zones as burial

grounds, as stores for medicinal trees and sacred zones; and applying sanctions and punishment, which prevented people from cutting down trees indiscriminately. The general belief that burial grounds are regarded as the ancestral abode prevented people from moving into those areas to cut down trees indiscriminately. In many instances those who violated the tradition of not harming these sacred zones were severely sanctioned, and these served as deterrent to potential intruders.

Table 10 presents the traditional techniques adopted in the past to ward off intruders from the forest, according to the household respondents. Creation of sacred zones topped the list with 25.1 percent score. This preservation method was followed by creation of burial grounds (21.7%), punishment and sanctions (16.8%), game reserves (16.2%), medicinal centres and ancestral abode with 10.1 percent score each.

According to one of the key informants and a forester, preservation and management of important forest sites were the preserve of chiefs, property owners and traditional priests. The practice was used to preserve many of the groves we see today. To ward off intruders, some were turned into cemeteries for the burial of the dead. These graves, cemeteries and preservation sites became storehouse of medicinal plants, extinct species of trees, wildlife, and cutting of trees; and so harvesting of game on these lands was forbidden. This helped to restore and preserve these sites for the general benefits of all community members.

Table 10: Preservation of forests in traditional societies

Item	Frequency	Percentage
Sacred zones	67	25.1
Burial grounds	58	21.7
Punishment and sanctions	45	16.8
Games	43	16.2
Medicinal centres	27	10.1
Ancestral abode	27	10.1
Total	267	100.0

Source: Field Survey, 2006

With the advent of modernity, 60 percent of the respondents did not see these measures as effective any longer; and this they said has contributed to the indiscriminate felling of trees. Whereas 30 percent felt the preservation channels were effective, the rest (10%) claimed they were unaware of their effectiveness (Table 11).

Table 11: Effectiveness of traditional forest preservation strategies

Item	Frequency	Percentage
Not effective	160	60.0
Effective	80	30.0
Not aware	27	10.0
Total	267	100.0

Source: Field Survey, 2006

About 41 percent of the respondents agreed that the powers of chiefs were on the decline and this has greatly affected traditional forest preservation strategies. Other factors given for the decline in traditional strategies are government interference (30%), greed (15%) and modernisation (14%) as presented in Table 12. The decline in the power of chiefs seems to suggest that the incorporation of traditional forest preservation strategies into modern afforestation schemes was not going on and this might partly account for the low participation in afforestation programmes. According to Wade (1987) there is an increasing understanding of the importance of traditional institutions and their role in controlling resource exploitation and their potential to the preservation of local forest. This is yet to be seen in the district because only 30% of household respondents saw traditional preservation strategies as effective. The district could only boast of two preservation sites at Kromain and Enyan Denkyira, while the rest had been reduced to grasslands.

Table 12: Reasons for the decline in traditional forest preservation strategies

Reason	Frequency	Percentage
Decline in the power of chiefs	109	41.0
Government interference	80	30.0
Greed	40	15.0
Modernisation	38	14.0
Total	267	100.0

Source: Field Survey, 2006

The depletion of forest by community members for farm land, fuel wood and others threatens agricultural sustainability with serious consequences for the rural poor. With appropriate policies and technological support, poor populations can be mobilised to promote forest regeneration and management. When asked about current forest management practices, 44 percent of the respondents said they were aware that the government was introducing new measures to encourage afforestation but could not give details, as they had not yet benefited from the programme.

The forest resources of an area constitute a great wealth to that area. The availability of resources is critical in determining the extent of rural poverty and the potential of an area to overcome forest degradation. About 70 percent of respondents intimated that the high levels of poverty in the area were due mainly to environmental degradation. Poor resource management can severely damage the resource base of an area. China's rural poverty eradication is believed to be closely associated with resource endowment, particularly the availability of forest and arable land (IFAD, 1985).

According to the District Coordinating Director, there was the need for a coordinated effort by all stakeholders to ensure a well-managed forest in the district. He emphasised that the District Assembly needs to budget money for plantation development and stop distributing seedlings to people who are not organised and / or not interested in tree growing.

The tree growers believed that government assistance in the area of seedlings, logistics and credit was vital. The tree growers and the household

respondents had proposed a number of afforestation systems such as fruit production and growing of timber logs that could help improve afforestation in the district. It would be difficult from the responses of these respondents to propose a single forest management strategy for the district, as different people preferred different strategies. The choice depended on personal likeness, likely benefits to be obtained and largely, the community in which they lived. The idea of having general preservation centres to protect land, improve climate and rainfall might still have to be largely managed jointly by the community and the District Assembly, but in a more coordinated manner.

Table 13 presents the various forest systems proposed by household respondents and tree growers that can help improve participation. Overall, 60.2 percent (majority) of the respondents proposed the production of timber logs for sale while 12.1 percent suggested fruit production. Another 11.8 percent of the respondents gave woodlots and firewood production as an important measure to manage the number of trees cut as fuel wood. These were mainly housewives and those who depended on the forest for energy.

The rest proposed bamboo production (9.3%) and cultivation of trees for wood carving (6.6%). While 63 percent of the household respondents proposed the production of timber logs for the local and foreign markets, 22.7 percent each of the tree growers preferred woodlots and bamboo production. No tree grower proposed production of trees for wood carving, the preferred choice of wood carvers. This could be due to the differences in interests among the various respondents.

Table 13: Forest management systems proposed by respondents

Type of system	Households		Tree growers		Total	
	N _e	%	N _e	%	N _e	%
Timber logs	168	63.0	6	27.3	174	60.2
Fruit trees	29	11.0	6	27.3	35	12.1
Woodlots production	29	11.0	5	22.7	34	11.8
Bamboo production	22	8.0	5	22.7	27	9.3
Trees for wood carving	19	7.0	0	0.0	19	6.6
Total	267	100.0	22	100.0	289	100.0

Source: Field Survey, 2006

The majority (80%) of the tree growers would like to see the introduction and development of these economic tree plantations, which could enable them earn enough income continuously in future. Here, the issues of concern were that of the provision of seedlings and finance to assist them in the initial years of operations. Technical support could come from NADMO, the Forestry Commission and MOFA.

The NADMO Coordinator proposed that, a community plantation development committee should be established to oversee the activities of all tree growers in the district. The communities should be encouraged to establish their own community plantation development programmes. Depending upon the needs of that community, they could be assisted with seedlings and other logistics to start with. It was important to allow the community to agree on what was most pressing to their locality, but the range of alternative could be from woodlots,

firewood, timber, animal feed to fruit crops. It is crucial to ensure greater women participation, as overwhelming evidence suggested they had a high capacity to ensuring success in afforestation, perhaps, because of the fact that they represented the sole people responsible for sourcing energy in rural settings. He intimated that care must however be taken to ensure that, tree growing did not necessarily overburden an already burdened spectrum of the population with disastrous consequences.

He further suggested that the district should put the necessary mechanisms in place in order to benefit from the Youth in Forestry Programme. Encouragement and support needed to be given to the teeming unemployed youth to partake in tree growing as a way of overcoming the environmental problems facing the district. Some of them could be used to educate and inspire their colleagues to participate in tree growing as a permanent business.

The District Planning Officer acknowledged the need for the District Assembly to create an enabling environment for environmental NGOs to establish branches in the area to stimulate forest enhancement programmes. He admitted that the current situation where only one environmental NGO exists, and whose activities remained largely limited to Abaasa and unknown in many parts of the district, was not the best. The capacity of NADMO and others should also be augmented to be able to provide the necessary logistics including seedlings at the right time to tree growers. Furthermore, he stated that, the District Assembly needs to liaise with the regional forestry office to post a substantive District Forestry Officer to the area to help supervise forest activities. The assembly

should further establish environmental desk to enable them coordinate forest activities holistically in line with cabinet directive in March, 2002 to district assemblies to establish environmental desks.

The forest reserves at Kromain and Enyan Denkyira deserved special protection from intruders. The chief of Kromain deserved special honour for his keen interest in the preservation of the Kromain Forest Reserve. Other traditional rulers in the area could follow the footsteps of the chief to ensure the greening of the area. The district should ensure that the necessary support for the preservation of these sites, and the need for regular and sufficient budgetary allocation to ensure that whatever forest reserve remained was preserved.

According to the executives of the Wood Carvers' Association, there were about 200 or more wood carvers in the district with Kokoben alone hosting about thirty. Their major complaint was lack of land and other logistics to plant the "cidrela" tree which is their main raw material, and which is running out of supply in the district. The capacity of the trade to give employment and income to the youth of the area was immense, as their products were in great demand in the local and external markets. The business could also attract and promote tourism in the area. Deeper research into the worries of the woodcarvers and their activities would be useful. This would guide policy formulation towards a more economical utilisation of scarce wood reserves in Ghana.

The wood carvers at Kokoben and others preferred to have a plantation stocked with trees suitable for carving, which they could depend on as ready source of raw material for production and hence income. This could greatly assist

them in their craft works. One prominent issue that came out in the course of the fieldwork was the teeming number of people with skills in woodcarving, but who lacked production resources. According to their executive members, they had not been able to make much meaningful impact in their standard of living because of shortage of raw materials, and difficulties in accessing land to plant trees used as raw material for their wood carving business.

It is time to re-examine the potential of the wood carving industry and its benefits to the youth in the district. Indeed, according to Choge (2004), woodcarving provided export value of over \$20 million annually to Kenya and generated self-employment opportunity for about 80,000 carvers who were breadwinners of 400,000 family members. This revelation was collaborated by Stranda-Gunda and Braedt (2004), who had demonstrated that the commercial use of natural resources to manufacture products for sale to tourists had become a significant supplementary source of income to many Zimbabweans.

According to two of the key informants, trees could serve as protection of the environment and as food for the family. They, therefore, saw production of fruit trees as a major poverty eradicating strategy. They saw mango, guava, pineapples, orange, pawpaw, among others, as fruit trees that could yield well in their area. Community members as well as tree growers seems not to be abreast with many of the modern forest preservation strategies gathered from the literature such as taungya system, social forestry, farm forestry and agro forestry and this should be the focus of any public education drive.

Benefits of forest

The respondents in the household survey indicated that they benefited a lot from the forest and its produce. This response ran through all ages, sexes and people with different educational backgrounds. In Figure 6, all the 267 household respondents indicated that the forest was useful in one way or the other to them.

When asked about the benefits that accrued to them personally, the majority (64%) of the household respondents said they depended on the forest for their food requirements. This group was followed by 22 percent of the respondents who said they depended mainly on the forest for their income; and 11 percent of the respondents indicated that the forest provided employment for

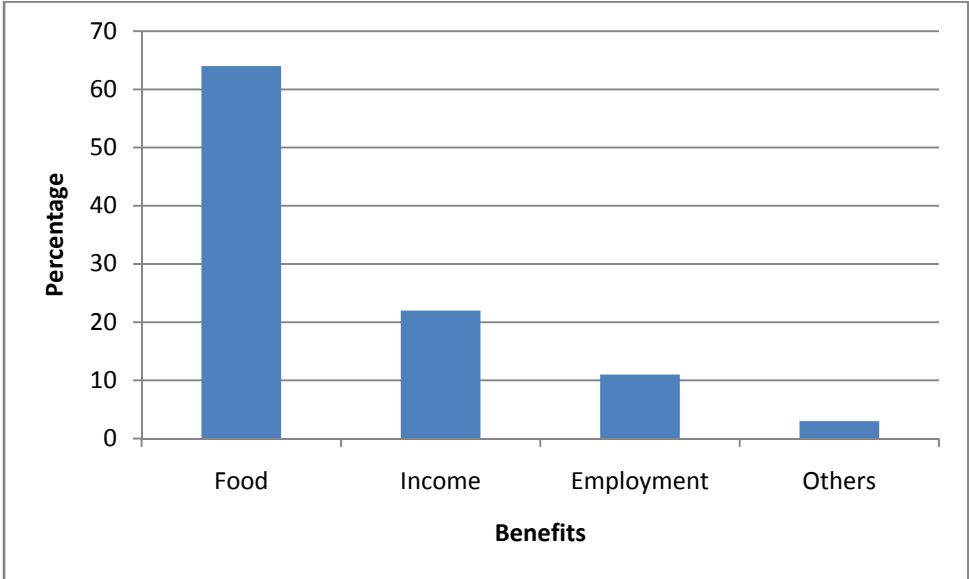


Figure 6: Benefits of forest to household respondents

Source: Field Survey, 2006

community members. The benefits of forest given by respondents are similar to those presented in the literature and the conceptual framework and therefore gives

an indication of the universal appreciation of the importance of trees to human survival (Cunningham and Saigo, 1997).

All the 22 tree growers admitted that many of their household food requirements were obtained from the forest. Table 14 shows the benefits derived from the forest as mentioned by the sampled tree growers. It is clear from the responses that the tree growers had a more detailed understanding of the benefits of forest.

It is anticipated that as more people join the Tree Growers' Association, the district would certainly witness a boost in afforestation. However, not many respondents in both the household and tree growers' survey saw energy as a major benefit from the forest. It was when the respondents were asked directly about their source of energy for the household that they realised the forest was very important in that regard. This further confirms the assertion of Prabhakar (1998) that people generally do not like to plant trees purposely for fuel, and that even in areas where fuel wood was in short supply, few households were ready to plant trees only for firewood. Trees with a variety of use, therefore, were more acceptable in afforestation in rural communities.

Comparing the benefits of afforestation in the conceptual framework and the literature review, responses from respondents showed that the latter was more interested in personal benefits while the former offered some form of corporate benefits such as: controlling water run-off, provision of game and nature appreciation and beauty, as well as medicinal herbs.

Table 14: Benefits of forest to tree growers

Item	Number of respondents	Percentage
Food	8	36.4
Income	4	18.2
Serves as wind breaks	3	13.6
Rainfall	2	9.1
Soil fertility	2	9.1
Improve environment	1	4.5
Fuel energy	1	4.5
Bush meat	1	4.5
Total	22	100.0

Source: Field Survey, 2006

Deforestation

Over reliance on the forest for households' daily needs has led to high rates of deforestation in the area. While some believed that there was still a lot of forest, others said the area has become much deforested and needed immediate action, so that future generations would not suffer.

Table 15 describes the perception of respondents about deforestation in the district. The study indicated that 58.9 percent of the respondents believed that there were not enough trees in the forest to cater for their needs and that the area was deforested while 8.1 percent still did not see deforestation as a problem. But

the rest (33%) affirmed that the forest in the area was averagely deforested. While the majority of households (59.5%) and key informants (80%) agreed that there was high deforestation in the district, only half (50%) of tree growers agreed to this assertion. None of the key informants agreed that the forest was not deforested.

Table 15: Perception about deforestation

Item	Households		Tree growers		Key informants		Total	
	N _o	%	N _o	%	N _o	%	N _o	%
Deforested	158	59.5	11	50.0	4	80.0	173	58.9
Averagely deforested	91	34.2	5	22.7	1	20.0	97	33.0
Not deforested	18	6.3	6	27.3	0	0.0	24	8.1
Total	267	100.0	22	100.0	5	100.0	294	100.0

Source: Field Survey, 2006

Causes of deforestation

The causes of deforestation varied greatly. Figure 7 represents the views of respondents on the causes of deforestation. Field data show that chain saw operation, firewood cutting and mining were the main causes of deforestation in the district. About 54 percent of the respondents indicated that chain saw operation was the most forest-degrading agent in the district. Others included crop farming (31%), animal rearing (9%), firewood harvesting (3%), and wood for

roofing (2%). Though respondents admitted that firewood cutting for fuel energy, crop farming and animal rearing affected the forest, they claimed that their effect was very minimal compared to that of chain saw operation. The field data does not correspond to the findings of the Food and Agriculture Organisation (1982) that 70 percent of recent disappearance of closed forests in Africa, 50 percent in tropical Africa and 35 percent in Latin America can be attributed to its conversion to agricultural uses, mainly by hungry landless farmers seeking newer and fertile lands. The field data also showed that animal rearing is not a major forest degrading agent in the district as indicated by UNRISD's research findings in Tabasco, Mexico, that 90% of the tropical rain forest were destroyed for pasture for cattle.

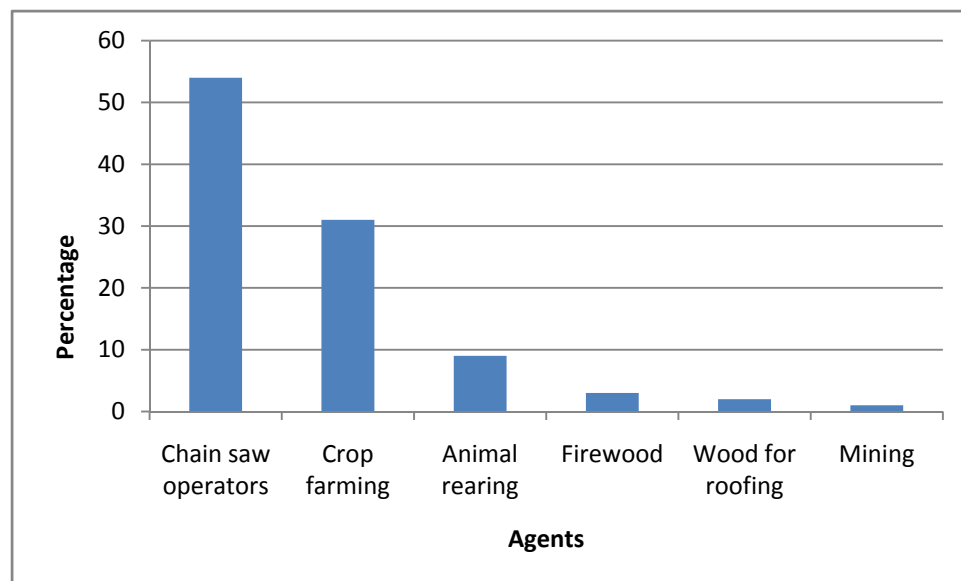


Figure 7: Forest degrading agents

Source: Field Survey, 2006

Only one percent of the total respondents saw mining as a problem. They made reference to the activities of the miners of kaolin at Ochisu as causing some harm to the environment. Apart from this, gold and mica mining, sand winning, charcoal production, among others were becoming predominant challenges in the district and the earlier laws were put in place to monitor their activities the better.

The search for mineral resources has been very much relaxed in developing countries both for legal and illegal operators. Prospective mining companies and individuals clear enormous amount of fertile lands for mineral extraction without making provision for the regeneration of the forest. Their waste products also posed further danger to human, animal and plant lives. Alternative livelihood programmes for indigenous people was limited and on a small scale. An intensive research work by Agbesinyale (2003) on Wassa West District has demonstrated the negative impact of mining on developing countries and the district in particular. This should serve as a lesson to the district to put in place the necessary bye-laws before mining became more intense and problematic.

Thirty-one percent of the respondents indicated that crop farming was also a cause of deforestation in the area. The people gave the introduction of tractor ploughing as one of the major causes of deforestation, even though they admitted that their own traditional farm preparation techniques had also not been friendly to the environment. To them, the introduction of tractor ploughing has contributed in no small way to destroy the environment.

Indeed, it is not in AEED alone that the introduction of new technology has brought problems to farmers and community members. Mann (1990) cited in

Agbesinyale (1992), has indicated that in Machakos District in Central Kenya, rural people who were for generations aware of the fragility of their marginal lands, ploughed and farmed with care; but they experienced low rainfall and soil erosion with the introduction of so-called modern agriculture techniques- tractor ploughing.

Effects of deforestation

Figure 8 indicates that many of the respondents were aware of the effects of tree cutting or deforestation in the area. The respondents identified climate change (37%), reduction in crop yield (21%), reduced tree population (20%), destruction of the environment (18%), and reduction in rainfall amounts (4%) as direct results of deforestation.

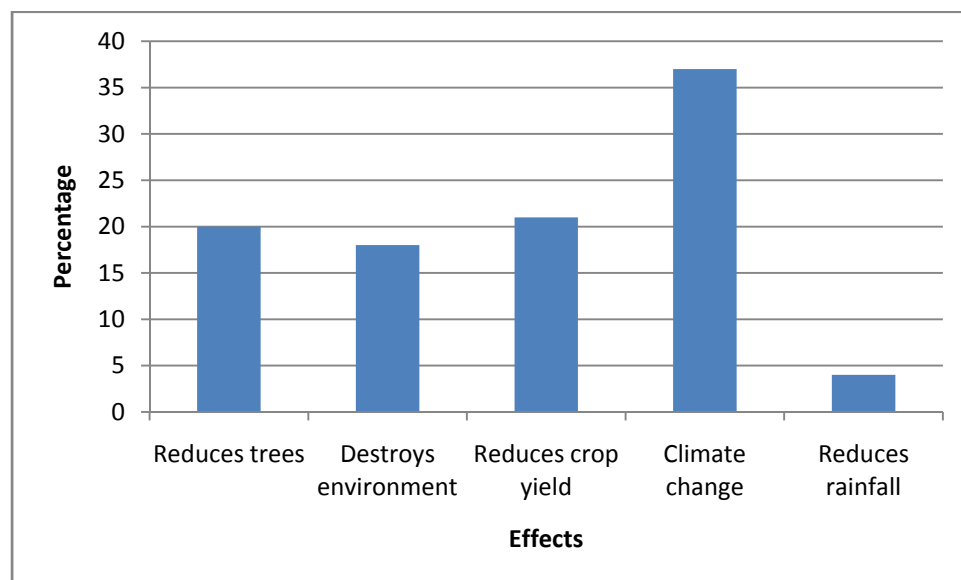


Figure 8: Effects of deforestation

Source: Field Survey, 2006

Deforestation reduces the quantity of trees, destroys the environment and causes climate change, and can aggravate poverty in an area, especially when livelihood is depended mainly on agriculture. The respondents admitted that tree leaves remained a major source of nutrients for lands in the absence of chemical fertilizer. The capability of tree leaves to rejuvenate bare lands was generally accepted in the area and this matched with the analysis of Young (1989). According to Young (1989), for a tree-leaf bio weight of 4,000 kilogrammes of dry matter per hectare per year, the potential nutrient return to the soil in litre is in the order of 80-120 kilogrammes of nitrogen, 2-12 kilogrammes of phosphorus, 40-120 kilogrammes of potassium and 20-60 kilogrammes of calcium. These amounts could make substantial contributions to the fertility of a declining potency of soil.

CHAPTER FIVE

SUMMARY, CONCLUSIONS AND RECOMMENDATIONS

Introduction

In this chapter, summary of the study, conclusions and recommendations are presented. The summary focuses on the objectives, aspects of the methodology and the main findings of the study. The conclusions are derived from the main findings of the study, which tried to answer the research questions and other important issues raised. The recommendations for policy makers and implementers are based on the conclusions. Two areas for further research are also presented.

Summary

The study examined afforestation in the Ajumako-Enyan-Essiam District (AEED). It specifically sought to: assess the benefits of forest to community members within the district; identify the problems of afforestation in the district; analyse the causes of deforestation in the district; assess the contributions of community members and other stakeholders to afforestation in the district; assess the motivational packages that can encourage communities members to participate in forestry programmes; and make recommendations for improving afforestation in the district.

The study was cross sectional and descriptive. Simple random, purposive and quota sampling techniques were used to select respondents for the study. The study made use of both primary and secondary data. To assist in data collection, interview schedules, questionnaire, interview guide, focus group discussion guide and observation guide were used. Three hundred and seventy-five households and twenty-two tree growers were sampled for the study. Three officials from the District Assembly and two opinion leaders were purposively selected to answer questionnaires on the study. Editing and coding were carried out to make the data accurate. Data was then analysed with the Statistical Product and Service Solutions (SPSS Version 13), frequencies, tables and graphs were produced for the report writing.

The main findings of the study were as follows:

- The majority (64%) of the household respondents depended on the forest for their food requirements. This group was followed by 22 percent of the respondents who depended mainly on the forest for their income, while 11 percent of the respondents indicated that the forest provided employment for community members. In the case of tree growers, benefits of forests to them were food (36.4%), income (18.2%), new forests replacing destroyed ones (13.6%), rainfall (9.1%), improvement in soil fertility (9.1%), improvement in the environment (4.5%), fuel energy (4.5%), and supply of bush meat (4.5%).
- Community participation in afforestation programmes was generally low. Over 65 percent of the household respondents had never planted trees on

- About 79.8 percent of the household respondents who said they had ever planted trees were males, while the rest (20.2%) were females. The low levels of women participation in afforestation in the district partly accounted for the low levels of afforestation in the district since the success of many forest programmes had been attributed to women's active participation.
- Only nine percent of registered tree growers in the district were women. Seventy-five percent of the seventy-seven women respondents had never planted trees on their own.
- The women were constraint by time due to domestic and other productive roles, and difficulties in accessing land and capital (credit facilities) to plant trees. Therefore, there was the need to develop policies that would tackle women's peculiar problems in tree growing to enable them participate in tree growing.
- Many people had not understood the importance of trees in their lives or that the necessary participatory process to encourage them to plants trees had not been sufficient. An intensive public education would help them to appreciate the importance of trees and to know that one did not need a special kind of knowledge to plant trees.

- Among the reasons given for low community participation in tree planting were lack of time, difficulties in accessing land, inadequate incentives, and lack of support from the government and the District Assembly.
- Some reasons given by the household respondents who had never planted trees included lack of technical knowledge (29.6%), lack of seedlings (27.2%), insufficient logistics and lack of land (13.8%), poverty (10%), lack of time (10%), no introduction of tree planting in the area (5%), and lack of incentives (4.4%).
- There was political consideration in the distribution of seedlings. The District Assembly supplied 5,000 seedlings for planting in 2004 and continued to do so yearly.
- Over reliance on the forest for households' daily needs had led to high rates of deforestation in the area. About 58.9 percent of the respondents believed the forest was highly deforested while 33 percent and 8.1 percent believed the forest was averagely deforested and not deforest respectively.
- Firewood and charcoal constituted their main source of energy in the district (74%). The other sources of energy for the respondents included gas (16%) and electricity (9%). Sixty-five percent said they could not stop using firewood and charcoal because they had no money to fund alternative sources of energy like liquefied petroleum gas.
- Chain saw operation (54%), crop farming (31%), animal rearing (9%), firewood harvesting (3%), and wood for roofing (2%) were the major

forest-degrading agents cited by the respondents. Crop farming menace was attributed to tractor ploughing and poor traditional methods of farming.

- About 70 percent of the respondents intimated that the high levels of poverty in the area were due mainly to environmental degradation. Poor resource management could severely damage the resource base of an area.
- Respondents identified climate change (37%), reduction in crop yield (21%), reduced tree population (20%), destruction of the environment (18%) and reduction in rainfall amounts (4%), as the direct results of deforestation.
- People did not want to plant trees purposely for fuel wood even in areas where wood was in short supply. Rather, they preferred to grow trees with a variety of uses, which was much more acceptable in afforestation programmes in rural communities.
- Afforestation programmes were hampered by the long gestation periods that trees took to mature. Hence, the call on stakeholders to provide farmers with seedlings that have shorter gestation periods.
- Measures proposed by respondents to improve afforestation included joint forest management schemes (31.9%), direct government involvement (25.2%), public education (23.3%), ready market (12.3%), and credit (loan) facilities (7.5%) to tree farmers. Whereas joint forest management scheme was the dominant measure suggested by both households (32%)

and tree growers (40.9%), the topmost measure proposed by the key informants was public education (80%).

- Some respondents perceived trees and land development as permanent investment so the indigenes and those who intended to stay long periods in a particular area should grow trees.
- Churches, schools and government were considered as pioneers of afforestation when compared to individual ownership. About 44.6% of respondents considered schools as doing more in tree planting than the churches (21.4%), the government (13.6%), farmers (12.2%), tree growers (1.4%), and NGOs (1%).
- The traditional forest preservation techniques adopted in the past to ward off intruders from the forest consisted of the creation of sacred zones (25.1%), creation of burial grounds (21.7%), punishment and sanctions for offenders (16.8%), creation of livelihood centres (16.2%), creation of medicinal centres (10.1%) and ancestral abode (10.1%).
- Sixty percent of the respondents affirmed that these traditional forest preservation strategies were no longer effective in forest management as against 30 percent who believed they were effective, and 10 percent indicating indifference.
- The traditional measures of preserving forests were no longer effective due to decline in the power of chiefs (41%), government interventions (30%), greed (15%), and modernisation (14%). The district could only

boast of two preservation sites at Kromain and Enyan Denkyira. The rest had been reduced to grasslands.

- There were limited motivational schemes for foresters in the district. The majority of the household respondents were dissatisfied with forest programmes in the district. They were not satisfied with the type of seedlings supplied for planting, technical support to tree growers, afforestation policy, timing of afforestation, moral support, and the work of environmental NGOs.
- The motivational factors for improving participation in tree growing in the area were the choice of seedlings (28%), property rights (24%), provision of logistics (11%) and non-political interference (11%), transparent and accountable system of government (8%), market access (7%), rate of return from the forest (6%), and choice of land (5%).
- The activities of the miners of kaolin at Ochisu were seen as causing some harm to the environment. Gold and mica mining, sand winning, charcoal production have also caused environmental degradation.
- Forest management systems proposed by the respondents to invigorate the forests included planting of timber logs and fruit trees, woodlots and firewood production, bamboo production, and growing of trees for wood carving.

Conclusions

The research findings showed that community members were ready to support afforestation activities which met their expectation despite the current low participation in tree growing. The existence of the tree growers' association in the district and their ability to remain focused despite the existing challenges shows that there is great potential in afforestation programmes in the district.

Experience from successful afforestation programmes in other parts of the world especially in India showed that where people were actively involved and motivated, their participation in forest programmes tended to be high. Providing tree growers with tree seedlings at the right time of the season, involving them in the choice of tree seedlings, giving them tree seedlings that have multiple purposes, sharing of benefit in an open and transparent manner, and above all providing motivational packages can significantly improve participation in tree growing.

This confirms the assertion by Barraclough and Ghimire (1990) that many studies carried out on the success of community based forest projects showed that those that failed were not participatory because they did not fully take into account socio-economic conditions of the people, and hence did not coincide with the direct forest management objectives of local people. In all forest projects it is important to have at the back of our minds the recommendation of Prabhakar (1998) that trees with multiple uses are often preferred by local folks.

Recommendations

Based on the findings and conclusions, the following recommendations are made:

- There was the need for education to change wrong perception and bad habits on afforestation. These educational programmes should be jointly organised by the District Assembly, environmental NGOs and the Forestry Commission, in conjunction with the chiefs and opinion leaders.
- For successful forest programmes, the District Assembly and environmental NGOs should introduce trees and programmes that take into consideration the culture and tradition of the people, and which have the capacity to reduce poverty.
- The District Assembly needed to liaise with the regional forestry office to post a substantive District Forestry Officer to the area to help supervise forest activities.
- The District Assembly should create an enabling environment for environmental NGOs to establish branches in the area to stimulate forest enhancement programmes. The current situation where only one environmental NGO exists, and whose activities remain largely limited to Abaasa and unknown in many parts of the district, is not the best.
- The government should make land acquisition for tree growing easier, especially for women. The need for the government to establish a transparent and proper land reform regime would improve access to and use of land.

- Linking tree growers (both fruit and woodlots) to markets and processing centres is key to soliciting their continuous involvement. This will ginger interest in new and potential entrants. The District Assembly and MOFA should not only encourage, but also institute fruit production in the area as it has the capacity to reduce poverty, which is readily acceptable to the people.
- The District Assembly and the environmental NGOs should encourage the people to form community afforestation associations and to support them with land, logistics and finance. The expertise of ADRA Ghana and others in fruit production could be of immense assistance.
- The forest reserves at Kromain and Enyan Denkyira deserves special protection from intruders. The District Assembly should ensure the necessary support for the preservation of these sites. There should be regular and sufficient budgetary allocation to ensure that whatever forest reserve remains is preserved.
- Tree growers needed to be well motivated so that others could get interested in their programmes and thereby join the association to enhance afforestation in the district and the country as whole.

Areas for further research

A number of issues came out that deserve deeper studies and research to help conserve the forest:

- The district needs to have a forest profile that can enable it to show at a glance the status of all forests in the area at any given time. This will provide records of both common and rare species.
- Further research is needed to establish and disseminate the importance and potential of bamboo trees to afforestation in the district.

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APPENDIX 1

HOUSEHOLD INTERVIEW SCHEDULE

INTRODUCTION

Please tick in the appropriate box [√] or enter respondent response in the space provided after each question.

Day of interview:.....

Time of interview:.....

A. BACKGROUND INFORMATION

1. Village/Zone:.....

2. Sex: a) Male [] b) Female []

3. Age: a) Below 30 [] b) 31-40 [] c) 41-50 [] d) Above 50 []

4. Level of education of respondent:

a) None [] b) Primary [] c) Secondary (voc/technical etc []

d) Tertiary (university/polytechnic/training college) []

5. Marital Status: a) Married [] b) Not married [] c) Divorced []

d) Widowed or Widower [] e) others, (specify).....

6. What is your main occupation? (a) Service industry []

(b) Extraction industry [] (c) Manufacturing industry [] (d) Farming []

7. What are your secondary occupations? (a) Service industry []

(b) Extraction industry [] (c) Manufacturing industry [] (d) Farming []

8. How many children do you have? (a) One [] (b) Two []

(c) Three [] (d) Four and above []

9. How long have you been staying in this district? (a) Below ten years
(b) 10-20 years (c) 21-30years (d) 31 and above years
10. Have you planted some trees on your own before? a) Yes [] b) No []
11. If no, why?.....

B. FOREST, ITS BENEFITS AND DESTRUCTION

12. Which of the following is the major benefit of the forest to people in this community? (a) Employment [] (b) Food [] (c) Income []
(d) Others (specify):.....
13. Which benefits accrue directly to you? (a) Employment (b) Food
(c) Income (d) Others (specify):.....
14. How will you describe the state of the forest now? (a) Not deforested []
(b) Averagely deforested [] (c) Very deforested []
15. Which of these causes of deforestation is applicable to this area?
a) Crop farming [] b) Animal rearing []
c) Lumber cutting for sale [] d) Chain saw operators [] e) Mining []
f) Firewood [] g) Cutting of wood for roofing []
16. Which of the above are more intense?.....
17. Which of these do you engage in?
a) Crop farming [] b) Animal rearing [] c) Lumber cutting for sale []
d) Chain saw operation [] e) Mining []
f) Firewood gathering [] g) Cutting wood for roofing []
18. What is the main source of energy for cooking in your house?

- (a) Electricity [] (b) Gas [] (c) Firewood and charcoal []
 (d) Solar energy [] (e) Others (specify):.....
19. Does it affect the forest? a) Yes [] b) No []
20. If yes, in what way does it affect the forest?.....
21. Will you like to change your source of energy for cooking?
 (a) Yes [] b) No []
22. If yes, why?.....
23. If no why not?.....

C. AFFORESTATION POLICIES AND PROGRAMMES

24. Are you aware of current forest management systems in the country?
 a) Yes [] b) No []
25. In what way can government policy on afforestation be successful?.....
26. Are there any environmental NGOs in the area?
 a) Yes [] b) No []
27. If yes, how will you grade their activities?
 (a) very good [] (b) averagely good [] (c) bad []
28. What about the government? (a) very good (b) averagely good (c) bad
29. Which of these is the best way government can do to protect the forest and
 its produce? (a) Provide funding [] (b) policy change []
 (c) Involving all stakeholders in forest activities []
 (d) Others (specify):.....

D. COMMUNITY PARTICIPATION IN AFFORESTATION

30. Have you been involved in any tree planting activity? (a) Yes [] (b) No []

31. Will you partake in any action to protect the forest? (a) Yes [] (b) No []

32. If yes, indicate the actions you will take.

.....
.....

33. How do you describe the level of participation in afforestation in the district? a) High [] b) Average [] c) Low []

34. Which of the following groups is most serious in afforestation in the area?

a) Individuals [] b) CBOs [] c) Government [] d) Mosques []

f) Civil society groups [] g) Schools [] h) Churches []

i) Others (specify):.....

35. What can be done to improve community participation in afforestation programmes in the area? (a) Public education []

(b) Provision of incentives []

(c) Government direct involvement in tree planting []

(d) Others (specify):.....

36. Are there private tree growers in your area? a) Yes [] b) No []

37. If yes, are you a member? a) Yes [] b) No []

38. Are the trees used for afforestation acceptable to your community?

a) Yes [] b) No []

39. If no, what will you like to see changed?

.....

E. REDUCING RURAL POVERTY

40. How do you describe current afforestation programmes in terms of success in the area? a) High [] b) Average [] c) Poor []
41. Can community afforestation programmes help in poverty reduction?
a) Yes [] b) No []
42. Explain your answer above.....
43. How will you describe yourself in terms of your standard of living?
a) High [] b) Average [] c) Low []
44. Is there any relationship between your answer above and deforestation?
a) Yes [] b) No []
45. How can communities be effectively involved in afforestation to reduce poverty?.....
.....
46. In your opinion, which of these groups destroy more forest than the others? a) Rich [] b) Average income earners [] c) Poor []
47. How do you define poverty here?
.....
.....
48. In your estimate, how many people are poor out of every 10 people?
.....
49. Which of the following is used in your area to indicate that a person is poor? (a) No formal employment [] (b) food consumption []
(c) Possession of land [] (d) clothing [] (e) housing []

(f) Educational level [] (g) access to water and electricity []

(h) Others (specify):.....

50. Have they got any link with the destruction of the forest?

a) Yes [] b) No []

51. How?.....
.....

F. NATURAL RESOURCES SUSTAINABILITY

52. Is the forest well regarded and protected in recent time?

a) Yes [] b) No []

53. If no, why?.....

54. If yes, give reasons.....

55. What were some of the strategy used in the past to preserve forest resources?.....

56. Who were those responsible for taking care of these places?
.....
.....

57. Have their functions changed of late? a) Yes [] b) No []

58. Give reasons for your answer.....
.....

59. Are current afforestation programmes in the district in line with belief and culture of the people? a) Yes [] b) No []

60. What forest management style would you propose for your area?

.....
.....

61. State of your level of satisfaction with the following with regard to afforestation:

Moral support

Item	Grade
Very satisfied	
Satisfied	
Not satisfied	

Environmental Organisations

Item	Grade
Very satisfied	
Satisfied	
Not satisfied	

Type of Seedlings

Item	Grade
Very Satisfied	
Averagely Satisfied	
Not satisfied	

Technical Support

Item	Grade
Very satisfied	
Averagely satisfied	
Not satisfied	

Type of afforestation

Item	Grade
Very satisfied	
Averagely satisfied	
Not satisfied	

Timing of afforestation

Item	Grade
Very satisfied	
Not satisfied	
Averagely satisfied	

Financial support

Item	Grade
Very satisfied	
Averagely satisfied	
Not satisfied	

62. What would motivate you to participate in afforestation?

.....

.....

.....

APPENDIX II

QUESTIONNAIRE FOR ORGANISATIONS AND OPINION LEADERS

INTRODUCTION

Please tick in the appropriate box [√] or enter respondent response in the space provided after each question.

1. Name:
2. Organisation:.....
3. Sex: a) Male [] b) Female []
4. Age: a) Below 30 [] b) 31-40 [] c) 41-50 [] d) Above 50 []
5. What role does your organisation play in afforestation in the district?
.....
6. How well have you faired? A) Good [] b) Average [] c) Poorly []
7. What are the constraints to your efforts? (a) Funding []
(b) Government policy [] (c) local participation []
(d) others (specify).....
8. How can these problems be solved? (a) Increased funding []
(b) Improved government policy [] (c) Encouraged local participation []
(d) Others (specify):.....
9. Are traditional natural resource conservation measures still in force?
a) Yes [] b) No []
10. Explain your choice of answer.....
11. What support do you expect from government?.....
.....

12. What support do you expect from the community?.....

13. What support do you expect from other stakeholders? e.g. NGOs, CBOs?.....
14. Do you have any forest reserves or experimental tree growing centres?
 a) Yes [] b) No []
15. If yes, how are they fairing? a) Excellent [] b) Average [] c) Badly []
16. In what way is your organisation incorporating afforestation as a poverty reduction strategy in the district?.....
17. Do you have any package to encourage private tree growing in the district? a) Yes [] b) No []
18. If yes, what are they?.....
19. If no, why?.....
20. How will you describe the state of the forest now? (a) Not deforested []
 (b) Averagely deforested [] (c) very deforested []
21. Which of these causes of deforestation is applicable to this area?
 a) Crop farming [] b) Animal rearing []
 c) Lumber cutting for sale [] d) Chain saw operators [] e) Mining []
 f) Firewood [] g) Cutting of wood for roofing []

APPENDIX III

INTERVIEW GUIDE FOR REGISTERED PRIVATE TREE GROWERS

Please tick in the appropriate box [] or enter respondent response in the space provided after each question.

Day of interview:.....

Time of interview:.....

1. Name of tree grower:.....

2. Sex: a) Male [] b) Female []

3. Age: a) Below 30 [] b) 31-40 [] c) 41-50 [] d) Above 50 []

4. How will you describe the state of the forest now? (a) not deforested []
(b) Averagely deforested [] (c) Very deforested []

5. Which of these causes of deforestation is applicable to this area?
a) Crop farming [] b) Animal rearing []
c) Lumber cutting for sale [] d) Chain saw operators [] e) Mining []
f) Firewood [] g) Cutting of wood for roofing []

6. Is afforestation really an important issue in the district?
a) Yes [] b) No []

7. Give reasons for your answers.....
.....

8. Which of the following is likely to affect your trees? (a) Stray animals []
(b) Bush fire [] (c) Firewood [] (d) Coofing polls seekers []
(e) Others (specify):.....

9. What role can communities play in afforestation?.....
.....
10. Is this role being carried out by your community members?
(a) Yes [] (b) No []
11. How will you rate the relationship between government, forest department and indigenes? a) Very good [] b) Averagely good [] c) Not good []
12. Are there other afforestation programmes already in the district?
a) Yes [] b) No []
13. Were the chiefs, opinion leaders and community members properly informed and involved in these programmes? a) Yes [] b) No []
14. If yes, give details of how they were involved?.....
.....
.....
15. What are the problems of afforestation in the area?
.....
.....
16. Give your perception about afforestation generally?.....
.....
17. Can poverty in the area be attributed to deforestation?
(a) Yes [] (b) No []
18. What have you benefited from private tree growing?.....
.....
19. What are the problems you face as a tree grower in the district?

(a) Funding [] (b) Land [] (c) Seedlings []

(d) Others (specify):.....

20. How can these problems be resolved?.....

.....

21. What is the future of tree growing in the district?

(a) Very bright [] (b) Averagely bright [] (c) Not bright []

22. How many women are in your association?

23. What type of trees do you grow?

APPENDIX IV
FOCUS GROUP DISCUSSION GUIDE FOR WOOD
CARVERS AT KOKOBEN

1. What is your membership?
2. What does your group do?
3. Do your activities affect the forest?
4. In what ways have you benefited from wood carving?
5. What are some of the challenges you face in your work?
6. How have you overcome or expect to overcome these challenges?

APPENDIX V
OBSERVATION GUIDE

The issues to be observed:

1. Number of active forest plantations and activities of private tree growers.
2. The causes of disappearing forest cover.
3. Forest products and their contribution to the livelihood of community members.
4. Activities of NGOs, individuals and religious groups/schools, etc. in afforestation.

APPENDIX VI

DERIVATION OF NUMBER OF RESPONDENTS FOR INTERVIEW SCHEDULES IN COMMUNITIES

Formula = $\frac{\text{Population of the zone}}{\text{Total population}} \times \text{Sample size}$

Total population

Mando- $8,429/22,995 \times 375 = 137$ respondents

Enyan Main- $7,404/22,995 \times 375 = 121$ respondents

Enyan Abaasa- $7,162/22,995 \times 375 = 117$ respondents

Total number of respondents = 375

The same process was used to determine the number of respondents in each community- $\frac{\text{Population of community}}{\text{population of zone}} \times \text{sample size}$

Mando has seven communities but only six qualified or had populations above two hundred people. These are as follows:

Attakurase- $592/8,429 \times 137 = 10$ respondents

Ampia Ajumako- $1,239/8,429 \times 137 = 20$ respondents

Kromain- $1,945/8,429 \times 137 = 32$ respondents

Mando- $2,414/8,429 \times 137 = 29$ respondents

Owane- $1,846/8,429 \times 137 = 30$ respondents

Tweikukrom- $389/8,429 \times 137 = 6$ respondents

Enyan Main has sixteen communities but only six were considered as follows:

Akotogua- $688/7,404 \times 121 = 11$ respondents

Asepanyin- $567/7,404 \times 121 = 9$ respondents

Enyan Akaa- $1,339/7,404 \times 121 = 22$ respondents

Enyan Main- $3,691/7,404 \times 121 = 60$ respondents

Eshiro- $887/7,404 \times 121 = 15$ respondents

Opepease- $232/7,404 \times 121 = 4$ respondents

Enyan Abaasa has nine communities with population of 7,272 but only seven communities with population of 7,162 were used as follows:

Abaasa- $4,681/7,162 \times 117 = 76$ respondents

Attakwaa- $290/7,162 \times 117 = 5$ respondents

Budukwaa- $338/7,162 \times 117 = 6$ respondents

Eduansaokokodu- $466/7,162 \times 117 = 8$ respondents

Nsawadze- $392/7,162 \times 117 = 6$ respondents

Obontser = $476/7,162 \times 117 = 8$ respondents

Onyaadze- $519/7,162 \times 117 = 8$ respondents

APPENDIX VII

DETERMINATION OF NUMBER OF HOUSEHOLDS

Average household size given by District Assembly = 4.4

Formula for calculating number of households in a community:

Population of community/ Average household size= Number of households per community

Mando Zone

Attakorase-592/4.4=135 households

Ampia Ajumako-1,239/4.4=182 households

Kromain-1,940/4.4=443 households

Mando-2,414/4.4=549 households

Owane-1,846/4.4=420 households

Tweikukron-389/4.4=88 households

Enyan Main Zone

Akotogua-688/4.4=156 households

Asempanyin-567/4.4=129 households

Enyan Apaa-1,339/4.4=304 households

Enyan Main-3,691/4.4=839 households

Eshiro-887/4.4=202 households

Opepease-232/4.4=53 households

Enyan Abaasa Zone

Abaasa-4,681/4.4=1064 households

Atakwaa-290/4.4=66 households

Budukwaa- $338/4.4=77$ households

Eduansaokokodo- $466/4.4=106$ households

Nsawadze- $392/4.4=89$ households

Obonser- $476/4.4=108$ households

Onyaadze- $519/4.4=118$ households

Population of nine zones

Zone	Population
Ajumako	9,547
Biseese	22,204
Breman Essiam	8,735
Enyan Abaasa	6,936
Enyan Main	9,834
Entsii Sunkwaa	7,761
Mando	8,300
Ochiso Ba	8,190
Total	81,507

Source: AEED Water and Sanitation Agency

Communities selected in Mando

Community	Population	Number of respondents
Attakurase	592	10
Ampia Ajumaku	1,239	20
Kromain	1,949	32
Mando	2,414	29
Owane	1,846	30
Tweikukron	389	6
Total	8,429	117

Source: Field Survey, 2006

Enyan Main has 16 communities but only 6 were considered as follows:

Communities selected in Enyan Main

Community	Population	Number of respondents
Akotogua	688	11
Assepanyin	567	9
Enyan Apaa	1,339	22
Enyan Main	3,691	60
Eshiro	887	15
Opepease	232	4
Total	7,549	121

Source: Field Survey, 2006

Enyan Abaasa has 9 communities with a population of 7,272 but only 7 with population of 7, 162 were considered as follows:

Communities selected in Enyan Abaasa

Community	Population	Number of respondents
Abaasa	4,681	76
Attakwaa	290	5
Budukwaa	338	6
Eduansaokokodu	466	8
Nsawadze	392	6
Obontser	476	8
Onyaadze	519	8
Total	7,162	117

Source: Field Survey, 2006

APPENDIX VIII

MAP OF AJUMAKO-ENYAN-ESSIAM DISTRICT