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RURAL WOMEN AND THE HIGH FOREST OF GHANA
A CASE STUDY OF THE NKAWIE FOREST DISTRICT

By

Edith Abruquah ©

MF Report submitted in partial fulfilment of the requirement for the
Master of Forestry Degree

Faculty of Forestry
Lakehead University
Thunder Bay, Ontario
Canada

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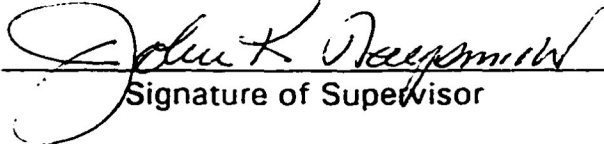
**TITLE OF REPORT: Rural Women and the High Forest of Ghana -
A Case Study of the Nkawie Forest District.**

NAME OF STUDENT: Edith Abruquah

DEGREE AWARDED: MASTER OF FORESTRY

* * * * *

This report has been prepared
under my supervision
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Signature of Supervisor

May 21, 1996

Date

ABSTRACT

Abruquah, E. 1996. Rural women and the high forest of Ghana: a case study of Nkawie Forest District. M.F. Report. Faculty of Forestry, Lakehead University, Thunder Bay, Ontario, Canada. 128 pp. (Advisor: J.K. Naysmith, PhD).

Key words: forest conservation, forest resources, non-timber forest produce, deforestation, rural women, land degradation, taungya farming.

A comprehensive record of rural women and forestry at the community level in one district in Ghana has been developed. The extent and nature of their participation, knowledge of non-timber forest products, rationale for their actions, problems they encounter, factors affecting their activities, effect of such activities on the forest resources and the various ways by which they contribute to forest conservation are reported. The study methods involve participant observations and unstructured interviews in five villages in Ashanti Region of Ghana. Results of the study indicate that women know about the seasonality, availability, values, distribution, types and cost of various forest products. The forest work women do and the purpose and the ways they utilize forest resources depend on the characteristics of the forest available to them and the kinds of economic resources available to their household. For 40 percent of the women in the Nkawie forest district, the principal reason for engaging in forestry activities is to earn income. Allocation of sufficient time to meet all other needs is their major concern. Generally the commercial activities of the women, especially the extraction of fuelwood, tend to have a negative effect on the forest resources while their activities on a domestic basis have a minimum or no effect on the forest. Some recommendations are made as to how women can more effectively participate in forest management activities including the decision making process at levels beyond the household.

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CHAPTER 1

INTRODUCTION

It is generally known that women in developing countries play a vital role in forestry.

Women are major users of forest resources mainly as a source of income and also as a means of sustaining the family by providing food, medicine and fuel for the family and fodder for livestock. For centuries, women have gathered forest products. This remains an important activity for tribal societies and for many other rural households in Africa, Asia, and Latin America. Hakangard (1990) and Molnar (1991) observed that in a growing number of geographic regions women are key actors in the forestry sector in the following roles: collectors of a wide range of products; repositories of essential knowledge regarding forest produce use and growing patterns; producers of trees and sale items manufactured from forest products; decision makers regarding the management of forest resources; farmers whose agricultural and livestock production systems depend on the availability of forest products.

In recent years, ecological imbalances have become a global concern. Major causes relevant to developing countries include deforestation, population pressure on land, defective and poor irrigation systems, road construction and overgrazing. The United Nations Food and Agriculture Organization (FAO) (1984) projected that without major changes in forest management or consumption patterns, this already acute condition will deteriorate further. With an upsurge of concern for protecting environmental resources, however, there is increasing

interest in the sustainable use of the forest which in turn is a vital component of the environment.

Quite a number of organizations give full support to the role of women in environment and development. Principle 20 of the 1992 Rio Declaration on environment and development states that "women have a vital role in environmental management and development and (their) full participation is therefore essential to achieve sustainable development". The United Nations World Commission on Environment and Development (UNWCED) (1987) defined Sustainable Development "*as that which ensures that the needs of the present are met, without compromising the ability of the future generations to meet their own needs*". This implies that sustainable development is about a broader, deeper, and more dynamic process of learning and change, aimed at creating appropriate, equitable systems. It relates to all aspects of human activity of which women are a vital part. It is imperative that we respond to the issue of ecological imbalances so as to sustain our forests and at the same time maintain and even enhance the productive human activity that takes place in them. In an attempt to achieve the concept of sustainable development, women can play a major role as noted above by Molnar (1991). This calls for the identification of the existing role of women, the problems they encounter, and their views and concerns regarding the use and management of the forest resources.

STATEMENT OF PROBLEM

Human activities may destroy forest resources and there is a need for decisions and solutions to rectify the situation. Women's primary role in meeting basic needs make them actors in environmental management. According to Falconer (1990), women play a central role in environmental management and in promoting sustainable development which is an important

contribution but are taken for granted. Women in developing countries are generally excluded when it comes to decision-making despite the fact that their local knowledge and traditional practices could enrich such decisions. Although women could be more effective in the management of the forest resources, they are not encouraged to express their opinions or identify and document problems related to the forest in order to appreciate the need to solve them. This awareness of forest resource issues is consequently reduced or lost altogether.

A better understanding is required of indigenous gender-based responsibilities and rights in order to design forest projects that more equitably fulfil household needs. Currently women are also found in subordinate positions due to lack of education and often do not reap the benefits of forestry programs.

Ardayfio-Schandorf (1992) noted that women's problems and solutions should be identified with the help of the women involved; for forestry is now about people more than trees in themselves. Since agriculture alone has not been enough to improve farmers' economic situation, it seems reasonable to seek ways of making sustainable use of the forest resources that are available.

STUDY OBJECTIVES

Women play a variety of forestry roles in developing countries. Some are at the managerial, professional, and technical levels. Other women may be forest guards and labourers in forestry agencies and loggers in the timber industry. Apart from those roles, there are rural women whose normal daily activities involve the use of the forest and the forest resources. This study targets such women.

The objectives of this study are:

1. to examine the traditional knowledge, skills and role of rural women in the utilization and conservation of forest resources,
2. to identify the reasons for women's involvement in forestry, their priority concerns and the problems women encounter in forestry,
3. to examine the effects of rural women's activities on forest resources, and
4. to determine ways in which women could become more efficient contributors to forest conservation practices and the decision-making process.

INTENDED USE OF RESULTS

Women's involvement in forestry is gradually coming into its own as an important policy concern in the developing world, in the forestry sector, and as a precondition for sustainable economic development. The results of this study can assist toward the following:

- developing forestry programs related to training and education of rural women, and the introduction of technology at the household level.
- Planning toward programs for energy conservation in rural areas, protection of existing forest reserves, establishment of new forests through community and social forestry initiatives and preservation of biological diversity.

Each of these programs will, if successfully implemented, enhance the concept of sustainable development.

CHAPTER 2

LITERATURE REVIEW

This section reviews literature on the country of study (Ghana) in terms of its setting and forest conditions. Literature is also reviewed on the relationship of people to forestry, the participation of women in forestry activities and their role in decision making in developing countries and in Ghana.

BACKGROUND AND SETTING OF GHANA

Ghana is located on the west coast of the African continent. The Gulf of Guinea forms its southern boundary and to the north, east and west lay the states of Burkina Faso, Togoland and the Ivory Coast respectively. The country extends 627 kilometres from North to South and 526 kilometres from East to West. Ghana lies between 4° 45' North and 11° 1' North latitude, and 1°14' East and 30° 07' West longitude.

The territorial area of Ghana is 238,500 km² comprising lakes, seasonally flooded land and dry land. In addition, it has a territorial water area that extends off shore 200 nautical miles. Administratively, the country is divided into ten regions namely; Upper East, Upper West, Northern, Brong-Ahafo, Volta, Ashanti, Western, Eastern, Central and Greater-Accra regions.

Demography

The population of Ghana is currently estimated at 19 million, an increase of 6.5 million since the last census in 1984. Ghana's population is growing by 2.6 percent annually (Ghana Census Office (GCO), 1985).

Population size is a major criterion used in describing towns as a rural or urban settlement. The 1984 population census classified settlements of 5,000 or more people as towns/urban and those below 5000 as rural settlements. On this basis nearly 70 percent of the population of Ghana is considered rural. Population density varies from one part of the country to the other. In 1984, Ashanti Region, the site of the study and the most populated Region, had a population of 2,089,683. This represents 17.1 percent of the national population with a density of 86 persons per km² (GCO, 1985).

Economic Perspective

The main features of the Ghanaian economy are similar to those of other low-income developing countries. Agriculture is the main economic activity representing 45.5 percent of Gross Domestic Product (GDP) but accounting for approximately two-thirds of the labour force (World Bank, 1989e). The timber industry is the third most important foreign exchange earner after cocoa and gold, accounting for 4.5 percent of the total GDP (International Union for the Conservation of Nature and Natural Resources (IUCN), 1988; Ghana Export Promotion Council (GEPC), 1991; International Institute of Environment and Development (IIED), 1992). Ghana's forests are therefore valued primarily as a source of commercial timber with an estimated current annual allowable cut of about 1.1 million m³ (Ardayfi-

Schandorf, 1992). The forest also plays a vital role in stability and fertility of soils and the quality of water (Francois, 1987). In addition, the United States Agency on International Development (USAID) (1993) reported that other economic benefits derived from the forest include fuelwood, wild animals, food, building materials, and raw materials for manufacturing household tools. These products contribute even more significantly to the livelihood of the rural Ghanaian. However, according to Ardayfio-Schandorf (1992) non timber forest products are usually excluded from the calculation of economic value of the forests, partly because they are considered to be part of those traditional practices that are becoming less important.

Structural Adjustment Programs (SAPs) with assistance from the World Bank and the International Monetary Fund (IMF) have operated in Ghana since 1983 in an effort to remedy national economic problems (Ewusi, 1987). With the introduction of the SAPs by the IMF, Ghana was faced with the challenge of readjusting and realigning her budget on debt repayment. This called for changes in her economic priorities by focusing amongst other things on rehabilitation of the key export sectors of the economy namely, cocoa, gold, and timber. To generate the required funds, more of the forest had to be sold (Ardayfio-Schandorf, 1992). These SAPs also demanded economic sacrifices from people, currency devaluation, rising unemployment levels, and the creation of more "democratic" political structures (Addai, 1991). Mikell (1990) believed that overall, the poorer people - including small farmers, women, and children - appear to suffer disproportionately from aspects of the economic adjustment policies.

FORESTRY IN GHANA

Ghana's Forest

There are two major ecological zones in Ghana. Most of Ghana's total area of 238,500 km² is savanna (56%) or closed forest (35%) (Hall & Swaine, 1981; Wagner *et al.*, 1991). Figure 1 shows the major vegetational types within these two zones in the country. The tropical high forest in Ghana has similar characteristics to tropical forest in other regions: a high species diversity, generally high in soil nutrients, multiple canopy layers and slow growth rate of the mature forest (Ardayfio-Schandorf, 1992).

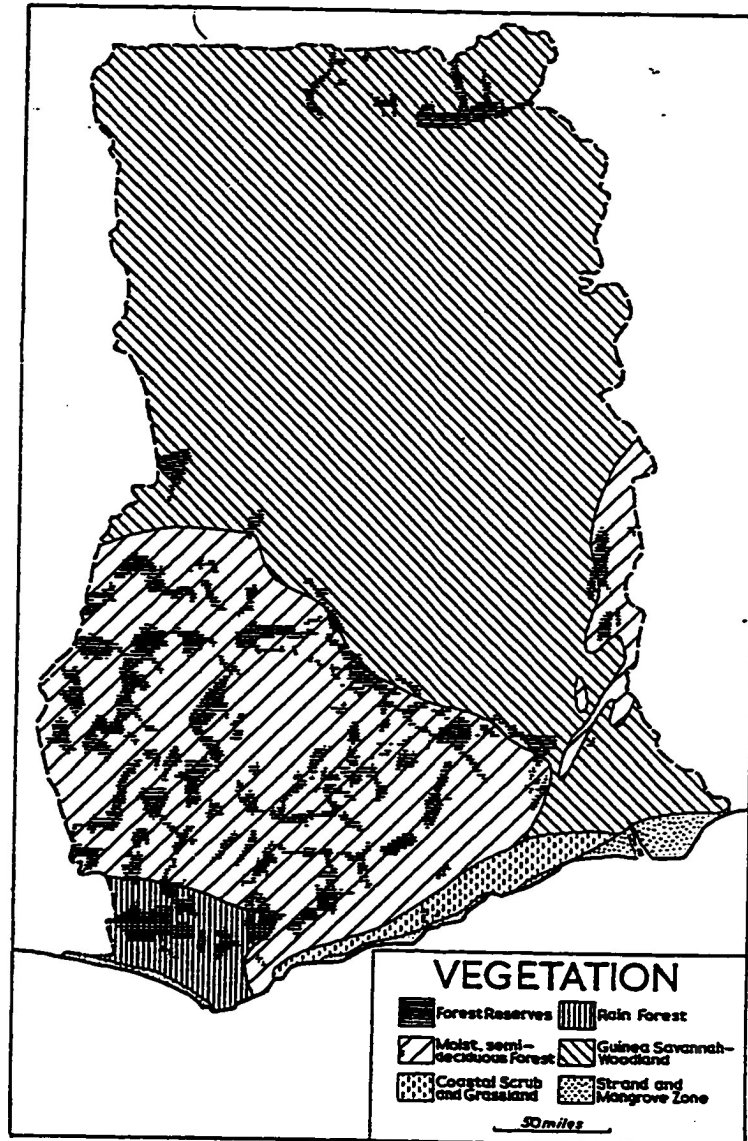


Figure 1. Map of Ghana showing vegetational zones.

By 1980, about 17,180 km² of the high forest were left under the jurisdiction of the Forestry Department (Sayer *et al.*, 1992). The Forestry Department presently holds about 15,913 km² of the high forest in constituted Forest Reserves, of which 11,590 km² is managed for sustainable production of timber for export (Ghartey 1989; Nolan 1989).

Forest land outside the forest reserves is mainly free for any one to use. The trees are removed and crops planted either for food or for cash. People indiscriminately clear forested areas during land preparation for the establishment of farms. These forests are also used for domestic or commercial timber or fuelwood with no forest management or conservation being practised (Asare, 1987). However, Wagner *et al.*, (1993) believes that although deforestation has occurred on lands outside the reserves, they are not barren; much of the land continues to support woody vegetation. Wagner *et al.*, (1993) further suggested that such lands could contribute significantly to local needs if the users were to undertake major agroforestry efforts.

The Growing Deforestation Problem

Accelerated development in Ghana, the need of people to feed themselves and the desire to improve their quality of life have led to an increased demand for agricultural land, resulting in degradation of forest land (Francois, 1987; IUCN, 1988). Evidence of land degradation can be observed in many forms including; deforestation, soil erosion, reduced soil fertility, pollution, salinization, depletion of wildlife resources, biodiversity reduction and desertification conditions (Ardayfio-Schandorf, 1992).

The deforestation rate in Ghana between 1981-1985 was estimated at 1.3 percent annually (Repetto, 1988; World Resource Institute, 1990). The most important activities that lead to the rapid destruction of the forests and grasslands were farming, bushfires, grazing, and the removal of trees as timber or fuelwood (Asare, 1987). Currently, the area of land devoted to agriculture is expanding due to population increase at an annual rate of almost three percent and continuous agricultural colonization in the Western and Brong Ahafo regions of Ghana (Energy and Rural Women's Work, 1985; Ardayfio-Schandorf, 1992).

Another factor contributing to deforestation is the system of farming namely shifting cultivation, a sequential system of growing trees and food crops also called 'shifting agriculture' (variously known as swidden cultivation or slash and burn agriculture) has been practised by farmers since time immemorial. Frimpong-Mensah (1989) and Wagner *et al.* (1993) noted that, slash and burn agriculture is considered a major cause of deforestation in Ghana.

Foresters have introduced a variation of this 'shifting agriculture' system within forest reserves to reduce the cost of reforestation in rehabilitating deforested areas. Under the 'tuangya system', farmers cultivate the deforested land for two to three years. These young trees are planted, often with the last agricultural crop, so that by the time the crops are harvested, the trees are well established and able to outgrow the subsequent weed invasion (Bene *et al.*, 1975). Local people agree on terms with the Forestry Department to undertake farming under this system within forest reserves. This system is however not practised on land outside forest reserves.

It was noted by Asare (1987) that, deforestation is increasing throughout the country. Deforestation has caused the food base of people to be less varied as the habitat for many game and plant species has been destroyed (Hakangard, 1990). As a consequence, deforestation has a worse effect on areas where women and poor people are directly dependent on the forest resource Fernandes *et al*, (1987).

FORESTRY AND PEOPLE

Due to the increasing rate of land degradation, it has become necessary to find ways of preventing it in order to assist in meeting sustainable development objectives. Francois (1987) noted that, development is said to be about people and consequently needs people to carry out its programs to lead to an improvement of their life. Development is therefore closely related to human work and management (Francois, 1987). Among the major environmental and developmental problems facing human kind today is how to sustain the forest (Myers, 1989). The notion of sustainable development is well established and calls for economic viability, social vitality, and ecological soundness in any development undertaking (UNWCED, 1987). To reach the goals of sustainable development therefore, local people need to be involved as participants in its programmes and projects (Ishwaran, 1992) because of the profound consequences for humanity. A paper by IIED (1992) further supports the fact that local people with established patterns of forest use are the keys to the sustainability of the forest. Local people are willing to maintain the integrity of protected areas only if they are able to realize concrete benefits from the protection of such areas. Again Ascher (1995) argued that "Forest systems"

consist of people as much as they consist of plants and animals. To deny this reality, rather than to accept the need to allow human forest activity, if it is within the bounds of sustainability, encourages land degradation by people. Since most forest systems involve many human activities that may either complement or conflict with one another, the principal aim should be to organize these human activities. The involvement of people in sustainable use practices is essential.

Putting the Role of Rural Women in Perspective

Women are the major players, but by no means the only players in Ghanaian forestry. Men do participate in forestry as well and occasionally dominate certain activities such as the harvesting and manufacturing of canes (rattan), and the carving of mortar and pestles. Since women are not the only players, they alone cannot succeed in solving forest conservation problems.

In many rural areas, women work longer hours than men, both in total, and specifically in provision of family basic needs - traditional, social, and subsistence agricultural and forestry tasks. This essential work is carried out using primitive, low productivity technologies leaving little time for other income earning activities and placing a heavy burden on women's health (Poostchi, 1988). Agyemang-Mensah (1992), noted that women are increasingly becoming the sole heads of their household, with responsibility for the economic, health, educational and general well-being of themselves and their families. Women rarely benefit from development projects. This is in part due to the fact that women are fully occupied with daily household, farm and forestry activities and have

virtually no time to participate in meetings, planning sessions and the decision making process as it applies to development projects. Development experts who plan schemes to improve the lifestyles or increase the incomes of village communities have in the past rarely analyzed the gender issues involved. Yet such issues are fundamental to integrated rural development (FAO/Swedish International Development Agency (SIDA), 1987). Generally women are not consulted during the design of programs that are intended to improve their lifestyle.

The imperative to rectifying the unsatisfactory status of women therefore is justified by both equity and economic reasons. Rural women can play a key role in re-establishing the forest that is lost and in protecting what is present if they are included in problem identification, decision-making and implementation processes since they have much contact with the forest. The burden of solving forestry problems should however be on both men and women.

RELATIONSHIP OF WOMEN TO FORESTRY

Profile of Women Involved in Forestry

Women are engaged in various government and nongovernment forestry jobs as managers, professionals, technical officers, loggers and labourers. Rural women also regularly collect, process and market forest produce for household use and for sale.

Women occupying top positions in the timber industry and management are few. Ansa (1986) reported on one Miller/Logger Managing Director in the Timber Industry and 14

women loggers in Ghana. There were also a few other women managers in the furniture industry.

In the past, forestry employment was largely restricted to policing large forest reserves in remote areas. This tended to limit the number of women who took forestry jobs. Because there are more men than women with formal education, most of the top positions in the forestry sector are held by men. His Majesty's Government of Nepal (HMG) and the International Union for the Conservation of Nature and Natural Resources (1988) noted that as more women assume responsible positions particularly in government, their role in policy-making and project design and delivery will effectively contribute to the overall role of women in resource conservation. In Ghana, professional women foresters who have graduated from the Institute of Renewable Natural Resources (IRNR) are working in various government agencies such as the Forestry Department, Timber Export Development Corporation, Forest Research Institute of Ghana, and Department of Game and Wildlife. The number of professional foresters who have been trained at IRNR since its establishment in 1986 is 303 of which only 40 are women, that is 13 percent of the total. Seventeen out of the 40 women took the forestry option of renewable natural resource management (Appendix I) and an additional number specialized in Fresh Water Fisheries and Watershed Management and Game and Wildlife. In addition to professional women foresters, the School of Forestry at Sunyani has trained a number of women technicians since 1974. The total number of graduates for the period 1974 to 1994 is 826 of which 68 (eight percent of the total) are women. See Appendix II. Although the number of trained women is increasing, the numbers are disproportionately low.

Women commonly work as labourers in tree seedling nurseries in Ghana. Nursery operations such as collecting tree seedlings from germination beds is a job considered to be well suited for women. It is said that patience and nursing instincts ensure that the delicate seedling is carefully removed and moved to another bed or to polythene tubes in which it grows to the required size for planting (Aloo, 1987).

Rural Women and Forest Products Utilization, Processing and Marketing

The developing world situation - For centuries women have gathered forest products. This remains an important activity for tribal societies and for many other rural households in Africa, Asia and Latin America (Aloo, 1987). Fortmann (1986); Fortmann *et al.*, (1985); and Hoskins (1980) refer to rural women in developing countries as frequently being subsistence foresters. The principal occupation of eighty percent of the women in Africa is farming but beyond this activity, they engage in other income generating activities such as the sale of raw or processed forest products (Cannacoo *et al.*, 1992). According to Falconer (1990), in the West African Humid Forest region, women dominate the collection, trade, and processing of the majority of non timber forest products.

Women collect and sell fuelwood and charcoal often as a sole means of livelihood. In addition to the direct collection and selling of fuelwood, wood is also the primary fuel used for cooking and processing, and therefore indirectly improves women's income (FAO/SIDA, 1987). In Kenya, fuelwood procurement is the specific task and responsibility of women however women are not permitted by culture to engage in tree planting and tending activities which would facilitate their task (Chavangi *et al.*, 1991). Ardayfio-Schandorf (1981), noted

that in Nigeria, women living in highly degraded areas have the burden of spending more time on collecting and carrying fuelwood. Similarly, Reddy *et al.* (1979) reported from a survey in a typical small village in India that fuelwood gatherers were covering an average distance of 4.8 km a day and spending an average of 2.6 hours a day in collecting the daily fuelwood requirements. Arnold *et al.* (1978) points out that this task of walking long distances could also be a constraint on other activities in those seasons of the year when plenty of hands are needed for farming.

Women keep domestic animals in most traditional societies. In Nepal, women are responsible for finding fodder for the buffalo - a massive job considering the magnitude of their daily consumption. Elsewhere women keep poultry, goats, pigs, rabbits and other small stock that play an important role in the family nutrition (FAO/SIDA, 1987).

Medicine extracted from trees and forest plants are still the only form of treatment readily available in most villages. In India, for example, the 'tendu' tree (*Diospyro melanoxylon*) has an astringent bark used to treat diarrhoea and dyspepsia. Its dried flowers are also claimed to be effective for the treatment of several urinary, blood and skin diseases (FAO/SIDA, 1987).

Forest foods such as fruits, nuts, barks, leaves, roots and fungi are also collected, processed and sold by women. In the northeast of Zambia, forest land serves as a major source of leafy wild vegetables, mushrooms, and edible caterpillars. These three items are major sources of cash and income for women (Rhodda, 1991).

The Ghanaian situation - Many farming families in Ghana continue to be dependent for part of their livelihood on forests near farming plots (Baker *et al.*, 1985, Belsky *et al.*, 1983; Kunstadter *et al.*, 1978; and Liemer *et al.*, 1987). According to the FAO (1989) the rural people of Ghana depend on the forest for income and employment. For many people, the money earned from collecting, selling or processing forest products provides an essential component of family income enabling them to buy food and invest in future food production (eg. purchase of seeds, or tools). Ardayfio-Schandorf (1985) noted that some women are engaged in the collection and manufacture of forest produce for their day to day survival and that 84 percent of both retail and wholesale traders in non timber forest produce in Ghana are women.

According to the World Bank (1988) and IUCN (1988), women collect and sell various forest plants used in traditional medicine. In the rural areas, this is a major source of income since close to 100 percent of the rural population depends on traditional medicine as their main source of health.

Women in most Ghanaian villages collect and sell fuelwood. They also produce and sell charcoal as a source of income to supplement the unpredictable yields from their farms (Cannacoo *et al.*, 1992). The use of fuelwood for palm oil processing by women is very common in Ghana (IUCN/World Bank, 1990). Palm oil is a product that can further be used for a variety of items such as soap and margarine and therefore has a considerable market in the country. Thus fuelwood both directly and indirectly creates employment for women.

Fodder production is another important area in tree and shrub production. Here however, the economic gains are indirect since people do not grow fodder for sale but to feed

their livestock that in turn may be sold or exchanged for other goods (Agyemang-Mensah, 1992; FAO/SIDA, 1987).

Women play a key role in the cane processing industry by employing other people in the collection and supply of raw materials to the artisans. The women themselves sometimes take part in the collection. Darko (1981) reported that at Enyiresi, a village in the Eastern region of Ghana, well known for its cane industry, women are found to be the sole sellers of raw cane and fabricated products.

Rural women are engaged in the processing and marketing of bushmeat. Approximately 75 percent of the population of Ghana consumes wild animals regularly (FAO, 1987b). In an evaluation of the Subri Forestry Project in Ghana, Korang (1986) found that 94 percent of those surveyed considered the worst impact of forest conversion to agricultural land to be the loss of bushmeat in the area.

Forest Conservation Effort of Rural Women

Developing world situation - Experiences from various parts of the developing world show that women have a great interest in defending and restoring the forest ecosystem and in protesting against deforestation.

Women in Duagara Paiteli, India, protested strongly when they learned in 1978 that their community forest had been sold by the male-dominated panchayat for conversion to a potato farm. Village men believed they would be employed on the farm and that many improvement (roads, for example) would result from the project. This issue however turned wives against husbands and mothers against sons. In spite of the strong opposition and

threats from their menfolk and the district administration, the women eventually saved the forest (Sheth, 1985).

Members of the Chipko movement in India hugged trees to prevent them from being felled by foresters. The Forestry Department announced an auction of 2500 trees in the Reni Forest overlooking Alakanda River, which had already flooded disastrously. One woman organized the women in her village to physically protect the trees from the company that won the auction. This forced the Uttar Pradesh government to investigate. Two years later, the government placed a ten - year ban on all tree felling in many forests along the Himalayans (FAO/SIDA, 1987).

Plantations have been established outside forest reserves to arrest deforestation, to produce wood to meet the demands of industry, to conserve land and water, and to provide forest products. Women have very often participated in the development of forest plantations (FAO, 1990).

In Indonesia, women transplant seedlings in the Upper Solo Valley where reforestation programmes aim to provide local populations with new supplies of fuel, timber, fruit and nuts. Population pressure has deprived families of the forest products upon which they depend. Many women have begun home gardens that are said to provide as much as 60 percent of their forest needs (FAO/SIDA, 1987).

Maathais (1984) reported on the Kenya National Women's Organization's role in providing assistance to women's groups to nurse and sell seedlings to the National Tree Planting Organization in Kenya.

Drought has destroyed much of the vegetation in Cape Verde. Because most of the men work further away from the island, replanting has been left to women and children who also have terraced and replanted hillsides and restores low lying sandy areas with shrubs (FAO/SIDA, 1987).

The Ghanaian situation - On the issue of protesting against deforestation, although women's green movements in Ghana such as Amasachina in Savelugu District are gradually springing up, there has not been any strongly organized approach (Ardayfio-Schandorf, 1992).

Women generally seem to participate in community level forestry programs because they tend to be the major sufferers when forest land is degraded. Ansa (1986), noted that in Ghana, it is mainly women who participate in tree planting activities. They mark out the planting lines and then join the men in the digging and actual planting. More recently, the Forestry Department, Collaborative Community Forestry initiative programmes and the Environmental Protection Council Co-ordinated Village Pilot Projects have organized women to establish woodlots for the supply of fuelwood and as a source of raw material for the manufacture of charcoal (Amoako-Nuama, 1992).

Anon. (1981) reported that women in Ghana know which tree species are good for improving the soil, the carrying capacity of the land and for hedges and windbreaks. Community women's group in the Vea and Tono areas of the Upper East Region are involved in the establishment of community nurseries and woodlots to improve soil fertility under the Irrigation Company of Upper Region (ICOUR) project (Amoako-Nuama, 1992).

More than 20 years ago, when the taungya system of planting crops between rows of saplings within forest reserves was being encouraged in Ghana, foresters soon recognized that the role of rural women was critical, for it was they who traditionally grew garden crops (FAO/SIDA, 1987).

According to Fortmann (1983), it is the intelligence, initiative and labour of women that will determine the success of agroforestry and other tree projects in tropical countries.

Rural Women and Decision Making Beyond the Household

Forest programs have generally not introduced mechanisms for women's participation in decision making. Hoskins (1979) noted that overlooking women's involvement often leads to the failure of projects. Even in the "new" approach of social forestry, women are largely excluded. When approaching local residents, foresters and extension workers often speak only to the community and village council most of whom are men. For example, Cecelski (1985) reported that in Senegal, timber in village woodlots reserved for meeting household fuel needs (and reducing women's workload), was planned to be sold as polewood by men in village councils without women knowing.

In Ghana, although women are major income earners in the villages, men still control decision making. While urban rural migration has increased women's burdens and responsibilities, their authority is still limited (Energy and Rural Women's Work, 1985).

There has however been progress with the involvement of women in higher decision making processes in some countries. Women's forest committees have emerged in some villages in Nepal to manage the village forest (Molnar, 1991). In West Bengal, women have

encouraged men to form forest protection committees for forest land rich in non timber forest products (Chen, 1990). Kumar (1988) noted that women are often the driving force in programs to rehabilitate degraded lands. Once they are involved in decision making, they in turn convince men in the community that forest rehabilitation is worth their time and effort.

CHAPTER 3

RESEARCH PROCEDURE, DATA COLLECTION AND STUDY AREA

ASSUMPTIONS AND RATIONALE FOR QUALITATIVE RESEARCH

The nature of the research problem requires as fully as possible, an interpretation of the entire role rural women play in forestry in particular from the women's viewpoint or frame of reference in order to know and understand them. This qualitative research is an attempt to study people multi-dimensionally, that is their activities from various perspectives.

Corbin (1990), defines qualitative research as that which produces findings not arrived at by means of statistical procedures or other means of quantification. It can refer to research about people's lives, stories or behaviour but also organizational functioning, social movements, or interactional relationships. It is further said by Mustafa *et al.* (1982), that the qualitative data technique tends not to be structured even with interviews of large numbers of people. The breadth of a large sample size and statistical significance are sacrificed. Instead, in-depth knowledge to understand the full ramifications of what people do, say and think, and the social systems they develop are actually sought. In Szent-Gyorgyi's (1980) terms, the reality that qualitative researchers address " is contradictory, illogical and incoherent."

A qualitative method - participant observation, was used in this study to understand the underlying factors of rural women's participation in forestry of which little is known. This method was also used to gain novel and fresh slants on things about their participation of which considerable is already known.

Howard S. Becker, one of the leading practitioners in qualitative methods in the conduct of social science research, argues that participant observation is the most comprehensive of all types of research strategies, (Patton, (1990).

The strategy of participant observation has been called; participant observation, field observation, qualitative observation, direct observation or field research. All these terms refer to circumstances of being in or around an ongoing social setting (Lofland, 1971).

DATA COLLECTION PROCEDURES

Sample Selection

The study was undertaken in the Nkawie Forest District within the Ashanti Region in the forest zone, the closed or high forest referred to earlier, of the Southern part of Ghana. Sampling for villages and women to be studied took place as follows.

Out of a total of four political districts within the Nkawie Forest District namely; Ahafo-Ano North, Ahafo-Ano South, Atwima, and Amansie West Districts, one was randomly chosen and it happened to be the Atwima Political District. Upon consultation with the Nkawie District Forestry Officer, twenty villages within the Atwima Political District were purposefully chosen for the study. The choice of the twenty villages was

influenced first of all by the kind of activities going on in those villages since it was necessary to study settings in which rural women were engaged in forestry activities. Secondly the condition of roads leading to the villages was taken into consideration.

According to Patton (1990), the sampling strategy can be random despite the fact that a small sample size is chosen for in-depth qualitative study.

For many audiences, random samples will substantially increase the credibility of the results, this Patton terms 'purposeful random sampling'. Five villages were subsequently randomly sampled from the twenty proposed villages, namely; Anyinamso, Beposo, Betinko, Kyiraaso, and Siribuoso.

Selection of women for the study was based on women engaged in 'taungya' activities (described in Chapter 2). The record of women engaged in 'taungya' was obtained from the Nkawie District Forestry office and a list of names of women was compiled for each of the five villages chosen. The names of ten women from each village list were randomly chosen for the study. Although all of the women involved in the study practise 'taungya', they were very much engaged in various other activities in connection with the forest. Interviews were used to explore the nature of activities the women undertook in addition to 'tuangya'.

Participant Observation

The method employed for the study was participant observation augmented by unstructured interviews as well as informal discussions with rural women. Lofland (1971) explains that participant observation is a the strategy of directly being with and

around the participants of a setting over a period of time. It is the most direct and therefore the most intimate method of social research. According to McCall *et al.* (1969) and Guba *et al.* (1982) participant observation emphasizes direct observation, informant interviewing, document analysis, respondent interviewing, and direct participation which is made possible in large part by repeated, genuinely social interaction with members of an organization under study.

Rural people's knowledge exists among innumerable groups of people in varying environments. This kind of knowledge is more often than not underrated and unacknowledged. Chambers (1983) states that "——it's only by talking, travelling, asking, listening, observing and doing of all this together that researchers and rural people can most effectively learn from each other." Participant observation was an appropriate methodology for the study of rural women in the villages because it fostered close relations between the researcher and the women thereby making it possible to gather information which would not otherwise be available. Two types of observers are determined by (Schwartz *et al.*, 1955; Gold, 1958; Bain, 1967; Lofland, 1971); an 'unknown observer', who will not identify herself as an observer to the people being studied and a second type, a 'known observer', ensuring people in the setting are aware that she is observing them. It is argued by Whyte (1984) that in carrying out research in a community setting, maintaining a covert (unknown observer) role is generally out of the question. Lofland (1971) noted that such a role provides a limited entry to relevant situations and makes it difficult to secure relevant information. Most of my data were

obtained through the role of a known observer, carried out on settings such as farms, fuelwood collection sites, homes and selling places.

Journal notes were kept throughout the fieldwork period. All 50 women were studied at varying times of the day, depending on what activities they were engaged in. Normally attention was paid to the women's conversations and notes were not taken while they spoke. Each informal interview was recorded, however, approximately 20 to 25 minutes after the encounter in order that all of the important information was retained.

As with any research work, there were positive and negative issues the researcher had to address while carrying out the field work. The problem of entering a setting and gaining acceptance was a critical factor, and it was even more so because of the methodology being used. The reason was that the researcher was relying to a great degree on the women being studied to obtain all the data required. Lofland (1971) noted that in entering a setting, one could use 'pre-existing relations of trust' as a route into the setting, rather than 'going in cold'. 'Gatekeepers,' self-appointed community hosts and informants of the setting itself then feel more assured as to the trustworthiness of this newly appeared would-be observer (Whyte, 1984). Since the Forestry Department technical officer was known to the people in the setting, he was relied upon to get the researcher introduced to the women and to explain the purpose and objectives of the research to them.

The technical officer assisted the researcher in obtaining a local guide, one for each village whose purpose was to vouch for the credibility and sincerity of the researcher as well as to explain certain local terminology. In some instances, the local

guide had to interpret some dialects to the researcher. By having the local guide accompany the researcher, she enjoyed the enormous advantage of being able to move about, observe, and ask questions unrestricted by the duties and socially defined constrictions in the setting. The objectives of the research were thoroughly explained to the local guides as well as the nature of work to be carried out and the type of data needed. They were also taught how to establish rapport with the respondents. The researcher feels that having worked with female local guides made many things easier.

The researcher experienced an initial "newcomer feeling" consisting of guesses and hunches about the research and struggling to ascertain the meaning of events. It did not however last long. As Whyte (1981) suggested, if the researcher is comfortable with the people, then the research being carried out will proceed with few problems. The respondents were cooperative and they willingly answered questions and expressed their thoughts. There was little difficulty getting information on the kind of activities the women were engaged in, for example, the various types of forest produce being handled by the women. Some personal questions had to be delayed however until later in the study period when the researcher was sure that support and trust were established between the researcher and the participants.

As the research proceeded from day to day, the researcher made more friends, even with women who were not among the samples to be studied. Such women stopped by to find out what was happening and some of their contributions were useful. Those discussions sometimes confirmed information already collected and sometimes contained completely new information. It also gave the researcher an idea about the women's level

of acceptance and interest in the research work. This feeling was gathered especially from those women who spoke 'Ashanti twi' - a dialect understood by the researcher. Five of the rural women studied were of different ethnic origin who had migrated to their present locations and could not speak the local dialect fluently. During their turn of the study, the local guide had to interpret those dialects to the researcher. It was obvious that they were not as relaxed with the flow of information as were the women who could speak 'Ashanti twi', the same language as the researcher.

Another reason underlying the feeling of acceptance was that, whenever the researcher took pictures the women passed comments like, 'would you mind taking more pictures'. Some of them made remarks like 'make sure you put us in your book' and also 'do come back and visit us from time to time'.

The researcher was not however readily accepted by the entire community. For example, on one occasion the researcher went with the local guide to a home of one of the women to be studied. The household members entertained fears and pretended they did not know the person to whom we were referring. The local guide had to explain that it was not the case that the person we were looking for was involved in any trouble but that we needed to speak with her concerning forestry research work. A strategy that was adopted was for the local guide to introduce the respondents to the researcher the evening prior to the observation day since most of the women can be easily met at home at that time. This approach also gave the respondent the opportunity to meet the researcher thereby creating some familiarity between them. Other benefits included being able to brief the respondent on the objectives of the study and the nature of work to be carried

out, and finally to agree on some plan as to how the work could be carried out successfully the following day.

Another aspect the researcher had to be careful with was the role - relations she maintained in the field since much of the data collection depended on this. Most of the rural women have little or no formal education and the researcher had to guard against making the respondents feel inferior. Field dress of the researcher was kept simple so as not to create any barrier by over dressing.

During the 'observation' process with the respondents, informal discussions took place. Interviews were conducted after the observation to interpret some of the significant observations the researcher made. Some detailed quantified information was obtained through these interviews, for example, information on amount of time spent on the collection of forest products. Some of the respondents tended to give very long replies that did not always include information of interest to the researcher. This problem was tackled tactfully by cutting in and asking another question.

Although the interview questions were not written out and read to the respondents, the researcher endeavoured to ask each woman the same questions. Each interview lasted about 30 to 40 minutes depending on the respondent.

The field observation was tedious and energy consuming but perhaps the fact that the researcher made friends and succeeded in collecting the necessary research data more than compensated for that. As far as practicable, the researcher tried to overcome the problems that arose in the data collection process.

As a result data were gathered on collection, processing, utilization and marketing of non-timber forest produce; various aspects of forest foods and fodder, fuelwood and charcoal production, forest medicine, and raw material for manufacture of utility items such as baskets and ladles. The problems the women encounter in the forestry activities as well as the value and importance of the produce were included in the data. Data on time spent by women on forestry activities, and how such time is linked to other factors such as, household chores, environmental and socioeconomic conditions were gathered. Observations and interviews covered women's roles in conservation, that is in protecting the forest, and judicious utilization of the resources. Finally information was sought on how the women thought those problems of forest protection and resource utilization, could best be solved in terms of sustainable use of the forest.

DATA ANALYSIS PROCEDURE

The data obtained from these observations and interviews are classified into five categories containing the basic elements necessary for understanding the situation as follows:

1. Factors determining rural women's involvement in forestry and the value and importance of forest produce and services.
2. Collection, processing, utilization and marketing of forest produce.
3. Rural women's forestry activities and the amount of time allocated to them.
4. Effects of rural women's activities on forest resources.

5. **Conservation and judicious utilization of forest resources.**

During the process of classification, the researcher scanned the data for themes existing in the data. In addition, extent to which the data allotted to one category held together, that is the internal homogeneity of the data belonging to one category, was another guiding principle for this classification. Secondly, the categorization was made such that each one is mutually exclusive and thus stands out clearly from others.

Inductive analytic techniques, finding patterns and developing category systems, were used in analyzing the data. The method is a way of isolating essential characters that determine a phenomenon.

To ensure confidentiality names of individuals involved in the study are not mentioned.

STUDY AREA

The total area of the Nkawie Forest District is 6335 km². This area experiences a double rainfall regime, the major season from May - August and the minor season from September - October. Ashantis are naturally the dominant ethnic group in the area although other migrant and settler groups are found in villages in the area.

There are five forest reserves within the Forest District and their land areas are as follows:

Asenanyo Forest Reserve	- 225.28 km ²
Tano Offin Forest Reserve	- 397.57 km ²

Tinte Bepo Forest Reserve	- 144.20 km ²
Offin Shelter Belt Forest Reserve	- 59.62 km ²
Jimira Main and Extension Forest Reserves	- 63.36 km ²

One of the four political districts in the Nkawie Forest District was randomly chosen, that was Atwima District which has a total area of 2582 km². Among the villages selected for the study, Betinko and Siribuoso are situated on the main Kumasi - Bibiani road while Anyinamso, Beposo, and Kyiraaso are located on untarred branch roads leading from the main road (Figure 2). These villages were established through the movements of groups of farmers from less agriculturally promising areas to their current location to clear land for cocoa farms.

Increased demand for forests as a result of growing population has traditionally been met from the abundant forest resources surrounding the villages. Currently the vegetation of the immediate surroundings of the villages is predominantly second-growth with patches of grasses and *Eupatorium odorata* weed being very common. All the villages are close to forest reserves but those reserves near Betinko and Siribuoso are not as rich in fauna and flora as those close to Anyinamso, Beposo and Kyiraaso. In addition the forest reserves serving Betinko and Siribuoso are more degraded with 'Acheampong' weed (*Eupatorium odorata*) than those of Anyinamso, Beposo and Kyiraaso.

The conversion of forest land to agricultural land especially through slash and burn methods has been a major factor in deforestation in the Nkawie Forest District. Farming is the main economic activity in the villages with the principal crops being cocoa, maize, cassava, and fruits. In one village, Beposo, cola nut and coffee are also

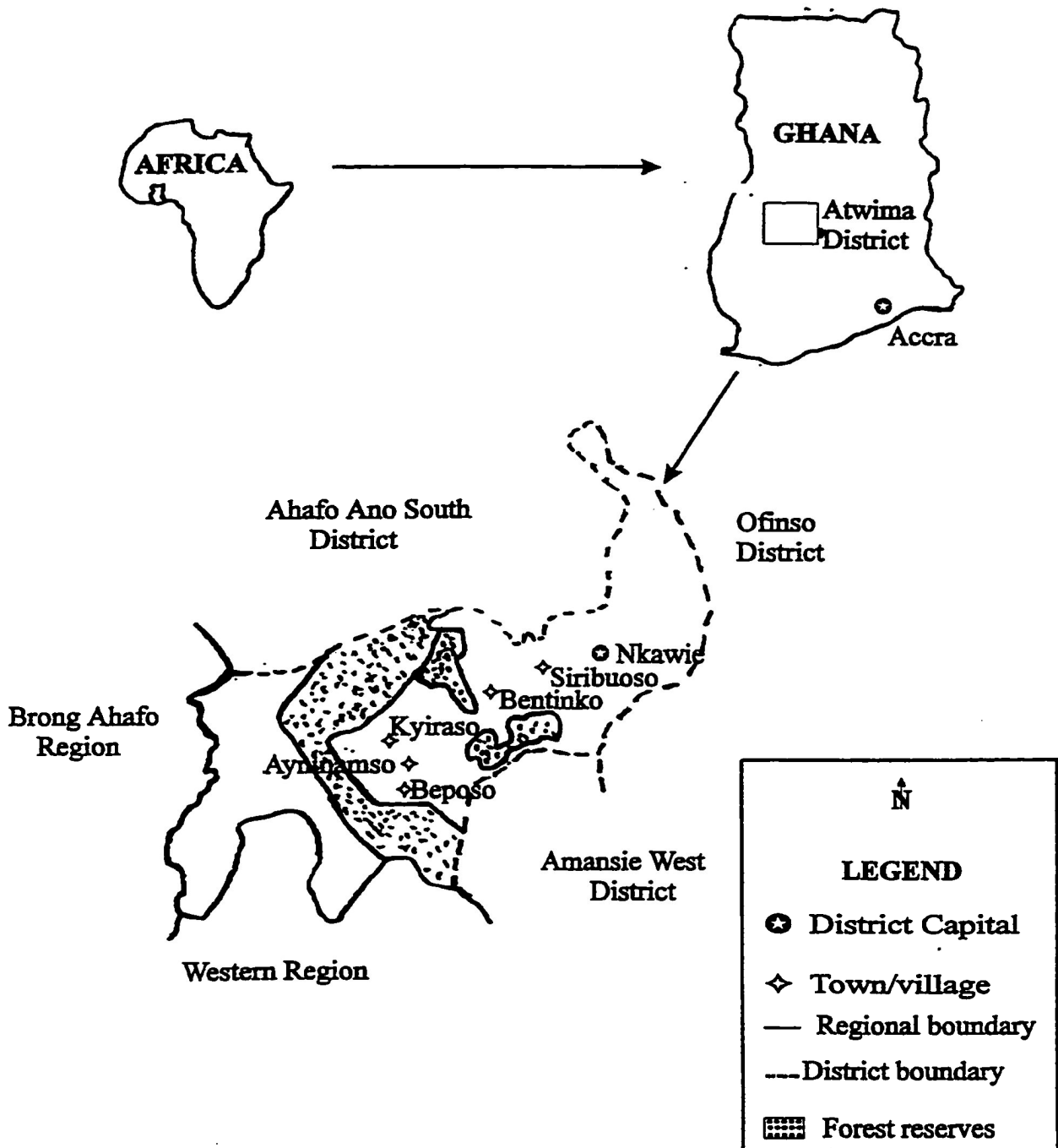


Figure 2. Map of study area showing various forest reserves and villages of study
 (Source: Atwima Political District Office, Nkawie)

grown. The economy remains at the subsistence level due to a number of factors including poor roads and the absence of a transportation network to convey food crops and minor forest products to larger centres.

The major land tenure systems in the Atwima District include private ownership with legal title and various types of tenancy, cash rental, caretaking, share cropping, pledges, gift, and a degree of communal ownership. Privately owned lands are inherited from family members or purchased outright and are covered by lease documents to avoid litigation. Caretaker tenurial system does not require initial payment of any fee but the caretaker is expected to share produce obtained from the land with the landowner. The rental system requires payment on the land for a period of time. When the rental period elapses, the tenant ceases to have any entry rights to the land. Communal ownership includes, religious groves, wooded river courses, and 'stool' lands, that is land owned by chiefs.

CHAPTER 4

RESULTS

BACKGROUND OF WOMEN INVOLVED IN THE STUDY

Fifty rural women from five villages within the Ashanti Region of Ghana were observed and interviewed for the study to determine the extent of their involvement in forestry and also the extent of their appreciation of forest services such as soil fertility and windbreaks. The following is a summary of the basic personal data collected.

Age and Family Structure

Out of the 50 women observed, 12 of the respondents were between the ages of 20-30, 13 between the ages of 30-40, 23 between the ages of 40-50, and two were between the ages of 50-60. About 50 percent of the women had six children each, 25 percent had four children each and another 25 percent had two children. Two of the women had no children.

Educational Background

In general the older the respondent the less formal education she has had. In this context it is worth pointing out that - 30 percent of the respondents had completed basic

elementary education, that is six years of schooling, 40 percent had at least four years of education but could hardly read or write and the other 30 percent had no formal education at all. Many of them however reported that their children attend school.

Religious Beliefs

The vast majority of the rural women - 80 percent - were Christians of different denominations who normally attend church on Sundays. The remaining 20 percent were Animists (those who attribute soul to inanimate object). However, all the women were found to have a strong belief in local taboos and local traditional beliefs especially those relating to forests. Some of these beliefs related to particular trees as the dwelling places of spirits, other parts of the forest as sacred groves, and observing particular days as days on which one may not enter the forest.

Occupation

Farming was the major occupation of the 50 rural women studied. They were all actively involved in farming - food and cash crops both within and outside the forest reserves in the study area. Apart from farming, 50 percent were actively engaged in petty trading in such provisions as, salt, matches, and soap.

In addition to farming and petty trading, the women were involved in the collection, processing, and marketing of non-timber forest produce such as fuelwood, and forest foods. While some engaged in such activity on a small-scale, selling and engaging

in barter trade at the village level (domestic oriented women), others were involved on a large scale - that is on a commercial basis, collecting the produce in large quantities and marketing it in towns. Twenty-nine (Anyinamso-6, Beposo-6, Betinko-5, Kyiraaso-5, Siribuoso-7) of the respondents were observed to be engaged in the collection of non-timber forest produce on a small scale. The other 21 (Anyinamso-4, Beposo-4, Betinko-5, Kyiraaso-5, Siribuoso-3) were engaged in commercial trading and of that number, nine were trading in sponge, pestle (a woody material used in pounding food and medicinal plants), food wrapping leaves, snails and bushmeat, fruits and vegetables. Three manufacture and sell charcoal, three engage in the sale of chewing sticks (woody material used in cleaning of teeth), three in commercial fuelwood, two manufacture sponge, and one collects medicinal plants for commercial purposes. The market produce usually changes with the season.

The study seeks to establish the relationship existing between rural women and forestry (see page 32); the results are presented under the following headings:

1) Factors determining rural women's involvement in forestry; and the value and importance of forest produce and services.

2) Collection, processing, utilization and marketing of forest products.

This presents the type, availability and distribution of forest produce women harvest and the problems they encounter. It also shows how the women gather, process and market the produce.

3) Rural women's forestry activities and the amount of time allocated to them.

Generally the women are known to spend a lot of time on forestry activities. This section discusses what factors account for the time spent on such activities and how that time is linked to other factors such as, household chores, socioeconomic and ecological factors. The women's level of satisfaction with the amount of time spent on forestry activities is also examined in this section.

- 4) The effects of the women's activities on the forest and related resources are assessed in this section, and
- 5) The results obtained from observations and interviews on methods adopted by rural women to conserve forest resources are presented and analyzed.

FACTORS DETERMINING WOMEN'S INVOLVEMENT IN FORESTRY AND THE VALUE AND IMPORTANCE OF FOREST PRODUCE AND SERVICES.

Factors Determining Women's Involvement

Women contribute in various ways toward household sustenance and this involves substantial reliance on the forest. Men, women and children are all involved in the collection of forest produce for household use. Whereas men tend to concentrate more on the commercial potential of the forest such as timber and big game, while regarding other forest produce as of minor or secondary benefits, the women see the forest as multi-functional. They therefore involve themselves in gathering, processing, and marketing of a number of non-timber forest products.

The respondents gave various reasons for their involvement in forestry activities including; economic, food and nutrition, domestic use, health, social, and spiritual. Each respondent gave at least four of the reasons listed.

Economic

Rural women collect various items such as fuelwood, snails and fruits to sell as their main source of income or to supplement their income earnings. The fact that they receive little or no financial support from their husbands or others, forces rural women to rely on forest produce in order to meet basic needs. In cases where women have husbands who provide family support, supplementary income from forest products may be unnecessary.

Forest products harvested by women vary from village to village depending on availability and in some cases markets. For example, women in Beposo rely on the production of okra as a cash crop and turn to forest produce (food wrapping leaves) for income only if the okra crop fails.

Food and agriculture

Forest produce provides an important supplement to the diet of rural people. Such foods serve as agricultural food substitutes in times of shortage or as a supplement to foods. Some forest produce adds taste and flavour to meals. When land required for production of agricultural crops is lost, women rely on forest produce to meet some of their food requirements.

Domestic use

Forest products such as fuelwood for cooking, bamboo for minor construction and cane for making baskets are almost equally as important as food products themselves. For example, women carry their staples in baskets; wooden ladles, mortar, and pestle are necessary for food preparation and fuelwood is essentially the sole source of energy for cooking.

Health

The use of traditional medicine collected from both outside and inside forest reserves for the cure of diseases is popular in the study area. This will be discussed in a later section of the results.

Social and Demographic

Women commonly give forest produce as gifts as a sign of appreciation in return for services rendered to them by others. As well much of the social interaction in a household takes place around an open fire which, particularly during the cool periods results in the use of significant amounts of fuelwood. Concerns were expressed by the respondents as to the increasing number of people in the household and the resulting high pressure on the available forest resources to meet their needs.

Spiritual - Some women visit the forest to obtain spiritual fulfilment, certain rites are also performed on festive occasions, and gods are worshipped in sacred groves of the forest. Spiritual issues were not however major points among the women engaged in the study. It was indicated that the use of the forest for spiritual purposes does not result in the loss of forest products or values. It rather helps in maintaining the resources. Table 5 indicates reasons given in order of priority by the respondents for their involvement in forest functions.

Table 1. The principal reason given by women for their involvement in forestry activities by village.

Reasons/Villages	V.1	V.2	V.3	V.4	V.5	Total	Percentage
ECONOMIC Employment Cash income Supplement income Satisfy high demand	4	4	2	6	4	20	40
FOOD AND AGRIC. Food security and diversity in family diet. Supplement food	2	2	3	3	3	13	26
DOMESTIC Domestic products for household use (eg. Fuelwood, fodder, bamboo).	1	1	3	1	1	7	14
HEALTH Medicinal herbs	1	1	1	-	2	5	10
SOCIAL AND DEMOGRAPHIC Gifts Loss of farmland leasehold Increase in household numbers	1	1	1	-	-	3	6
SPIRITUAL Performance of rites Keeping of gods	1	1	-	-	-	2	4
Total number of women	10	10	10	10	10	50	100

V.1 = Anyinamso, V.2 = Beposo, V.3 = Betinko, V.4 = Kyiraaso, V.5 = Siribuoso.

Collection, processing, and marketing of non-timber forest produce from observation, vary from person to person and also from village to village as revealed in Table 1. The extent of dependence by respondents on various forest resources is reflected in Table 1. The overall percentages of women indicating their reasons in order of priority for entering the forest is shown in Table 1. Forty percent of the women gave the principal reason for engaging in forestry activities as economic.

Other determinants

In addition to the reasons given in Table 1, the extent of their dependence was further determined by the availability of the resources, season of the year, access to markets, existence of established trade and commercial networks and outlets, availability of alternative income-earning opportunities, socio-cultural factors such as taboos, and in the case of processing of the forest produce, the acquisition of the necessary skills. The age, educational, and religious background of the women also influence the extent of their involvement.

Availability - Differences occur in the types of forest products prevalent in the various villages. Food wrapping leaves for example are abundant at Beposo and a large number of rural women are involved in their collection. The village has therefore become a big supply centre of food wrapping leaves. Cola-nuts are popular at Anyinamso and a number of women are engaged in collection and marketing of this produce. Beposo, Kyiraaso and Anyinamso tend to have more forest resources available compared to

Siribuoso, and Betinko and consequently more of them were engaged in forest produce activities than in the latter villages.

Season - The availability of some of the forest resources depends on whether it is the rainy or dry season. The season determines the type and quantity of produce that can be collected. Although most of the products can only be collected seasonally, some can be collected year-round. Women therefore have full-year access to some products such as fuelwood and charcoal while products such as fruits, snails and mushrooms are available only part of the year for example one respondent's comment was " I make more money when the fruits are in season, and my children have so much to eat when foods like wild yams and snails are in season."

Market Access - Access to market encourages women 's involvement in the collection of the forest produce. Some of the villages such as Beposo have established trade networks for certain goods, however, access to markets is not always easy - road conditions being a major factor here. Women deal with such problems and for example, carry out their normal duties by walking with headloads of produce to the next biggest town to market their produce. On the other hand, Betinko has good access to markets but a limited number of consumers in comparison to Beposo. This is in part due to a limited range of products, primarily okra, and few forestry products.

Alternative Commercial Activities - The existence of alternative income generating activity and employment opportunities affects the extent to which forestry activities are undertaken. For example, at Betinko, pottery making is quite common since the appropriate clay is available for its manufacture. Some concentrate on pottery-

making rather than undertaking forestry activities. This however depends on the skill one acquires as will be explained below.

If women are engaged in other income generating activities and they realize that there is an external higher demand for forest produce which could provide better income, they quickly switch to such forestry activities.

Processing / Manufacturing Skills - Another factor that determines women's involvement is the nature and extent of their processing or manufacturing skills. At Siribuoso, those who had the skill to weave baskets were engaged in making them while those who have no such skill beat *Parkia bicolar*, a woody vine, into sponge to sell. Women who manufacture baskets earn more than those who make sponges and simply do not have the skill to weave baskets.

Socio-Cultural - Rural women have strong beliefs. Socio-cultural factors influence their involvement in forestry. In all the five villages studied, it is a taboo to engage in any farming activities on Tuesdays and therefore women rely on forest produce for their household food requirements.

Age, Marital Status, Education, and Religious Background - The above factors were found to influence the manner in which the 50 women surveyed related to the forests and the extent to which they were involved in forestry activities.

Over time, it becomes physically more difficult for a woman to walk long distances to collect forest produce. They require more time to engage in the harvesting and processing of forest resources.

Whether a woman is married plays a part in determining the need for forest resources. For example, one may collect a particular product just to improve the taste of a meal in order to please her husband. Again most of the married respondents had children and go to the forest to collect herbs to prepare traditional medicine for their children.

Those with some education show less reliance on forest resources since they tend to have other businesses such as sewing and trading. Those with less education and few skills need a source of income and rely more on the forest resources to fulfil those needs.

Women because of certain beliefs will enter the forest to collect certain items used to meet spiritual requirements. Again, they respect taboos concerning forest but Animists are more prone to hold the forest in more reverence.

A combination of one or more of the issues discussed above determine women's involvement in forest resource activities.

The value and importance of forest produce and services

The following two tables show the ranking of forest products by respondents who use them for commercial (Table 2) and domestic (Table 3) purposes.

Each of the 21 women involved in commercial activities was asked to list what she considered to be the ten preferred products of commercial value based on the ease with which they could be sold and the potential profit to be derived from their sale. In all, 210 products were mentioned by the women (Anyinamso-40, Beposo-40, Betinko-50, Kyiraaso-50, Siribuoso-30). The ranking was done by the author and based on the

number of times each product was cited. The results of the ranking for the first ten forest produce for each village are shown in Table 2.

Table 2. Ranking of forest produce in order of commercial value by village.*

Villages / Forest Produce	Anyinamso	Beposo	Betinko	Kyiraaso	Siribuoso
	Pestle material**	Marantaceae***	Fuelwood	Fuelwood	Bushmeat
	Fuelwood	Pestle material**	Bushmeat	Pestle material**	Charcoal
	Bushmeat	Snails	Charcoal	Bushmeat	Maranteceae
	Medicinal plant	Bushmeat	Chewing Stick	Canes**	Sponge material
	Cola nut	Cola nut	Pestle material**	Charcoal	Pestle material**
	Fruits	Sponge material**	Marantaceae	Basket material**	Mortar material**
	Maranteceae	Chewing Stick	Fruits	Snails	Fuelwood
	Mortar material**	Canes**	Canes**	Fruits	Chewing stick
	Basket material**	Building materials	Medicinal Plant	Sponge material	Canes**
	Sponge material	Fruits	Snails	Building materials	Medicinal plants

*According to the 21 of the 50 respondents who are involved in commercial activities.

**Collection and processing of these items are dominated by men; the marketing by women.

***Marantaceae (Wrapping leaves)

Two products, pestle material and bushmeat, were cited by all villages whereas only two villages, Anyinamso and Kyiraaso, ranked basket material as one of the ten preferred products. Four of the five villages rated sponge material and fruits as one of the top ten preferred products. Cola nut, although it is a priority in only two of the villages, was rated the fourth preferred item in both villages. Charcoal was among the top preferred products for three villages and it was ranked second at Siribuoso, third at Betinko and fifth at Kyiraaso. Two of the five villages cited fuelwood as the top product and three villages cited fuelwood and pestle as either the first or second preferred item. According to those surveyed, the priority items are dependable sources of income. The preferred produce varies from village to village as noted in Table 2.

The fact that the 21 commercial oriented respondents did not mention any forest services, such as soil fertility, river water quality and quantity and wind breaks, is a function of the criteria used for ranking preference and not their lack of awareness of forest service values. Nevertheless an observation from the survey is that forest services would not be ranked highly in the order of preference for those involved in commercial activities.

The 29 respondents involved in the domestic use of the forest were asked to list what they considered to be the ten preferred products and services of domestic value based on the extent to which they rely upon the products and the usefulness of the services. The ranking was done as described on page 49 but in this case 290 products were mentioned (Anyinamso-60, Beposo-60, Betinko-50, Kyiraaso-50, Siribuoso-70).

The results of the ranking of the first ten products and services for each village are presented in Table 3 below.

Table 3. Ranking of forest produce and services in order of domestic value by village.*

Village / Forest Produce	Anyinamso	Beposo	Betinko	Kyiraaso	Siribuoso
	Fruits	Fuelwood	Soil fertility	Fuelwood	River water
	Fuelwood	Medicinal plants	Fuelwood	Medicinal plants	Fruits
	River water	Fruits	Windbreak	Fruits	Soil fertility
	Medicinal plants	Palm sap	Bushmeat	River water	Charcoal
	Charcoal	Pestle material	Charcoal	Seeds	Basket material
	Bushmeat	Canes	Fruits	Windbreak	Fuelwood
	Pestle material	Seeds	Medicinal plants	Mortar	Pestle material
	Soil fertility	Bushmeat	Canes	Timber	Mortar material
	Canes	Mortar material	Basket material	Basket material	Bushmeat
	Timber	Basket material	Mortar material	Canes	Maranteceae

*According to the 29 of the 50 respondents who are involved in domestic activities.

Four villages cited two of these forest services (that is soil fertility, river water quality and quantity or windbreaks) each and one cited none. Of the four, two villages ranked two forest services in the top three of their respective lists. The villages of Betinko and Siribuoso each ranked a forest service first on its list. The five respondents

at Betinko utilize forest both within and outside the forest reserves and they understand the importance of forest vis - a - vis soil fertility which in the reserves is very rich and outside of the reserves where the forest is degraded, and very poor. Therefore soil fertility is a major concern and is ranked first. Respondents at Beposo did not rank any forest service as one of the top ten because the forest resources are relatively abundant in the area providing all the services both inside and outside forest reserves and therefore their failure to recognize its importance.

The rating in order of importance to the domestic users revealed that fuelwood and fruits ranked first in three villages. This implies that at the village level the value of the forest is appreciated for both its services and the products.

Fuelwood was noted to be valued for both commercial and domestic purposes being ranked in the top in every case except by the commercial users in the village. It was interesting to note that timber was not rated as one of the most important products although it is a major source of income for the nation. This is because the respondents are not involved in timber operations although men from the five villages are.

Forest services such as windbreaks are important to the rural women since they are aware that crops grown under the taungya system are protected from strong winds, while those outside forest reserves are sometimes affected by winds. Agricultural crops such as plantain, maize, and cassava are detrimentally affected by wind if not protected by windbreaks.

COLLECTION, PROCESSING, UTILIZATION AND MARKETING OF FOREST PRODUCE

Types of Forest Produce Collected by Women

The types of forest produce women harvest from the forest is mainly non-timber produce such as: fodder and foods including fruits, vegetables and tubers; game; medicinal plants mainly bark, root, leaves and saps of plants; fuel and materials for domestic household items such as, canes, palm climbers and wrapping leaves. These products are meant either for domestic use or for sale. Table 4 shows the various number of species listed by the respondents.

Table 4. Number of species of forest produce collected by women by village.

Village/ Type	Fuelwood /Charcoal	Plant Food	Game	Medicine	Utility Items	Fodder	Total
Kyiraaso	27	17	18	26	14	10	112
Anyinamso	25	15	10	21	9	10	90
Beposo	18	10	11	25	9	8	81
Siribuoso	12	14	10	11	6	9	62
Betinko	10	9	8	14	8	15	54
Total	(40)	(35)	(31)	(19)	(19)	(9)	(153)

Some of the species mentioned were repeated in other villages. The numbers in brackets '()' represent the actual number of species per product.

In all, the women enumerated 153 different types of produce commonly and widely used. This comprised, 40 species of trees for use as fuelwood and charcoal, 35 types of plant foods, 31 species of game animals, 19 types of medicinal products, 19 species of household utility materials, and nine fodder species. The number of different species per village ranged from a high of 112 in Kyiraaso to a low of 54 in Betinko. In the latter case, women at Betinko generated their income mainly from okra and other agricultural crops.

Forest Foods

Types, Availability and Distribution - During the study it was observed that women gather, process, and market a wide range of forest foods from both fallow and forest lands. These foods which are wide spread in the study areas are grouped into four major headings for the purpose of the study; roots and tubers, game, mushroom and snails, fruit and nuts, vegetables and spices. While vegetables, roots and tubers were the most commonly harvested products, game for bushmeat, snails and mushrooms are the most popular forest foods.

The main example of roots and tubers was wild yam which serves as a staple for the women when their agricultural crops are not ready to be harvested. Roots and tubers, for example wild yam, according to the women can withstand low precipitation conditions and therefore they rely on them mainly when the rains fail. It was reported that root digging however requires more time and energy compared to the collection of other forest foods.

Game, mushroom and snails are regarded as delicacies and expensive food items both in the urban and rural areas hence making its harvesting an important activity for rural women. In the case of game, large animals such as antelope and deer are hunted for bushmeat throughout the study area but these animals are almost exclusively hunted by men. The women only carry out the processing and marketing. Other animals popular for bushmeat purposes are the grasscutter, porcupine, duiker, waterbuck, and birds.

Snails are collected during the wet periods of the year. The women are skilled at determining the possible areas where the snails are likely to be hiding. In describing where snails can be found, one woman said "they inhabit areas where the leaves on the ground are partially rotten, moist and cool."

Mushrooms are collected when they are in season and sold along the highway. Women estimate spending two to three hours a day to collect about 10kg of mushrooms when they are in season.

Examples of fruits in the area are; wild mangos (*Irvingia gabonensis*), "akotompotsen" (*Uvaria chamae*) and velvet tamarinds, (*Dalium guineanse*). Other species mentioned include grewia and ficus. Fruits are normally picked and eaten as snacks and as part of daily dietary requirements, but when they are in season, they are gathered for sale. The collection of fruits forms an integral part of the daily routine work carried out on the farm. The palm fruit is popular in the study area, particularly at Betinko. Palm nut and palm kernel processing are major components of women's food processing enterprises and despite the fact that the trees are normally owned by men, women process the fruits. Oil made from this fruit is used in soap making which serves

as another source of employment for women. Men derive palm wine from the palm tree and both men and women are involved in the selling of this derivative.

Seeds and nuts are collected from the forest. *Ziziphus jujube* for example, is collected and eaten while working on the farm. Other common nuts collected and sold are cola-nut and nutmeg. Vegetables are collected and used for salads, soups and sauces which are eaten with staple foods. Major edible leaf species mentioned are *Rhodognaphalon brevicuspe*, red-flowered silk cotton tree (*Bombax buonopozense*), silk cotton tree (*Ceiba petandra*), and some *Ficus* and *Albizzia*. Certain spices such as 'wisa' and 'awerewaba' are also commonly collected.

While some of the forest foods may be available year-round, most of them are seasonal and may be in abundance only during certain seasons of the year. Rural women have extensive knowledge of the times of the year that particular forest foods may be in season and in abundance and this is the time they usually gather these products for sale. The season of abundance, quantities collected per season per person, and the corresponding amount of money earned for some of the common commercial forest foods in the area are shown in Table 5.

Table 5. Seasonal periods of forest foods and quantities collected per season per person.

Item	Seasonal period	Quantity collected/ person/ season	Earnings/ person/ season (Canadian \$)
ROOTS AND TUBERS			
Wild Yam	April - June	40 baskets	40.00
GAME MUSHROOM AND SNAILS			
Bushmeat	August - December	100 pieces	80.00
Mushrooms	April - August	20 baskets	60.00
Snails	April - August	10 baskets	50.00
FRUITS AND NUTS			
Wild Mango	December - March	15 baskets	150.00
Velvet Tamarind	December - March	12 baskets	6.00
Cola Nut	August - December	25 baskets	50.00
VEGETABLES AND SPICES			
'Wisa'	August - March	6 baskets	4.00

Sixty percent of the women were of the view that diets are changing and contain fewer forest foods compared to previous years. They have to walk long distances to reach the collection sites and when on site, they spend increasingly more time searching for the foods. The tendency therefore is for them to rely more on foods sold at the market instead of traditional forest foods. For some, the forest foods are collected and consumed when they can make the time to spend on their collection or when they are in dire need of such food.

Gathering, Processing, and Marketing of Forest Foods - The gathering of forest foods forms an integral part of the women's daily routine work, which may also include

farming or trading. The collection of forest foods for household use is done mainly after the day's work on the farm. Seventy percent of the women collect food every day for household use, while 30 percent collect either every other day, once a week or when they need it.

Those who collect commercially, that is for sale do so during the work day and normally such produce is packed periodically and a day or two before the produce is bound for the larger centres. When gathering leaves and vegetables for food, women collect young leaves and shoots and ripe foods moving steadily from plant to plant, cutting, trimming, picking, and discarding unusable material, dropping the useable into baskets, and then continuing with a new plant. Gathering may require a cutlass or sticks and a basket to carry items gathered. Roots are normally dug out with hoes and fruits may require long sticks for plucking.

After collecting forest foods, some of the produce is processed to make it edible, either for added flavour or for preservation purposes. Since most of these foods are perishable, they are processed into forms which allow them to be kept for a longer period. For example, products such as snails and game are simply dried in the sun or smoked. Women know the extent to which these foods should be preserved in order to extend their shelf life. The processing of the produce requires considerable human energy involving heavy physical extension for much of the work day.

Forest produce is either eaten at home or marketed to generate income. There are generally three ways in which forest food is marketed, namely; from a stall at the market, from headloads carried by women as they walk about the village and delivery to a

customer directly from the farm. Those engaged in the commercial sale of forest products however, store the goods in their houses and sell them to a middle woman who in turn will sell them in town, while others send the produce themselves directly to the larger centres.

Importance of Forest Foods - Forest foods are an important component of rural nutrition, are used to prepare a complete meal, or may serve as dietary supplements, providing diversity, added flavour, and essential nutrients such as vitamins, to rural families. One woman said that, "during the fish season there is always an abundance of fish especially herring, but when the season is over it becomes too expensive to buy fish and I rely on wild mushrooms or dried snails for my family's source of proteins."

Bushmeat is particularly popular in the study area. It was stated by one of the respondents that "apart from the poultry I keep, I rarely have any source of domestic protein; bushmeat is an important alternative source of animal protein."

Diversity in diet is important partly because essential nutrients are obtained but also because when such foods are added to staples, the palatability of the food is enhanced which encourages and facilitates the consumption of that particular staple.

It was reported that forest foods such as fruits and wild yam serve as substitutes for staple foods (eg. cassava and maize) especially during periods of scarcity or as seasonal food resources. This is mainly during the times when the dry season ends, and from the beginning to the middle of the rainy season when stored foods are becoming exhausted and new agricultural crops are also not yet ready for harvesting.

Economic value is one of the most important factors in the collection of forest foods on a commercial basis. The gathering and cash sale of snails and mushroom assist in defraying family expenses such as school fees. For example, when the school term begins, and school fees are due and agricultural crops are not ready to be harvested and sold, respondents rely on forest foods to make money to meet such expenses. One woman described how she converts her earnings from the sale of forest foods into other forms of security, "with my earnings from the sale of forest foods, I buy either sheep or goats to increase my stock so that in the future I can sell some in times of need without detrimentally affecting my herd." Another one said, "I save part of the money I earn from the sale of forest foods till the end of the season and then I go into petty trading during the lean season in order to generate income to support my family."

Problems relating to forest foods - The respondents cited several reasons why the supply of forest foods is decreasing including the following: commercial logging and fuelwood extraction; population growth; privatization of forest land and resources; and the commercialization of rural markets and rapid urban migration that have created a market for popular forest foods.

As rural people move to urban areas, they continue to purchase traditional foods. Other rural dwellers develop the taste for traditional foods too. The demand for such foods in the urban areas is therefore increasing and consequently rural women need to collect more forest foods to supply the urban areas. Demand for forest land for agricultural purposes is also on the increase as the population increases. All of these factors have the effect of reducing the availability of a wide array of forest foods.

Fodder

Type, Availability and Distribution - Examples of fodder species collected by the women are; *Irvingia gabonensis*, and *Bombax buonopozenses*. The rural women did not mention any fodder species that is completely unavailable in the area, neither did they complain about difficulties involved in collecting any fodder species. There is apparently an abundance of fodder, the animals are raised on a small scale and there are other food sources such as peels of cassava - hence little pressure is put on fodder resources.

Gathering, Processing and Marketing - The land tenure system is such that not everyone owns cropland close to his or her home. It is often the case therefore that women must walk some distance from their homes to their farms. Fodder is normally collected after the day's farm work is done. Some of the women however occasionally walk the animals, especially sheep, to the farm and the animals browse as the women carry out their farm duties. Processing and marketing of fodder species was not reported.

Importance of Fodder - Eighty-five percent of the women raise animals and they all reported that fodder is of great benefit to them especially during the dry season. Commonly rural women keep animals including, goats, sheep, poultry, pigs, and other small stock that play an important role in providing additional protein rich foods. It was noted earlier that livestock are occasionally sold, thus fodder provides an indirect economic gain to the women. The collection of fodder for the animals is important, and it is especially so because they collect it to feed the animals during the end of the dry season or the beginning of the wet season.

No problems were cited concerning the availability, quality or quantity of fodder.

Fuelwood and Charcoal

Fuelwood

Types, availability and distribution - With so much pressure in the study area on energy supply for cooking, smoking of food items, production of vegetable oil, soap and pottery-making and since there are virtually no alternatives to fuelwood, women gather wood and other biomass for fuel from the forest. Appendix IV indicates the tree species normally used for fuelwood purposes.

Women are knowledgeable about where to find the preferred fuelwood species and have practical knowledge of the characteristics of such species. Properties such as burning characteristics, strong and lasting embers, easy ignition, less ash production, and also high calorific value are what the women look for as good quality fuelwood. The respondents also know which species provides the best flavour when used in smoking fish or game and avoid certain species for such purposes. One of the respondents spoke authoritatively about 'Esa' (*Celtis zenken*), and said that the tree burns slowly but produces a hot fire which cooks food in a shorter time. She said the species does not produce much smoke and it is easy to kindle. The most preferred species in the study area are underlined in Appendix IV.

For domestic uses (using or selling at village level), scarcity of preferred fuelwood species was not a concern; the opposite was true in the case of commercial use.

See Figures 3, 4, 5 and 6.

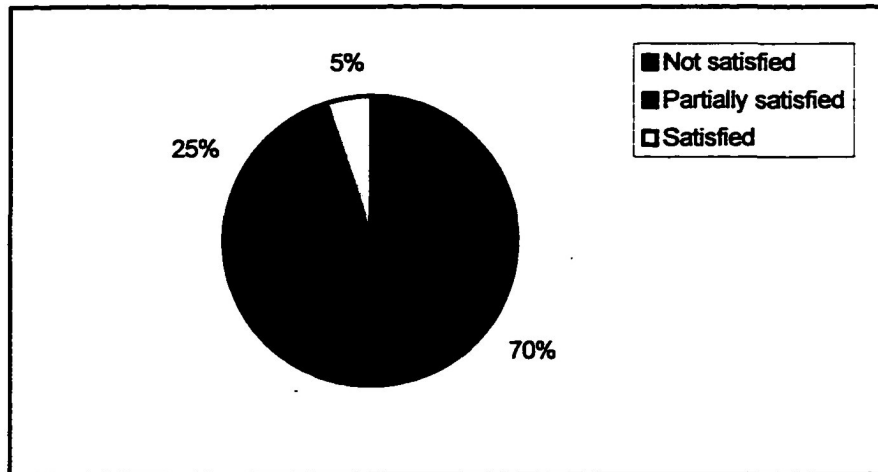


Figure 3. The harvesters' satisfaction with availability of fuelwood for domestic use.

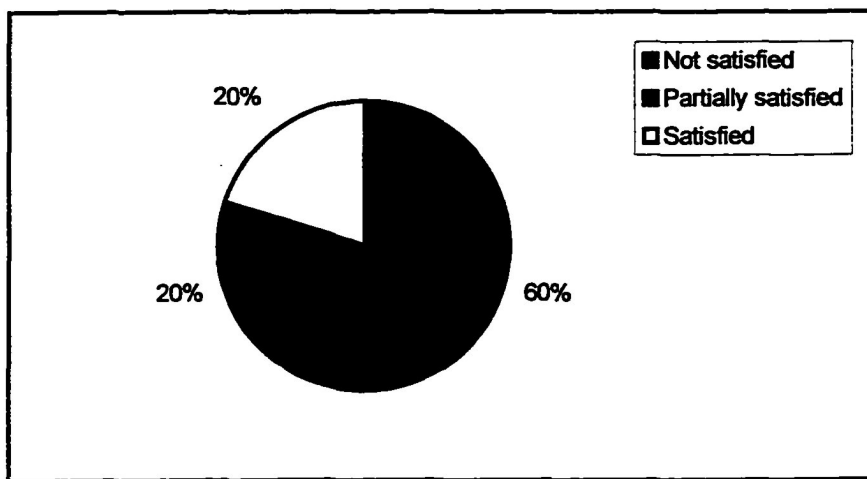


Figure 4. The purchasers' satisfaction with the price of fuelwood for domestic purposes.

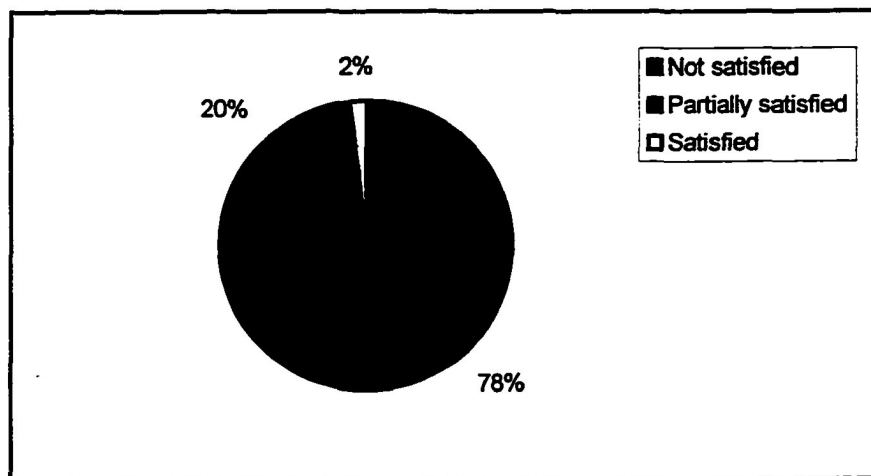


Figure 5. The harvesters' satisfaction with the availability of fuelwood for commercial purposes.

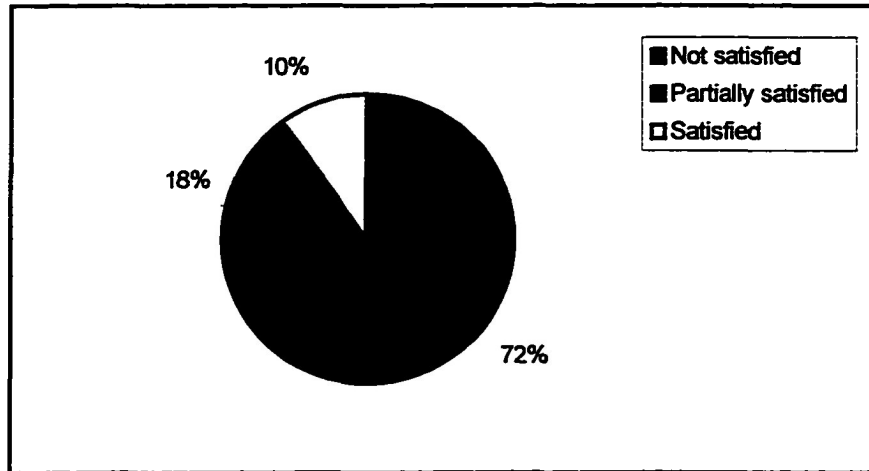


Figure 6. The harvesters' satisfaction with selling price of fuelwood for commercial purposes.

Seventy-eight percent of the respondents were satisfied with availability of fuelwood for domestic use (Figure 3), while 20 percent of the respondents were satisfied where the fuelwood was required for commercial purposes (extraction and selling to middle women who transport it to larger centres on a large scale).

Again seventy percent of the respondents were satisfied with the purchase price of fuelwood for domestic purposes (Figure 4). In terms of commercial production and marketing of fuelwood however, 18 percent of the respondents showed satisfaction with selling price while 72 percent indicated dissatisfaction (Figure 6).

Fuelwood is abundant throughout the study area. Because of this, domestic demands are easily met and where it is purchased locally for domestic use the prices are relatively low.

The relatively low price however negatively affects those women who sell fuelwood on a large scale commercial basis. The need to use relatively expensive equipment and the inherent maintenance costs of such equipment tends to increase production costs and therefore reduce profits.

Gathering and Marketing of Fuelwood - Gathering of fuelwood by rural women for domestic purposes takes two forms; deadwood cut with a cutlass and twigs broken up by hand. The other method involves cutting live trees or branches which are then dried in the sun. When women go out to gather fuelwood they rarely collect entire trees; deadwood is their major target, but occasionally, twigs and small branches are cut. As much fuelwood as can be carried in a headload is then tied in a bundle.

Men are not entirely removed from the fuelwood operation, but they participate in ways distinct from women. They collect mainly for commercial reasons. Men usually use chainsaws to cut live trees and branches, allow them to dry and cart them by lorries to sell in larger centres while women normally carry loads of fuelwood on their heads. A number of the respondents are currently involved in the commercial sale of fuelwood.

Importance of Fuelwood - Without the substantial effort by women to collect and transport fuelwood, the proper preparation of family meals would not be possible and the effect upon rural life would be disastrous. Other important aspects of fuelwood and its related activities both at the household and commercial levels were indicated by the respondents. Table 6 shows the importance of fuelwood according to four categories namely: dietary, commercial, social and the provisions of light and security.

Table 6. Importance of fuelwood.

Uses	Activity
Dietary	Meal Preparation and related activities Food preservation - smoking of food items etc. Heating of water
Social	Family and friends socializing. Pay homage to Chiefs on festivals As gifts to other families especially on outdooring of new babies and during funerals
Light and Security	To provide light at night To provide protection from reptiles, insects and wild animals.
Commercial	Sale of fuelwood Distillation of alcohol Extraction purposes, eg. Palm oil and Palm kernel Soap preparation Preparation of medicinal herbs

Problems Related to Fuelwood - The major problem related to fuelwood

production for domestic use is the considerable time spent finding preferred species.

Constraints facing women operating on a commercial basis include, the methods of cutting and the means of transportation. Production sites in the forest zone are not distant but they are scattered making the use of vehicles costly. Women therefore resort to head loading the fuelwood to a major point where vehicles can operate more easily.

Another problem is the lack of adequate capital to operate on a large scale. The majority of the respondents have little or no capital and thus must operate on a small-scale.

Charcoal

Type, availability and distribution - All of the species listed in Appendix III can be used for the manufacture of charcoal but women have preferences based on the properties of the wood. For example, *Celtis* is preferable for the manufacture of charcoal rather than *Triplochiton scleroxylon* since *Celtis* produces a heavier charcoal that burns longer than the *Triplochiton scleroxylon*.

Processing and marketing - Live trees are cut into smaller logs, a pit is dug, the wood is buried in the ground, fresh leaves and soil are used to cover it in a mound form, it is then ignited and allowed to burn into charcoal. This process takes a minimum of three days depending on the volume of logs. Men, children and women are involved in the manufacturing of charcoal. It was observed that there were more production sites at Beposo and Anyinamso than the other three villages. These villages dominate in the production of charcoal due to the relative abundance of *Celtis*, the preferred species.

Charcoal is normally loaded into jute bags ready for marketing.

Importance of charcoal - Charcoal is an important commercial item. There is a great demand for charcoal especially in the urban areas where the use of fuelwood in homes is not very practical. Occasionally however, charcoal is used as an alternative to liquefied petroleum gas, and electricity for cooking.

Problems relating to charcoal - All the problems relating to fuelwood production applies to charcoal production (see page 67). A critical factor in the production process is the length of time the wood must remain in the pit (it varies by species) to be properly transformed into charcoal and not reduced to ashes.

Forest Medicine

Type, Availability, and Distribution - Traditionally rural people rely on plant medicine to solve their health problems. Bark, roots, leaves, fruits, and seeds of plants are collected both from within and outside forest reserves for medicinal purposes. Most of the common plant species, especially shrubs can be grown in compounds or on farms. Women intentionally leave trees of medicinal importance on the land during farm clearance.

The respondents could not identify any species that is nearing extinction although it was agreed that for particular species one may have to walk long distances and search diligently in order to find them. This gives an indication that some species may be in danger.

Gathering, Processing and Marketing - It was noted from the study that both men and women are engaged in the collection of medicinal plants. The marketing of the produce is however more in the woman's domain. Women may enter the forest alone to collect small quantities of plant medicine for use by a family member, but when large quantities are required for sale, more than one person collects. Gathering companions are involved in this case, and they may include; men, children, and mixed groups of relatives and neighbours. Usually the collection is done after the day's farm work and brought home to be stored for later use.

Processing of forest medicines involves boiling, grinding, pounding, and cutting of the plant species depending on what it is to be used for.

Importance of Forest Medicine - There are specialist healers in the rural areas but knowledge and use of plant medicines are not confined to them alone. For a majority of the women, forest medicines are used at the local level. For a few, harvesting of medicinal plants is a major source of income since forest medicines are essential components of health treatment. Plant medicines are used for both preventive and curative measures against diseases to maintain good health and to encourage healthy growth especially in children. The rural dwellers rely heavily on forest medicines but also have many different healing practices and beliefs. Nevertheless forest medicines are still used together with mystical and ritual rites.

Several options of health care are available in the villages, for example treatment by a local nurse, pharmaceutical drugs from wayside chemical sellers, government or private health clinics, or hospital treatment. Eighty percent of the respondents have plant medicine as their first recourse for treatment of diseases particularly when they cannot afford to attend a clinic. See Appendix IV for a partial list of species and treatments. The lack of money is the principal reason that medicinal plants are chosen over other options. Long travel distances to clinics and hospitals is another factor contributing to their choosing medicinal plants first. For example Kyiraaso is about 20 km from the clinic with the road being in such a deplorable state, access is mostly by walking. Seventy percent of the respondents believe that certain illnesses are best cured by use of plant medicine. Reliance of rural women on plant medicine is not merely due to their firm belief in its potency dating back many generations and the other reasons given, but is also

due to the fact that the government of Ghana is encouraging the use of traditional medicines as an alternative to Western medicine.

Problems relating to forest medicine - The respondents gave indications as to the loss of certain species to the point of possible extinction. The distances required to travel to collect medicinal plants are increased.

Raw Materials For Utility Items

Another important group of forest products is raw materials for making utility items. These include wood for chewing sticks, mortar, pestles, ladles, sponge for bathing and chewing sponge, and the collection of food wrapping leaves. The manufacturing and use of these items also gives some employment and therefore cash for the rural women. For example, at Siribuoso, food wrapping leaves are used to wrap 'agidi', a locally made food from corn, which is sold commercially.

Rural women dominate the collection, and marketing of food wrapping leaves, the processing and sale of chewing stick, bathing and chewing sponge, and the marketing of pestle and mortar. They also deal in canes and other climbers.

Food wrapping leaves (marantaceae)

Type, Availability and Distribution - The leaves are available year-round but they are abundant during the rainy season (May-August). Substantial amounts of wrapping leaves can still be collected in the study area during the dry season unlike other less forested areas. For example at Beposo, the majority of women spend six hours per day,

six days a week in the collection of wrapping leaves for which they earn about \$1.00 Canadian dollar a week while outside this region using leaves as a cash crop may not be possible. During the dry season, about half that quantity can be collected but in turn will earn about \$3.00 Canadian per week. For this reason the respondents said they preferred to harvest during the dry season.

There are a number of species used to wrap foods including several special species in the marantaceae family, namely; Anwonomo the most popular one, Suahahan and Ntentrema. The respondents know which species is best for a particular food item. The properties of the three species are such that they are strong, durable, maintain good flavour in food, and can withstand boiling when used for such purposes. Of the three species, Anwonomo is preferred over the other two because the leaves are normally very large and broad which facilitates the wrapping of food and other items.

All respondents showed satisfaction with the availability of the resource and expressed no concern about it becoming extinct.

Gathering, Processing and Marketing - The gathering procedure is the same as for the collection of some forest foods. See page 57. No processing is carried out. The leaves are put into bundles and tied with ropes ready for the market.

Importance of Food Wrapping Leaves - For forty percent of the respondents (both domestic and commercial), collection of food wrapping leaves serves as the main source of income. This group spoke of how the money they make from the sale of food wrapping leaves contributes to payment of their children's school fees. One woman said, "I collected and sold wrapping leaves in order to pay for my children's elementary

education.” Another spoke of how such money is used to render support for her daughter, she says, “the sale of the produce helped me to provide pocket money for my daughter for a period of two years while she learned how to become a seamstress in Kumasi.”

Another thirty percent said it supplements their income and such women engage in the collection occasionally. An equal number of them do not collect leaves for sale. They do however collect a few for their own use at the household level. Most collect leaves for sale to other traders for eventual distribution to larger market centres.

Problems relating to food wrapping leaves - The respondents expressed their satisfaction with availability of market for the produce except for those at Beposo and Kyiraaso who complained about the deplorable state of the roads leading to their village.

Wood for mortar and pestle

Type, Availability, and Distribution - There are several tree species that can be used for the carving and making of mortars and pestles (used in grinding or pounding food items and sometimes medicines). For example the first step in the processing of palm fruit into palm oil, the palm fruits are boiled and pounded. Again, most of the staples such as corn are pounded and used in the preparation of a variety of meals. Rural women obtain most of the wood for this use from forest reserves for which they need to obtain entry permits from the Forestry Department to collect the produce. Examples of some of the species used are; Esa (*Celtis milbraedi*), Esa - kokoo (*Celtis zenkeri*), Esa

fufuo (*Celtis bromii*), *Bombax buonopozenses*. Certain species are preferred, purposely because of their durability. Examples of such species are the Celtis.

Gathering, Processing and Marketing - Most of the household utility items are carved by men who dominate the collection and carving of those items. Some women can however make pestles by themselves. The marketing of such items is however dominated by women. They sometimes have customers who come from other villages to buy the products and transport them to town to sell.

Importance of Wood for Mortar and Pestle - The preferable species (*Celtis*) has traditionally been used as pestles and mortars in the villages. Mortars and pestles are used together to prepare one of the most favourite meals in the region and throughout the country - 'fufu' (a local Ghanaian food prepared by pounding cassava and plantain or cocoyam together).

Problems - Respondents pointed out that most of the preferred species are found in substantial quantities only in the forest reserves, and therefore involves getting the required government permit. In some cases this means a 14 km walk to the nearest district forestry office.

Canes

Type, Availability, and Distribution - Canes are solid woody stems that hang from or entwine living trees including palm trees. They may be split or used in whole for a variety of furniture and other household items as noted below. Among the common species used are; Umbrella tree, (*Musanga cecropoides*) and Marabou thorns

(*Dichrostachys cinerea*), and the split or whole stems or twigs of Prayer beads (*Abrus precatorius*). The stems of some climbing palms are also used including, Rattan Palm, 'Eyee' (*Laccosperme opacum*), 'Ayike' (*Laccosperma secundiflorum*) and 'Demmere' (*Calamus decratus*).

Cane is one of the major non-timber forest products that is becoming scarce, particularly in the case of Betinko.

Gathering, Processing and Marketing - Most non-timber forest products are normally traded both locally, within the village and in other villages and larger centres. In the case of cane however, it is common to see traders coming to the local village and buying it directly from the collectors.

Importance of Cane - Rural women utilize raw canes in the manufacturing of household items such as, crop drying mats, and baskets to use at home or to sell. Baskets, weaving chairs, tables, baby cots, wig stands, hats, and fishing traps can be made from other palm branches, especially the oil palm, but those made from canes are highly preferred because of their flexibility, strength and durability.

Chewing Sponges, Bathing Sponges, Chewing Stick

Type, Availability, and Distribution - The most common chewing stick species harvested for commercial purposes is 'Nsoko' (*Garcinia epunctata*), 'Tweapeah' (*Garcinia kola*), and 'Owebiribi' (*Teclea verdoorniana*). Some other chewing sponge species are, *Acacia kameninensis* and *Acacia pentagona*. Species used for bathing

sponge include the stem of the forest climber, 'Ahensaw' (*Morordica argustifolia*), *Grewia mollis*, *Lasianthera africana* and *Milletia irvinei*. The most preferred chewing stick species are *Garcinia kola* and *Garcinia epunatata*, and that for bathing sponge, is *Morordica argustifolia*. These preferred species according to the respondents are getting scarce.

Gathering, Processing and Marketing - The climbers are beaten, washed, and dried to produce bathing and chewing sponge. With the chewing stick, wood is slit into small pieces for cleaning teeth.

Importance of Chewing Stick, Chewing and Bathing Sponge - Chewing sticks and sponges are used traditionally as a means of maintaining dental hygiene. The twig and slit stem of many small plants are used as chewing sticks. Chewing stick, chewing sponge and bathing sponge are important components of dental and body care. Ninety percent of women use these products at home. Although western-style toothbrushes, toothpaste and bathing sponges are available, the use of the traditional products is very common.

RURAL WOMEN'S FORESTRY ACTIVITIES AND THE AMOUNT OF TIME ALLOCATED TO THEM.

It was learned from the survey that a major concern of rural women is the amount of time expended on forestry activities. The amount of time they spend on forestry activities is linked to a number of other activities and conditions. These include occupational activities such as farming, environmental and socioeconomic conditions. For example, the length of time a woman can devote to forestry activities is limited by her responsibility for domestic activities such as meal preparation. As shown in Table 7, rural women have a long and heavy schedule of hard work.

The time allotted to the various roles indicated in Table 7 may vary slightly from village to village, and from woman to woman within the same village. For example, while some collect fuelwood in the morning for the day's cooking, others collect fuelwood after the day's farm work for use that evening and the following morning. The latter is more common.

Table 7. The average time spent on general activities per day.

Activity	Time
House chores Cleaning Water fetching Personal health care Child care, Meal preparation, Organizing tools needed for the day's farm work, Walking to farm	5.00 a.m. - 8.00 a.m.
Economic/domestic activities Farm work Meal preparation Fuelwood production, Trading	8.00 a.m. - 5.00 p.m.
House chores Child care Meal preparation Cleaning Crafts Petty trading)	5.00pm - 7.00 p.m.
Social activities Church Visits Local group meetings).	7.00 p.m. - 9.30 p.m.
Sleeping time	9.30 p.m. - 5.00 a.m.

Occupation

The allocation of women's time for forestry activities is done in close relationship with other jobs such as farming, the major occupation among the women. Farming is done both outside and inside forest reserves (taungya system). The amount of time rural

women are able to spend on forestry activities is influenced by the extent to which they are occupied by farming activities.

Farm activities are dictated by the season. For example more time is spent on farming during the rainy season than later when the crops are established. The abundance of forest produce coincides with the planting season, but priority is given to crop planting and consequently, little time is left to carry out forestry activities. However, immediately before planting, that is the beginning of the rainy season, the clearing of bushfallow results in the removal of live trees and shrubs hence production of large quantities of fuelwood and therefore a shorter time can be used in the collection. To the women, this is an advantage as the fuelwood becomes a by-product of farming and is produced in a relatively short period of time. It was also reported that during this particular period of farming, snail collection is more easily carried out. If more efficient implements were used in farming or if mechanization were to be introduced, women would require less time for farming activities and would have more time available for forestry activities.

Once the crops are established, the women revert to forestry activities. Until the agricultural crops are ready to harvest, the forest provide both food and income. This is mainly during the dry season. All forestry activities however are not carried out at the same time of the year.

Household Chores and Forestry Activities

Rural women have daily and personal domestic household chores that they must perform irrespective of other duties they undertake. This basically includes,

housekeeping, personal and community duties. Their primary role is to ensure that the family is properly fed; the gathering of forest products such as fuelwood and forest foods fulfils part of this responsibility. Fortunately some of the household tasks tend to be compatible with the forestry activities. These tasks may overlap but nevertheless women manage to meet all of their responsibilities. For example, while one is processing palm oil, she could also be selling fuelwood from her home and taking care of her children. In some cases however, household chores conflicts with other activities including forestry activities. The amount of time spent on forestry activities therefore depends on the circumstances of the household.

The respondents indicated that, although they spent time harvesting and preparing the forest products for domestic purposes, the time spent on collection of each product varies. For example, while an average of four hours twenty minutes is spent on the collection of wrapping leaves, three hours 10 minutes is spent on collection of fuelwood per week. It was noted that within the group of forestry activities, charcoal manufacturing is the largest single user of time. Sometimes, there are conflicts in the performance of household chores and domestic forestry activities. Amongst all the household chores and forestry activities, meal preparation was the greatest single user of time.

Considering household chores and commercial forestry activities, no conflicts exist between the two because, generally, very little time is spent on household chores. However, the single task of charcoal manufacturing (a commercial forestry activity) takes more time (an average of 48 hours 30 minutes per week) than any other single activity. If

typically rural women have 99 hours (Table 7, minus sleeping hours) a week to spend on all activities, then charcoal manufacturing takes almost half the time per week for someone involved in its production.

It was noted that neither group (commercial or domestic collectors) set aside any time for rehabilitation of the forest. If rural women utilizing the forest for domestic purposes are to contribute to forest tending and also have enough time for other activities, the time allocated for meal preparation must be reduced by introducing efficient stoves and improving ways of manufacturing charcoal.

To get commercial oriented women to be involved in forest tending programs will mean improving the techniques of charcoal production on a large scale to reduce the manufacturing time.

Environmental Conditions and Forestry Activities

Rural women have many duties to perform, and would therefore like to allot their time to various activities such that they can retain the same productivity. Since the amount of time spent on forestry activities is a function of accessibility, proximity and abundance of the forest resources, women have little control over the amount of time required to conduct such activities.

It was observed that the type and abundance of vegetation surrounding the villages strongly affects the number of trips one can make to the forest and the amount of time required to gather the produce. At Kyiraaso, Beposo and Anyinamso, the forest reserves were closer to the villages and the land outside forest reserves was relatively rich

in plant and animal species compared to the other two villages (Betinko and Siribuoso), consequently it takes less time and less trips to gather forest produce in those three communities.

For example, women in villages with abundant forest resources walk between one-half and two kilometres a day in order to obtain the required forest produce. The whole week's collection of snails at Beposo takes one to four hours, and respondents make one or two trips a week in order to meet the household needs. Unlike the forest-abundant areas such as Beposo, respondents at the less forested areas for example Siribuoso, walk one to six kilometres and have to spend an average of 12 hours per week on the collection of snails for domestic use. The trekking distance as well as the time needed to collect the produce increases the overall time involved and thus their working day is consequently prolonged.

Time Spent on Domestic and Commercial Forestry Activities in Relation to Socioeconomic Factors

Factors such as, marital status of a woman and the composition of the household, land tenure, and education, affect how much time is spent on harvesting of forest resources.

Marital Status and Composition of the Household - Whether a woman is married and whether she is married to a rich or poor man are major factors in determining the amount of time she spends on forestry activities. Those who are not married and have the whole responsibility of financing the household rely upon forestry activities to meet their

financial needs. Women who through marriage are financially independent spend little time on the collection of forest produce and purchase most of their needs. In such cases, their husbands often own land immediately outside the villages and therefore they need to spend relatively little time to acquire forest produce if they wish to do so. They also have the assistance of other people if they wish it.

The composition of the household also affects the time spent on forestry activities. For example, some of the women engaged in the study are members of polygamous marriages which in turn results in bigger household numbers. Under such circumstances, more time is spent on the collection of forest produce in order to meet the needs of members.

Children although they are consumers, may also play a large part after school or on Saturdays in the collection and transportation of forest produce within any given household. Under some circumstances, children irrespective of their sex may be sent alone to collect produce thus reducing the amount of time spent by women. Men sometimes accompany their wives to help collect but rarely assist in transporting the produce. Normally, the transportation of the produce is done by women. Men's involvement reduces the amount of time women must spend on a particular activity.

Land - The collection of the non-timber forest products is forbidden on an individual's land but not on community land. Produce such as snails and wrapping leaves could be collected from any piece of land except when crops are established on the land. All products can however be collected in the forest reserves by anyone provided a permit is obtained from the Forestry Department first. Normally less time is spent on the

harvesting of forest produce within forest reserves because the produce is available, while more time is required when collecting on community lands which are often degraded.

Individuals who own land do collect forest produce from it in addition to collecting from community and forest reserved areas. Women rarely own land; they therefore are usually restricted to public forests.

Education - Thirty percent of the respondents had some formal education and it was observed that most of them were engaged in petty trading in items such as matches, candles, and kerosene. Very often, the educated choose to buy the forest produce they needed and spend very little time on the collection because they have to attend to their businesses. Those with no or very little formal education rely mainly on the land to meet their daily needs hence longer periods of time are spent by them on the collection of forest produce.

Summary

The factors determining the amount of time available for forest activities are the same for both domestic and commercial purposes.

Fifty percent of the respondents cited environmental factors, that is proximity, accessibility, and abundance of the forest resources as the major issues determining how much time is spent on harvesting the forest produce. Twenty-four percent of the respondents thought the major factor was household chores, nine cited socio-economic conditions and four thought it was due to their farming activities.

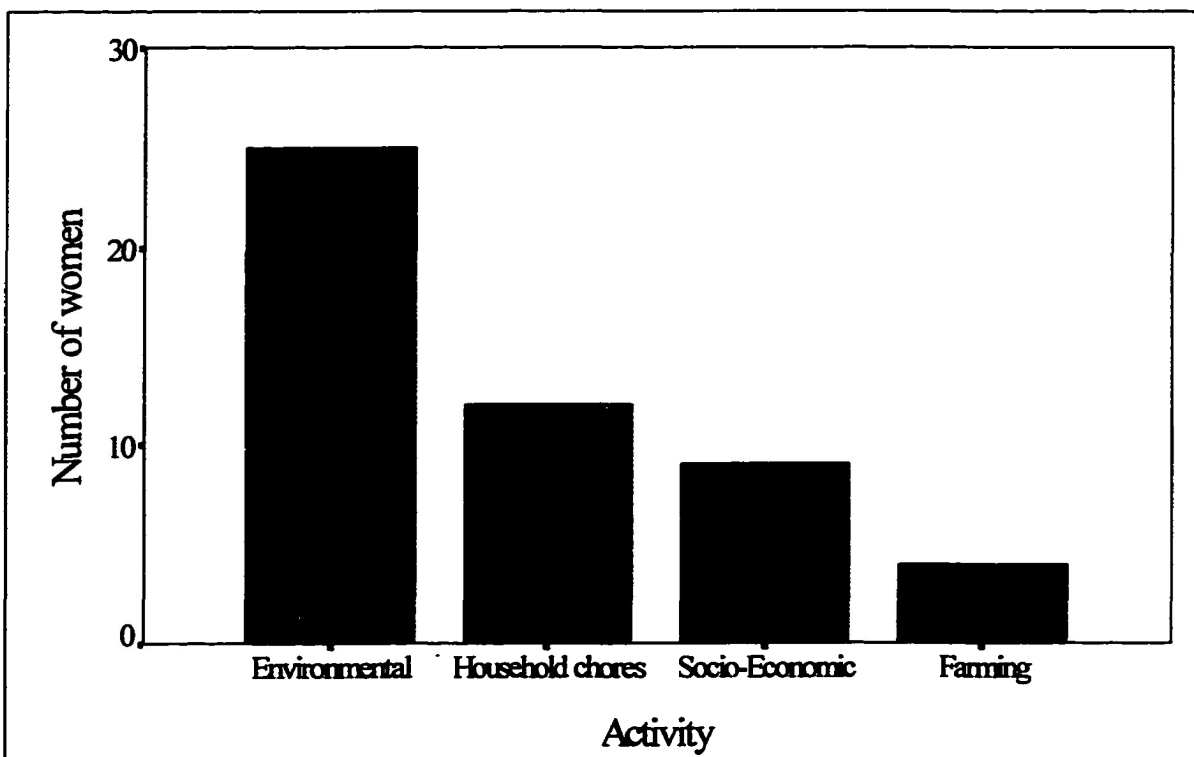


Figure 7. The most significant conditions and factors that conflict with women's forestry activities.

It was noted that women do not consciously put in any time to replenish what they take away. The taungya system in which the Forestry Department requires them to maintain the tree crop as well as their food crop is the only conscious way by which they contribute toward rehabilitation of the forest. There are however implicit ways in which they contribute to the conservation of the resources and these will be discussed in detail later.

EFFECTS OF WOMEN'S ACTIVITIES ON FOREST RESOURCES

As part of the research, observations were made concerning the effect women's activities have on the forest. This was done to determine whether the collecting of forest produce detrimentally affected the resources or not. It was observed that some but not all activities do cause degradation of the forest. For example it was noted that some gathering processes as well as shifting cultivation practices, and the use of bushfires did degrade forest land.

Forest Food and Fodder

In the collection of tree bearing forest foods for domestic use, large quantities are not collected and therefore the fruit trees are not harmed. When collecting for commercial purposes however, young men are engaged to climb the trees to collect all the fruits and sometimes unripe fruits are picked and branches are broken which affect fruiting the following year. In some cases, the branches are intentionally cut with a cutlass to make picking of the fruit easier. The cumulative effect of this practice is serious and indeed may result in the elimination of certain species.

The indiscriminate use of tools, such as the cutlass, has a detrimental effect upon the vegetative area. Sometimes plants which may be useful are destroyed in order to collect preferred items more easily. The collection of forest foods, either for domestic or commercial purposes, usually does not have a serious effect on the forest resources.

Fodder collection in the study area does not contribute to the degradation of the forest resources. This is partly due to the fact that the amount of fodder removed is comparatively small in comparison to the amount available.

Fuelwood and Charcoal

Gathering of fuelwood for domestic purposes does not normally degrade the forest. This is normally due to the fact that it is mostly dead trees that are utilized.

The collection of fuelwood for commercial purposes however involves the removal of large numbers of live trees that affects the composition of the forest to some extent which in turn can lead to possible extinction of particular species as preferred species are a target. The kind of machinery used may add to the problem. For example, equipment such as axes and chain saws are used for the felling of live trees for fuelwood purposes. During the harvesting process, other live trees may be killed. In addition to this, driving of trucks through the production site to convey the prepared fuelwood may harm saplings.

In addition to cutting live trees for charcoal production areas are cleared, holes are dug in the forest for the burning process of the charcoal and finally fire is set in the forest. When the charcoal manufacturing is finished the pocket of treeless land used as the production site is abandoned. The fire set in the forest for the manufacturing of charcoal sometimes when not properly extinguished, can start bushfires.

Forest Medicine

Forest medicines used for domestic purposes are obtained through the careful removal of leaves, barks, roots and twigs. Usually this does not cause permanent damage to the plant and in any case the number of plants affected is relatively small.

Occasionally a plant or its bark may be completely removed. Harvesting of medicinal plants for commercial purposes does have considerable detrimental effects upon the forest resources.

Raw Materials for Utility Items

The collection of food wrapping leaves is done by removing the mature leaves from plant to plant and discarding useless ones. This process of collection does not cause any negative effect on the resources. The species used have the ability to regenerate quickly when there is enough rain water in the ground. Regeneration may still take place when conditions are relatively dry but not as quickly as when the soil conditions are moist.

Live trees are cut mostly by men for the carving of mortar and pestle. The cutting of tree species suitable for the preparation of these items poses a great threat to deforestation in the study area. Large quantities are cut for sale on commercial basis, hence certain species are nearing extinction and deforestation is on the increase. The damage caused to the forest is almost at the same level as fuelwood extraction.

Although canes are becoming scarce in the study areas, their collection is not resulting in deforestation, however it does reduce the species diversity of the forest. The

use of canes for the manufacturing of baskets and other items is hampered because of a growing shortage of cane causing rural women to resort to using substitutes such as palm fronds.

The extraction of wood for chewing sticks has a negative effect on the forest due to excessive cutting of relevant tree species. Cutting of trees and climbers for bathing and chewing sponge affects the species diversity of the forest but does not contribute much to deforestation since certain preferred species are targeted. The gathering of such raw materials for domestic use does not have dwindling effects on the resources since normally small quantities are collected.

Farming

Mixed systems of farming exist in Ghana and are practised by both men and women. One of them is permanent agriculture which largely involves cash crops, for example, cocoa, rubber, oil palm, and citrus cultivation. Another is shifting cultivation practised for staple crops such as maize, cassava, plantain, and cocoyam. These staples are not only cultivated to meet the farm family's subsistence requirements, but are considered by the farmer as an important source of income since ready markets exist for such staples.

Clearing of land for farming purposes leads to land degradation in many instances. After the land is cleared, fire is used to burn the debris. After two or three growing seasons, the farmer abandons the land and move to another piece of land and starts the process again. When left to fallow, the land is usually overgrown with a

common weed called 'Acheampong weed' (*Eupatorium odorata*). This movement from one piece of land in favour of another continues and is normally referred to as the shifting cultivation system. This farming system of shifting cultivation lead to the loss of diversified species from the originally forested land since after clearing the land certain plant species which used to be present on that piece of land may not regenerate again due to the tools or methods used in clearing for example, fire. This will eventually result in land degradation as this piece of land is farmed over and over again. Farming activities are not carried out by women alone but they are also part of the farming community.

In practising the taungya system, the women are expected to tend the trees planted. The tree species normally used include; *Tectona grandis*, *Cedrela Odorata* and *Triplochiton scleroxylon*. By so doing, they contribute to the rehabilitation of parts of the forest reserves which may have been burned through bushfires. Due to the luxurious growth of their food crops under the taungya system, the women acknowledge the fertility of the soil inside forest reserves and also the protection trees give to their crops. Again, considerable knowledge is acquired on tree maintenance from the taungya system. It is normal in the study area to find trees on farms outside forest reserves providing the same services as the taungya system does, but those trees are not intentionally planted. Apart from leaving an existing tree on their farms outside forest reserves none of the respondents had intentionally planted trees on her own.

Bushfires

Bushfires have been used traditionally throughout Ghana as a means for hunting and land preparation. Indiscriminate use of fire however does have a destructive effect on forest resources resulting in land degradation. The issue of bushfires is therefore a controversial one.

In addition it should be noted that there are some ways in which women inadvertently start bushfires such as; transporting burning fuelwood to start a cooking fire on the farm and failing to extinguish fires after preparing meals on the farm, that in turn contribute in a minor way to the larger problem noted above.

Rural Women and Decision Making

Beyond the taungya system where the Forestry Department staff meets with women to discuss forestry issues and provide technical advice, no formal meetings are organized by the women. Forestry decisions are however made either by an individual, a family or a group.

On an individual basis, a woman may decide for example not to continue harvesting a particular product because it is immature or there is no market for it. Individual women also make decisions at the household level concerning what products are needed in the house. For example, the woman decides at what point it is necessary to replenish the supply of fuelwood for the household.

Family members may discuss around the fire after an evening meal how the harvesting and processing of the forest resources is proceeding, for example the time

required to collect, and market alternative products. Decisions arrived at from such discussions are usually made at the family level.

Rural women who collect a particular item may form a group that in turn makes decisions concerning harvesting and marketing practices. Such groups function informally and meet only when the need arises.

Discussion of forestry issues at the community level are usually between chiefs and elders therefore essentially excluding women. The respondents were of the view that if they were invited to meetings to discuss forestry issues they could make a significant contribution. In their view in order to incorporate their needs into forestry programs they must be participants in the higher decision-making process. They must be given the opportunity to learn new technologies but more importantly they should have the opportunity to contribute their vast practical knowledge. A major objective of improving the decision making process is to improve the health of the forest whilst reducing the work load of women. Forest demonstration units are a practical and effective means of showing women alternative practices.

Summary

Some forestry activities if not carefully carried out may result in a reduction or eradication of some particular species and in some cases deforestation of an area.

Normally the collection of forest foods does not significantly harm the forest. Similarly the extraction, particularly for domestic use, of forest medicine, food wrapping leaves, canes, chewing sponge and bathing sponge does not cause serious deforestation.

If the harvesting of such items for commercial sale however is not done more judiciously, some species will become extinct. For example the harvesting of fuelwood for commercial purposes and the manufacture of charcoal is causing major deforestation problems. Similarly, the removal of live trees for carving of mortar and pestles, and the manufacture of chewing sticks are a threat. This problem is made worse by the fact that the commercial market continues to expand.

It was noted that apart from making forestry decisions at the individual, user group, or family level, rural women are excluded from the decision making process generally.

CONSERVATION AND JUDICIOUS UTILIZATION OF FOREST RESOURCES

In the performance of their domestic duties, rural women have a way of optimizing the use of forest products thereby consciously or otherwise reducing the need to repeatedly return to the forest to collect the same product. This judicious utilization of resources helps control activities that could lead to the excessive collection of forest resources.

Recycling of Used Pestles

Instead of throwing away used household utility items some are restored thereby extending their usefulness. For example, when pestles used for pounding staples such as maize wear out and splinters from the pestle make the food unsafe, they are refurbished. This is done by recarving the head and soaking it in water. This recycling process reduce the actual amount of wood removed from the forest to produce this important utensil.

Use of Fuel

Women in the study have adopted two methods of conserving fuelwood used for meal preparation. One is to burn the husks removed from various agricultural products such as palm fruit husk, in conjunction with fuelwood. This results in a hotter fire at least for a short period, and reduces the actual volume of fuelwood used. A second method is to remove any red hot embers after the cooking is complete and douse them with water. This 'charcoal' that is produced is then used for subsequent fires.

Preservation of Forest Foods

Rural women do not normally harvest immature forest foods, for example, young snails are not collected because the women know that they will eventually be of harvestable size. Some forest foods are dried or smoked to prevent them from being wasted and by so doing the women do not make repeated trips to the forest to collect the same product.

Preservation of Medicine

In the collection of forest medicine, the respondents dry the excess and store them for use at a future date. In some cases, the medication demands the drying of the leaves but the fact that they preserve medicinal plants reduces the number of collection trips women must make.

Tree Conservation

Under the taungya system, the women agree to tend the trees in conjunction with their agricultural activities. On the respondents' farmland, certain tree species are also preserved for specific reasons. One reason is the value of the tree for timber; common species include, *Maclura excelsa*, *Mansonia altissima*, *Triplochiton scleroxylon*, *Terminalia ivorensis*, *Terminalia superba*, and *Ceiba petandra*. Another reason is the medicinal use of the tree, for example the 'akakapenpen' tree. The partial shade a tree gives to food crops preventing the food crops from the effects of the scorching sun is

another reason. The 'akakapenpen' tree serves the same purpose due to its light crown nature.

Collection of Leaves

Generally immature leaves of plants are not collected. For example, during the collection of food wrapping leaves, the women select the mature leaves and leave the soft young ones at the apex of the plant in order for them to grow to replace the mature ones. All of the plants are not removed because the collectors know that leaving some plants will lead to their multiplication. Possibly their role as mothers in taking care of children leads them to treat plants in such a tenderly manner.

Advice to People

Women help in the conservation of the forest resources by offering advice. It is common to see them correcting others, especially young people, who are damaging the resources. Women describe the consequences of such actions and why they must be discontinued. In addition to providing advice, the unnecessary cutting of a tree may be reported to the elders of the community, or in a situation involving a child to his or her parents.

Summary

Rural women assist in a variety of ways in the conservation of the forest resources. They see their actions explicitly in terms of saving time and money mainly.

Implicitly such actions also reduce the demand placed upon the forest. Not all women however practise such measures.

CHAPTER 5

DISCUSSION

The study confirms a number of findings documented by earlier researchers but as well raises new points concerning the utilization and conservation of forest resources by women. It considers the role that time plays in women's forestry activities, the effects that such activities have on the forest and the role that women play in decision making. The various reasons given for women's involvement in forestry activities and their preferences among forest products and services are shown.

UTILIZATION AND CONSERVATION OF FOREST RESOURCES

According to the literature, the primary role of women in forestry is collecting, processing and marketing of non-timber forest products for household sustenance and as a source of income (Falconer 1990; Fortmann 1986; Fortmann *et al.*, 1985; Hoskins 1980 and Molnar 1991). This is true for rural women in the high forest zone of Ghana. The study further corroborated their involvement in the establishment of plantations under the taungya system for both conservation and utilization purposes. It also lends credence to the fact that the collection, processing and utilization of non-timber forest produce is dominated by women.

The types and distribution, seasonality and availability, uses and importance, and other properties of these products are well known to rural women. The respondents have a substantial breadth of understanding of the forest components and their value.

For example various types of forest produce are collected by rural women including, fuelwood, forest foods, game, medicinal plants, fodder and raw materials for utility items such as pestles and food wrapping leaves. Table 4 shows that a total of 153 different species of forest plants and animals were cited as being used by the respondents. Rural women can identify and distinguish the characteristics of each. They also know exactly where these particular species are found in the forest. Respondents in heavily forested areas cited more species than those in less forested areas. Contrary to this however, a study by Ireson (1995) in Lao People's Democratic Republic encircled by Burma, Thailand, China, Vietnam and Cambodia showed that the number of items listed per village did not seem to correlate with the abundance of forest resources. The composite list for villages with access to old growth were not noticeably different from the list for villages without such access.

Rural women know which season is best to harvest which product. Most forest foods are picked during the rainy season; fuelwood however, although it may be harvested year-round is collected primarily in the dry season. Seasonality of some forest foods is indicated in Table 5. Sixty percent of the respondents were of the view that forest foods were becoming less abundant.

The availability and cost of various forest products are known by women. The purchase and selling prices of the produce either for domestic or commercial purposes are

also known. For example Figures 3 - 6 depict the knowledge women have concerning fuelwood availability and cost. Ardayfio-Schandorf (1986) noted a sharp increase in household expenditure on fuel from one percent to 16.3 percent in only a few months. A distinction was however revealed in the present study that there are differences in cost depending on whether it is for domestic or commercial purposes. Concerning fuelwood for domestic purposes, 70 percent were satisfied with the cost (see Figure 4). In terms of cost on commercial basis, 18 percent of the respondents showed satisfaction with the selling price of fuelwood (Figure 6). Fuelwood for commercial use experiences sharp increases in price.

Women have devised many uses for forest products, the study divides the uses into categories - see Table 6. In addition, Appendix IV shows the uses of several plant species for the cure of a wide range of diseases.

This kind of traditional, economic, environmental and socio-cultural knowledge concerning forest products should be utilized for the planning of forestry programs including agroforestry projects as well as guidelines for related research.

In addition to confirming the earlier findings, it was noted in the study that certain activities are undertaken that directly or indirectly result in the conservation of forest resources. Examples include the conversion of red embers into charcoal when using fuelwood to cook and the use of recycled pestles. It seems that such actions are deliberately taken to save time and money but implicitly they contribute to the conservation of the forest.

REASONS FOR WOMEN'S INVOLVEMENT IN FORESTRY

As has been noted in studies by researchers such as Molnar (1981) and Hoskins (1980), the basic reasons for women's activities in the forest are either for income generation or household sustenance purposes. Facets of these two major reasons are revealed in this study. There are a set of underlying reasons that explain why women participate in forestry activities namely; economic, food, domestic, health, spiritual, social and demographic purposes. The nature of the forestry activities undertaken by the respondents reflects particular reasons. Priorities vary from village to village as shown in Table 1.

All 50 respondents rely upon some forest products to sustain their households. Forty percent of the respondents however gave the principal reason for utilizing forest resources as economic. In addition to this, the domestic user on a small scale and the commercial user on a large scale benefit economically from the utilization of forest products. However the researcher believes that the majority of respondents who give the principal reason as economic are commercially oriented. It may be concluded that in order to get women to participate in various programs, their specific interest must be identified and targeted.

VALUE AND IMPORTANCE OF FOREST PRODUCTS AND SERVICES

Particular products are rated high by respondents whose main interest is the commercial use of the forest. From Table 2, products such as pestle, fuelwood, and bushmeat are cited as the top preferred products at Anyinamso, Kyiraaso, and Siribuoso respectively. Such produce can be gathered in large quantities and transported to other places for distribution and sale or can be sold directly to local consumers. Some products may increase in monetary value relatively rapidly. Because rural women are aware of price changes they remain prepared and ready to sell whenever it is advantageous. For example, Asibey (1986) reported that in Ghana, the price of grasscutters (bushmeat) increased from an average of 84 cedis (\$0.17 Canadian) per kg in 1980 to 658 cedis (\$1.32 Canadian) per kg in 1986 compared to 272 cedis (\$0.54 Canadian) for beef. A similar case prevails in Abidjan, the capital of neighbouring Cote d'Ivoire, where the price of grasscutter meat is 80 percent higher than that of beef. According to a survey of the Subri Plantation Project (Ghana) conducted by Korang (1986), the respondents considered the loss of bushmeat as the worst impact of forest land being converted to agricultural land in the area. The preference given to some forest products indicate that integrating these products into forestry programs such as agroforestry will encourage women to participate in such programs. For example, domesticating and incorporating grasscutters in the establishment of woodlots and pasture, an agrosilvopastoral system will be a useful project for women to undertake.

The rating of forest products and services by the domestic oriented respondents revealed that fuelwood, soil fertility, and water quality and quantity for example were of

the highest value (see Table 3). For one of the villages, soil fertility was ranked first on the top ten preferred products and services while in another village, water quality and quantity was first on the list. Four of the five villages studied mentioned forest services as a preferred benefit from the forest. The high ratings of forest services and the general appreciation shown by the four villages give an indication that rural women are conscious of land degradation and efforts to include them in forest conservation measures would be welcomed by them. Fruits ranked high in four of the five villages, hence women could easily be encouraged to incorporate them into their farm production.

Fuelwood was rated as a priority for both commercial and domestic purposes. Amoako-Nuamah (1992) argued that fuelwood is an indispensable commodity in the household. Other products that were regarded as a priority for commercial value were not necessarily viewed as priority items for domestic use. Rural women's involvement in forest conservation programs will depend on whether the preferred products and services are part of the benefits to be derived from such programs. The fact that many of the same products and services are preferred by the respondents facilitates the development of social, community forestry and conservation programs.

PROBLEMS AND CONCERNS OF RURAL WOMEN

Ardayio-Schandorf (1981), noted in a study on the role of women in fuelwood production in Nigeria that rural women have to work longer hours in highly degraded areas compared to less degraded ones. This reflects the pressure placed upon women who must meet family requirements when working in highly degraded areas.

That situation was confirmed in this study. Rural women carry out many and varied activities throughout the day as shown in Table 7. Time according to them is a key factor in undertaking both forestry and non - forestry activities. In Ardayfio-Schandorf's (1981) Nigeria study, factors that affected women's time in forestry activities were socioeconomic, environmental and other occupations engaging women.

In addition to the factors identified by Ardayfio-Schandorf this study revealed that women's household chores, particularly meal preparation, were a major time consuming activity. In total more time is spent on meal preparation than on harvesting of any single forest product for domestic purposes. Among the commercial forestry activities considered in the study charcoal production occupies most of the women's time.

Educated women and women married to men who are relatively well off financially spend less or no time on forestry activities. The 30 percent of the women who have had some formal education were engaged in other forms of income-earning activities such as petty trading and sewing. Thus as economic circumstances improve either through marriage or education there is less tendency to rely on the forest. Those with little or no formal education however continue to rely on the forest resources in order to meet their daily requirements. Most women do not own land and therefore cannot easily establish their own farms.

Figure 7 shows that 50 percent of the respondents were of the view that their time is affected by the environmental conditions of an area. Women at Kyiraaso, Beposo and Anyinamso are close to the forest reserves and land outside the reserves is much richer in plant and animal species compared to that of Betinko and Siribuoso. The forest produce

is therefore more accessible and abundant in the former villages. Those at Betinko and Siribuoso have to walk longer distances and spend more time on harvesting than those at Kyiraaso and Anyinamso. For example, women at Siribuoso walk up to six kilometres per day, spend an average of 12 hours a week and make three trips a week to collect snails to meet the needs of the household. Those at Beposo cover 1-1.5 kilometres per day, spend one to four hours a week and need to undertake one or two trips to meet their needs although the two villages are within the same ecological zone. The situation at Siribuoso is similar to the case of women in Gadkharh village in India where deforestation has forced the women to walk up to 12 kilometres per day and leave before dawn in order to collect the fuelwood necessary for meal preparation (Sheth, 1985). Deforestation is proceeding at varying rates amongst the communities in the study area. It follows that women in more degraded areas should be the focus of new practices and appropriate technologies at the household level. This might include for example the introduction of improved stoves and the integration of agroforestry and social forestry initiatives.

Other conditions such as the availability of the produce, access to market, lack of capital, lack of land, alternative commercial activities and processing and manufacturing skills contribute to determining the purpose of harvesting as well as the product to be collected since these are common concerns among the respondents. The World Bank (1988) for example reported that women are prevented by land owners from planting trees on leasehold land for fear of losing their rights to the land. Having identified these issues, introduction of agricultural techniques such as agroforestry on croplands could

provide more of the forest products required by women. Providing credit facilities to the women would improve the marketing of such produce. Assisting women in developing the necessary skills in the manufacture of forest products would limit waste in the use of raw materials and add value to finished products resulting in higher income earnings.

INTRODUCTION OF FORESTRY PROGRAMS AT THE COMMUNITY LEVEL

Deforestation is increasing and because of this more time is spent on the collection of non-timber forest products since longer distances need to be covered to get to the collection site. It was noted in the area of study that the main forest conservation activity women undertake is taungya farming within forest reserves. Wagner *et al.* (1993) stated that deforestation has occurred on lands outside the reserves however those lands are not devoid of forest cover. Such land could contribute significantly to local needs if the users were to adopt effective forest conservation practices.

Users of land outside the forest reserves include women as well as men and therefore both should be included in forestry programs. But because women have much more contact with the forest they can be the focus of training, planning and the implementation of various forest conservation practices.

There is the need to make rural women responsible for the establishment of nurseries that would provide multi-purpose tree species for local use. This will facilitate the practice of agroforestry technologies such as alley cropping, plantations, boundary planting and inter-cropping. One of the benefits of these agroforestry technologies is that

products such as fuelwood, fodder, yam stakes and poles for domestic construction would be readily available thereby saving women several hours a day. This would reduce the amount of time currently needed to harvest and transport essential domestic commodities. The extra time that would then be available to the women could be directed toward forest conservation activities and social concerns such as health programs. In addition to the economic value from such conservation measures there are environmental values or forest services, that benefit initially the women and subsequently the community at large. Effective agroforestry practices for example have positive effects on both agricultural and tree crops.

FACTORS DETERMINING THE EXTENT OF WOMEN'S INVOLVEMENT

The age, marital status, education and religious background of the women determine the extent of their involvement in forestry activities. Married women especially those married to 'rich' men rely less on the forest resources while the opposite is true for the unmarried. Polygamous marriages lead to larger families. Under such marital arrangements even though women have more help in carrying out their forestry activities the net result is a faster degrading forest. Most of the women have little or no education. Formal and informal education is necessary if for example polygamous marriages are to be discouraged. In turn this will result in smaller numbers of people per household.

Other factors including lack of capital, lack of manufacturing skills and availability of the produce determine the extent of women's involvement.

It was noted for example in this study that although most non-timber forest products are in abundance during the rainy season, priority is given to farming. Similarly Canancoo, (1992) noted that during the rainy season less priority is given to the sale of mortar and pestles since the demand for such products is less.

EFFECTS OF WOMEN'S ACTIVITIES ON THE FOREST

An increase in deforestation gives rise to soil degradation and drying up of water bodies. The causes are many including certain human activities such as land clearing for farming, bushfires, logging, and fuelwood extraction. At the local level, forest fires, grazing and growing demands for fuelwood and fodder contribute to the loss of forest (Asare, 1988).

It was found that to a very large extent the activities carried out in the forest for domestic purposes do not cause much damage to the resources, rather it is the harvesting and collection for commercial purposes that is the most harmful. There is a need for extension education to emphasize the implications of overharvesting on a commercial basis to help prevent the increasing depletion of the forest resources. His Majesty's Government (HMG) of Nepal in the formulation of the National Conservation Strategy for Nepal noted that women are rarely included in any phase of a development project including planning, policy and management of village extension work. The strategy goes on to say that assigning a woman staff officer the job of coordinating and ensuring women's participation in various stages of a project would seem to be a logical step

(HMG/IUCN, 1988). Hoskins (1979) has argued that women make better technicians and are efficient in extending forestry knowledge to rural women since they better understand working with them. The data from IRNR (Appendix I) and the School of Forestry, Sunyani, Ghana (Appendix II) show an increase in number of trained women although the numbers are still low to meet the demands of rural women. Training and educating more women will encourage their participation in forest conservation activities and decision making beyond the household level since ignorance, poverty and illiteracy will be reduced.

The method of collection and the quantity of fuelwood collected for domestic purposes causes minor harm to the forest. On the other hand if fuelwood is being harvested for commercial purposes power saws are used and the volume of wood harvested usually leads to forest degradation.

When forest foods are harvested for household use the quantities collected are relatively small compared to collection for commercial purposes. In order to obtain sufficient quantities for sale, young men are engaged in climbing trees and picking all of the fruit and in the process of doing so, some tree branches are broken which has a bearing on the following year's fruiting capacity. The use of tools such as cutlasses in collecting produce can also rob the forest of useful plants. Rural women engaged in commercial activities need to be made aware of the detrimental effects that large scale operations have on the forest and hence the need to be cautious about how the various activities are carried out in order to achieve sustained utilization.

WOMEN AND DECISION MAKING

Women in Nigeria (WIN), a national nongovernmental organization founded in 1982 is working to change women's subordinate position by using the concept of participatory methodology (Riley, 1992). The women are encouraged to speak out, ask questions, and make decisions. For women who are accustomed to being absent from most village meetings and silent when present, this is a rare opportunity. Molnar (1991), reported that there has been progress with the involvement of women in management decisions for the rehabilitation of forest in a number of countries where women are traditionally more outspoken, for example, in Nepal, Zimbabwe, Rwanda, and Northern India. Chen (1990), also noted that women in West Bengal have encouraged men to form forest protection committees for forests consisting of non-timber forest produce.

Contrary to such studies it was gathered from the interviews in the present study that rural women are left out of the decision making processes at the higher levels. They have never taken major decisions as, for example, the women in West Bengal. The WIN situation does not exist in these villages. It is only at the individual, family or group level that decisions by women are taken. Suggestions were made however as to how they could be involved in decision making at all levels other than just the individual, family, or group levels. These suggestions include the incorporation of the needs of women into forestry and conservation programs and making them familiar with new technologies and practices.

CHAPTER 6

CONCLUSIONS AND RECOMMENDATIONS

The project sought to meet certain objectives. They were to examine the relationship between rural women and the high forest, how their activities affect the forest resources, the effect that the forest has on their lives and finally to make recommendations as to how they can be effectively involved in the effort to achieve forest sustainability.

It has been shown that rural women depend heavily on the forest resource base to meet fundamental needs such as food, energy and water. To them, the forest serves as insurance against both hunger and destitution. Their livelihood is closely tied to the well-being of their forest base. They have vast traditional and practical knowledge and experience concerning the use of forest products, their availability, distribution, and seasonality.

It has been established that women appreciate forest services such as soil fertility and windbreaks in addition to a wide array of non timber forest products.

The study has further shown how the women in their own way contribute to the conservation of the forest. An example is the recycling of pestles. It was noted that a substantial amount of time is spent on the collection, processing, and marketing of non-

timber forest produce but no time is deliberately spent on forest conservation with the exception of the taungya system.

The amount of time the respondents devote to forestry activities is limited by the time required for household responsibilities in the case of domestic users and charcoal production within the activities of the commercially oriented users. Because women highly value forest services and depend heavily upon non timber forest products, if they have more time at their disposal, they could spend additional time on forestry activities and particularly forest conservation. Other factors hampering limited time available for forestry activities are market related problems such as, access to market, credit facilities, and the condition of roads.

The expansion of deforested areas results in women either spending more time in the collection process or their levels of production go down. In some cases both occur. Introduction of forestry programs such as those discussed on page 106 will result in the women having more time for conservation activities.

Women with education are more engaged in other income-earning ventures and spend less time on forestry activities. It was also established that the harvesting of the resources for domestic purposes did not result in significant harm to the forest, unlike commercial utilization which may.

Because of women's unique relationship with the forest their involvement in decision making should be greater than it is. Respondents cited how this might be accomplished. According to them, their needs should be reflected in policy and programs, for example introduction of improved cooking stoves that would reduce fuel

consumption and demonstration forests as training facilities for women in order to improve their skills and knowledge related to forest conservation.

Women's participation in forestry is essential in order to capitalize on their practical and holistic approaches. Women tend to be sensitive to the general state of the forest and therefore can influence in a timely fashion actions that may be detrimental to it. There is a strong need to recognize the important role women play in the use of the forest and of their understanding of the wide array of benefits provided by it. It is therefore imperative that women are integrated into forest resource management and decision-making processes. This in turn will help achieve the goal of forest sustainability.

RECOMMENDATIONS

The report has identified the following priority areas for action:

1. The Forestry Department's Social Forestry program, that is organizing people at the community level to carry out wide-scale tree planting programs, currently carried out in the savanna zone of Ghana should be extended to the high forest zone. For this to be successful, the current problems related to women's inability to raise capital and to own or control land must be addressed.
2. Forestry extension programs similar to those in the agriculture sector, should be implemented and focused on women involved in forestry activities. The Association of Women in Forestry (ASWIF) is a professionally and technically trained forestry women's group and should be involved in such an extension program. They can offer appropriate guidelines, suggestions, corrections,

encouragement and advice to their fellow women as to how sustainable utilization of the forest can be achieved.

3. Expand the role of women in the decision-making process beyond the family and user-group systems, by the amalgamation of the women user-groups and the community level structures.
4. As forestry conservation programs are developed and implemented they must incorporate the entire range of values of the forest as identified by the women including all of the non-timber forest products and the forest services such as water quality and soil fertility.

For the women to successfully implement such conservation programs there must be a revision of their time allocation, through the introduction of new technology and processes at the village level that will encourage them to undertake such forestry activities.

5. Women's knowledge with respect to preferred species, uses, tending and harvesting practices as it applies to forest foods and medicinal plants should be incorporated into the formal research and development strategies of both national and international research institutions.

The provision of this invaluable traditional ecological knowledge should be recognized through a fair royalty system including a consultancy agreement for the resource - women involved.

FUTURE RESEARCH

1. A similar study in the savanna zone of Ghana the results of which when added to the findings of this research will provide a basis for developing national policies and strategies concerning women and forestry.
2. An examination into the important role of extension education from a woman's perspective including professionally and technically trained women foresters and rural women who are directly involved in forestry activities at the village level.
3. A study of the effects that the traditional forms of land control and ownership have on land management practices and how it might change if women were to have the opportunity to own or control land on an equal basis with men.
4. An examination of the factors that lead women to place such high value on forest services such as soil fertility, water quality and windbreaks and how much the recognition of such intrinsic values might be incorporated into national forest conservation strategies and programs.

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APPENDIX I. Men and Women Professional Graduates from the Institute of Renewable Natural Resources (1985-1995).

Year	Total No. Of Graduates	Total No. Of Women Graduates	Total No. Of Women graduates (Forestry)
1985	15	1	nil
1986	22	4	1
1987	24	4	3
1988	30	2	1
1989	25	3	nil
1990	20	2	nil
1991	30	3	1
1992	32	6	2
1993	41	6	4
1994	43	7	5
1995	21	2	nil
Total	303	40	17

Source: Compiled from Institute of Renewable Natural Resources (IRNR), University of Science and Technology, Ghana, 1995.

**APPENDIX II. Men and Women Graduates From the School of Forestry, Sunyani,
Ghana. Women Were First Admitted to the School in 1974.**

YEAR	Total No. of Graduates	No. of Female Graduates
1974	25	4
1975	20	-
1976	22	2
1977	21	2
1978	20	1
1979	50	4
1980	33	2
1981	29	4
1982	29	1
1983	26	2
1984	33	-
1985	21	-
1986	30	-
1987	26	2
1988	23	2
1989	60	5
1990	71	4
1991	66	9
1992	70	7
1993	67	8
1994	84	9
Total	826	68

Compiled from Forestry Department Head office records, Accra, Ghana (1995).

APPENDIX III. Medicinal Plant Species and Related Cures According to the Respondents

Species Name	Type of Cure
Kagya (<i>Griffonia simplifolia</i>)	Stomach aches
Afuruma (<i>Voacanga africana</i>)	Waist pains and piles
Indian heliotrope (<i>Heliotropium indicum</i>)	Blood tonic, piles, boils
Madagascar periwinkle (<i>Catharanthus roseus</i>)	Piles
Kakapenpen (<i>Rauwolfia vomitoria</i>)	Waist pains, stomach troubles
Calaba bean (<i>Physostigma venseum</i>)	Healing bone fractures
Pamprama (<i>Coryanthe pachyceras</i>)	Abdominal pains
'Esresodua'	Boils and piles

APPENDIX IV. Tree Species Commonly Used for Fuelwood in the Villages and their Availability.

SPECIES/VILLAGES	Anyinamso	Beposo	Betinko	Kyiraaso	Siribuoso
1) <i>Albizia adiantifolia</i>	Medium	Medium	High	High	High
2) <i>Albizia zygia</i>	Medium	High	High	High	High
3) <i>Alstonia boonei</i>	Low	Low	Medium	Medium	Low
4) <i>Anigeria altissima</i>	High	High	High	High	High
5) <i>Alchornea cordifolia</i>	High	High	High	High	High
6) <i>Ceiba petandra</i>	High	High	Medium	High	Low
7) <i>Celtis milbraedii</i>	Medium	Medium	Medium	Medium	Medium
8) <i>Celtis zenken</i>	Medium	Medium	Medium	Medium	Medium
9) <i>Chlorophlora excelsa</i>	High	High	High	High	High
10) <i>Citrus sinensis</i> *	Medium	Medium	High	High	High
11) <i>Corynanthe pachyceras</i>	Medium	Medium	Medium	Medium	Medium
12) <i>Cola gigantia</i> *	Medium	Medium	Low	Medium	Medium
13) <i>Cylicodiscus gabunensis</i>	Medium	Medium	Medium	Medium	Medium
14) <i>Datura innoxia</i>	Low	Medium	Low	Low	Medium
15) <i>Drypetes floribunda</i>	High	High	High	High	High
16) <i>Elaeisguinensis</i>	Medium	High	High	High	Medium
17) <i>Ficus species</i>	Medium	Medium	Medium	Medium	Medium
18) <i>Ficus capensis</i>	Low	Medium	Low	Medium	Low
19) <i>Funtumia elastica</i>	Low	Medium	Medium	Medium	Medium
20) <i>Glyphae brevis</i>	Medium	Medium	Medium	Medium	Medium
21) <i>Holarrhena floribunda</i>	Low	Medium	Medium	Low	Medium
22) <i>Lannea welwitschii</i>	Low	Low	Medium	Medium	Medium

23) <i>Macaranga species</i>	Medium	Medium	Medium	Medium	Medium
24) <i>Magaritha discordea</i>	Low	Low	Medium	Medium	Medium
25) <i>Magnifera indica*</i>	Medium	Medium	Medium	Medium	High
26) <i>Mansonia altissima</i>	High	High	High	High	High
27) <i>Mollotus oppositifolis</i>	Medium	Medium	High	High	Medium
28) <i>Musanga cecropoides</i>	High	High	High	High	High
29) <i>Nesogodornia</i>	Medium	Medium	Medium	Medium	Medium
<i>papaverifera</i>					
30) <i>Persea americana *</i>	High	Medium	High	High	Medium
31) <i>Phyllanthus discoides</i>	Low	Medium	Medium	Medium	Medium
32) <i>Psidium guajava</i>	High	High	High	High	High
33) <i>Pterygota macrocapa</i>	Low	Medium	Medium	Medium	Medium
34) <i>Rauvolfia vomitoria</i>	Medium	Medium	High	High	High
35) <i>Terminalia ivorensis</i>	Medium	High	High	High	High
36) <i>Terminalia superba</i>	Medium	Medium	Medium	Medium	Medium
37) <i>Theobroma cacao *</i>	High	High	High	High	High
38) <i>Trichillia monadelphica</i>	Low	Medium	Low	Medium	Medium
39) <i>Triplochiton scleroxylon</i>	High	High	High	High	High
40) <i>Tarrieta utilis</i>	Low	Low	Medium	Low	High

* Agricultural Products

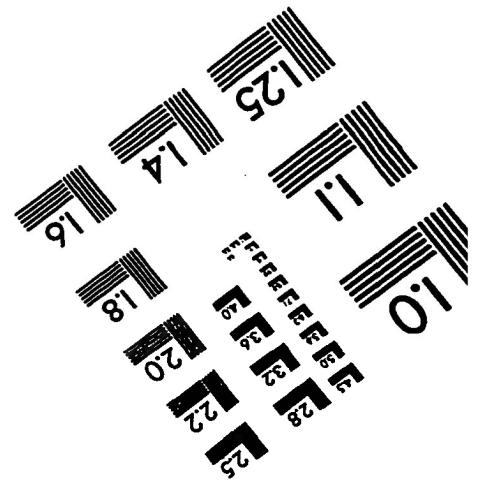
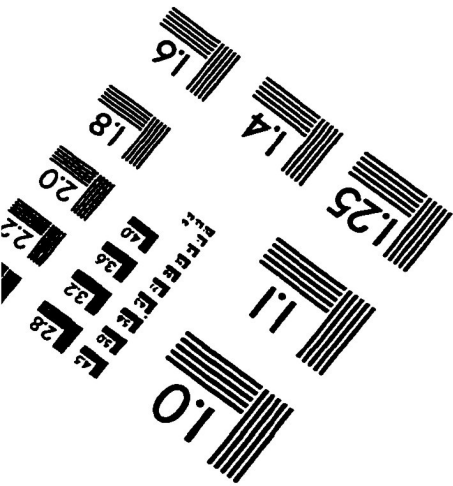
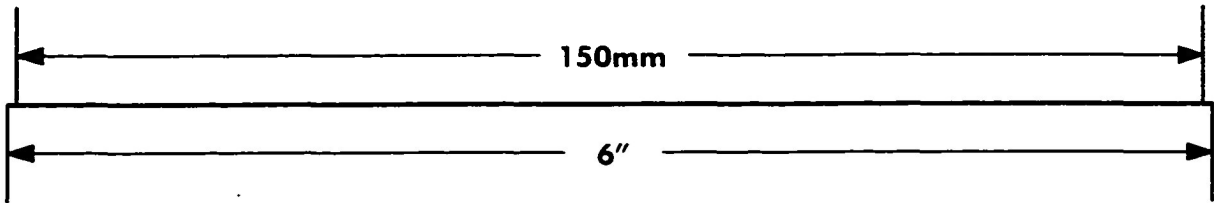
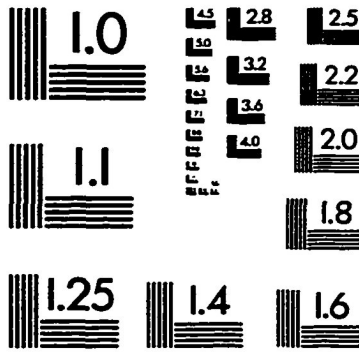
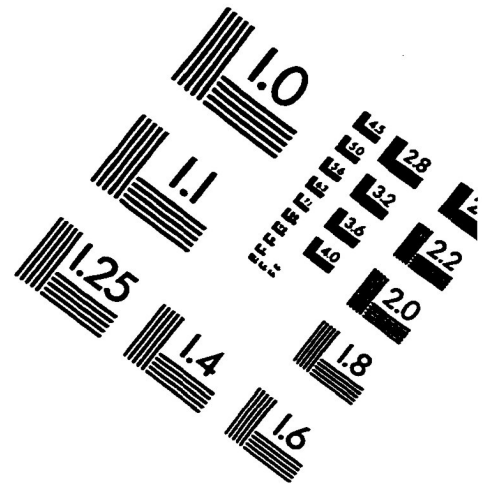
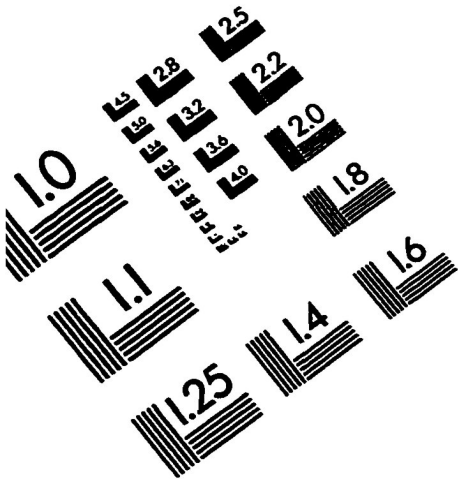
_ Most preferred fuelwood species

High - available and can be obtained

Medium - available but cannot be obtained easily

Low - rare species

IMAGE EVALUATION TEST TARGET (QA-3)



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