

WOMENS' LIVELIHOODS AND VUNERABILITY TO CLIMATE CHANGE

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CHAPTER ONE

WOMEN AND VULNERABILITY TO CLIMATE CHANGE

1.0 INTRODUCTION

There is growing evidence of changes in the interacting systems of the atmosphere, hydrosphere and biosphere as a result of the build up of greenhouse gases (GHGs) from atmospheric pollution (Liverman, 1989). This is a common concern of humankind. Existing scientific evidence points to the fact that this change is attributed to human activities that have substantially increased the atmospheric concentration of greenhouse gases and thus enhancing the natural greenhouse effect. Consequently, there is additional warming of the earth's surface and atmosphere, which may affect natural ecosystems and humankind.

As a result of increasing deterioration in the state of the world by climate change, the global community in 1992 at Rio de Janeiro adopted the United Nations Framework Convention on Climate Change (UNFCCC), of which Ghana is a party. In furtherance of her obligations under the Convention, the country undertook her study of greenhouse gas inventories, carried out her assessment of vulnerability to climate change and prepared her Initial National Communication in 2000.

Researchers evaluated how changes in climate may affect some important sectors of the economy. These included:

- Agriculture;
- Coastal resources; and
- Water resources.

Additionally, the assessments analyzed the scope and severity of the potential effects of climate change as a result of probable temperature rise; decreased precipitation and sea level rise.

In carrying out the assessments, there was no indication that women's vulnerability to climate change was addressed. Although several subject areas have been developed with respect to this issue, no research has been developed with regard to "Women's vulnerability to climate change" and a comparative mechanism is not in place.

To date no attention has been given to understanding specific ways in which changes in population and settlement density, economy and traditional practices are creating heightened vulnerability to women's livelihoods arising from climate change variations.

It is worth noting that many governments have recognized that there are important gaps in knowledge of the relationship between women's livelihoods and environmental problems arising from climate-induced change.

According to Ester Boserup, (1989) Africa is the region of female farming and fish processing and marketing par excellence. She goes on to expand her statement that in many African communities, nearly all the tasks connected with food production continue to be left to women. Therefore, the role of women in the socio-economic life of the populace cannot be over emphasized.

In Ghana, women constitute about 50.5% of the total population and about 30% are heads of households according to the 2000 census. Women control key productive sectors particularly in agriculture and in other sectors that are vulnerable to climate change. There is therefore the need to undertake a detailed vulnerability study on their activities as related to climate change.

1.1 Objectives of Study

The objectives of the study may be summarised as follows:

- To study women's livelihoods vulnerable to climate change and tackle methodological issues in a livelihood framework which address problems in health, agriculture, fisheries, energy and land sectors.
- To formulate actions to address women vulnerability to climate change including possible cost implications.

1.2 Area of study

The three locations selected for the study have certain peculiarities in common, in terms of their geographical location and within the areas where climate change vulnerability studies were undertaken. Tema, in the Greater Accra Region, falls within the Central Coast and is a major port for fishing and other goods. Keta, which is in the Volta Region, falls within the sandy segment of the East Coast. Kwanyako, in the Central Region of Ghana, is located within the Ayensu basin.

The East Coast and eastern sections of the Central Coast fall within the Coastal Savannah Zone of Ghana. The land cover within this zone comprises lagoons and wetlands. The East Coast has a large proportion of its land covered by the Keta Lagoon, (390 km²), the Volta Estuary (45km²), and the Songhor Lagoon (60 km²) within which mangroves abound. Human settlements are concentrated along the shores from Aflao to Ada. Beyond Ada, the settlements are relatively scattered along the coastline (Ly 1980).

Most of the Central Coast consists of shrubs and thickets on the western sections and a mix of mosaic of thickets and grass with and without scattered trees and shrubs. Substantial areas within the eastern sections have settlements on them. Many of the shorelines are planted with coconut trees where sandy shores occur.

1.3 Methodology

Much of the study is focused on women's livelihoods and vulnerability to climate change. A qualitative survey was employed by administering questionnaires to a small group of women in a locality. Interviews were also conducted with focus groups through an interpreter, where necessary. The procedure described by Roger Wimmer and Joseph Dominic, 1994, and Earl Babbie, 1992, was followed as much as possible. Whenever available, existing data were utilized.

Various assumptions were made to arrive at an initial assessment of women's vulnerability to climate change. The main assumption was that, out of the variables that might influence women's livelihood, lack of status and access to finance and land is the main driving force. This assumption is considered appropriate as an initial analysis towards more detailed women's vulnerability studies.

CHAPTER TWO

2.0 VULNERABILITY ASSESMENT AND CLIMATE CHANGE IN RELATION TO WOMEN

2.1 Vulnerability

Vulnerability, according to Webster's dictionary, is being prone to or susceptible to damage or injury. Blaikie, Cannon and others (1944) have attempted to refine the definition of "vulnerability". In their exposition, they stated that it "is the characteristics of a person or group of people in terms of their capacity to anticipate, cope with, resist and recover from the impact of a natural hazard". This will, however, involve a combination of factors that will determine the degree to which someone's life and livelihood is put at risk by a discrete and identifiable event in nature or in society.

The writers further expounded that some groups (for example, women and children) in the society are more prone than others to damage, loss and suffering in the context of differing hazards. Key characteristics of these variations of impact include class, ethnicity, gender, disability, age or seniority. These groups may find it hardest to reconstruct their livelihoods following a disaster.

It has also been defined that vulnerability has a time dimension built into it, since it is damage to livelihood and not just life and property. The word livelihood is important in the definition, and implies the command an individual, family, or other social group has over an income and/or bundles of resources that can be used or exchanged to satisfy its needs. This may involve information, cultural knowledge, social networks, legal rights as well as tools, land and other physical resources.

Researchers have observed that, as a rule, the poor suffer more from hazards than the rich, although poverty and vulnerability are not uniformly correlated in all cases (ibid).

It is a fact that certain characteristics of groups and individuals have a great deal to do with determining their vulnerability to hazards, especially gender and age. The first concern is the fact that women form the majority of the world's population. Already in Ghana, 50.5% of the total population are women. A high proportion especially those in the rural areas engage in agricultural activities and petty trading.

Ghana has a population estimated at 18.9 million (2000) that is growing annually at a rate estimated at between 2.8 and 3.0 per cent per annum. The birth rate is estimated at 39 per thousand (1999) while the death rate is estimated at 10 per thousand (1999). The rate of infant mortality is approximately 56 per thousand

life births while the overall life expectancy is 59 years (1999). The total fertility rate is 4.6, while maternal mortality is estimated at the rate of 214 per thousand live births (Ghana Statistical Service, 1994).

The land area, including inland water bodies, is approximately 239,000 sq. km of which 82,258 km² is classified as forest, and 155,614 km² as savanna. This supply of land is fixed in location and limited in supply. Land shortage is created by restricted and limited access to land. Whilst 65 per cent of the population depend on agriculture, between 40 and 60 per cent own no land (Benneh 1994).

Vulnerability in its entirety reaches beyond social and economic impacts into the very basis of sustainable livelihoods. People, especially women depend on their ecosystems to provide food, energy, water and medicine and also to renew fertility in soil and purity in water.

However, ecosystems are under threat from impacts of climate change. The impacts of climate change will affect a whole host of areas including habitats, wildlife, terrestrial and aquatic ecosystems. There will also be severe adverse changes in soil, arid lands, coastal zones and tropical forests. Changes in the climate will affect the locations of ecological systems and species, thus jeopardizing their ability to provide a host of values and benefits for the sustenance and existence of humankind.

2.2 Agriculture

According to Benneh (1994), agricultural land use in Ghana is concerned mainly with food production, cocoa farming, oil palm farming, livestock, fisheries and irrigated farming, together with shallot farming.

In 1998, the Environmental Protection Agency (EPA) commissioned agricultural experts to carry out analysis of climate change on cereal production and adaptation strategies to deal with potential climate change effects in Ghana. The impact of climate change on cereal production was assessed using the CERES model. CERES MAIZE and CERES MILLET models were used to generate growth and yield of maize and millet respectively.

The future climate change scenarios generated indicated that both the maximum and minimum temperatures increased over the years in all the agro-climatic zones of Ghana, but the increases were higher in the Sudan Savanna zone where temperatures are normally the highest (Ghana's Initial National Communication, 2000).

Using the projected climate scenarios and the CERES model, it was projected that percentage decrease in maize yield in the Transition zone ranged from 0.5 percent in the year 2000 to 6.9 percent in the year 2020. The yield of millet,

however, was not affected by the projected climate change because millet is more drought tolerant and, therefore, insensitive to temperature rise.

In Ghana, women control key productive sectors particularly in agriculture. They constitute 52% of the agriculture labor force, contribute 46% to the total GDP and produce 70% of subsistence crops. They play major roles in distribution and production. Though it has been noted that women undertake 85% of food distribution in the country and outnumber their male counterparts in agricultural production, several socio-economic factors affect women's productivity in this sector (MOFA-WIAD, 2002).

These include:

- Inaccessibility of realistic financial resources;
- Lack of information;
- Lack of improved appropriate technology; and
- Unfavorable land tenure systems (Ghana Living Standard Survey 2000).

In the Ghanaian system, women have the primary responsibility for childcare, ensuring sufficient resources to meet children's needs for nutrition, health care and schooling. In the rural areas and in female-headed households, they are also the main managers of essential household resources like water, fuel for cooking and sometimes food for domestic animals.

In addition to performing their household chores, women participate in land preparation, planting, weeding, fertilizer application, harvesting and transportation of produce. They also undertake the cultivation of vegetables in the dry or minor rainy season. Some of the women process both food and cash crops for home consumption and for sale. Given the variety of women's daily interactions with the environment, they are the most keenly affected by its degradation including climate change.

Women face greater difficulties in accessing formal financial services than men because of their lower status in the communities. Lack of acceptable collateral; and lack of familiarity with the land administrative processes due to illiteracy and lack of information are also part of the limitations that confront women. With restricted access to credit, women farmers resort to informal sources such as moneylenders, relatives and friends, who are unreliable, and in some cases expensive resulting in more hardships for the women.

Despite the fact that rural women and men are both active in agricultural production, women have generally been marginalized in development programs that provide support systems to farmers. However, increased access to agricultural support systems including credit, technology, education, extension

and marketing services is essential to improving productivity for both men and women.

Bushfires occur widely in Ghana but are more extensive in the savannas. Fires are set for varied purposes but may also be set unintentionally. Most observations have been made in the savanna, and indications are that the most noticeable effects of burning are the reduction in the composition and density of vegetation. The effects of soil microorganisms and chemistry have not been systematically studied. Bush fires have become, in recent years, the most degrading environmental factor in Ghana (ed. Laing 1994).

A World Bank study in the country found that women's plots had a lower rate of decline in soil. The evidence of this is found in reduced vegetation cover which leads to widespread accelerated erosion, reduced crop yields and increasingly desertifying conditions, especially in the savannah areas.

Climate change will systematically affect women due to their reliance on subsistence farming activities. These changes will affect soil conditions and therefore would have adverse impact on food production. Women's income from their livelihoods and other economic activities will become critical thus making them poorer. This reinforces the importance of the environment and particularly climate change in women's lives.

Given the opportunity, women may well have a predisposition to practice sustainable agriculture and maintain overall land quality, because of their strong reliance on natural resources.

2.2.1 Current Policy Intervention in Agriculture

The Ministry of Food and Agriculture (MOFA) established the Women in Agricultural Development (WIAD) directorate in 1989, with the objective of improving access of women and other target groups to information on improved agricultural and post-production practices for adoption, facilitating their access to resources towards an increase in production with high incomes, improved nutrition, health and food security on an environmentally sustainable basis.

These activities include transfer of technologies on food production, nutrition and food utilization, food processing, preservation and storage, while still maintaining the home management and other income generating activities to enhance the production capabilities of women in the agricultural sector. A gender strategy on agriculture development has also been developed by MOFA.

The outlined interventions have not taken into account the impacts of climate change; however, the threats of global warming and climate change are real. There is the need to recognize the importance of placing women at the heart of

sustainable development. It will be a mistake to solve climate change impacts without integrating women in the process, or improve their status and economic empowerment since women's management of local natural resources is crucial.

2.3 Fisheries

The land area of the coastal zone of Ghana defined as the area below the 30 m contour covers about 7% of the total land area of Ghana. It is home to 25% of the population of the country. The length of the coastal zone of Ghana is 565 km. The zone comprises the sandy East Coast (149 km) and West Coast (95 km) on the extremities of the zone (EPA 2000).

The East Coast stretches from Aflao in the east to Prampram, whilst the West Coast stretches from the country's border with La Cote d'Ivoire on the west to the mouth of the Ankobra River west of Axim. Between the two sandy segments of the coastal zone lies the Central Coast stretching from the Ankobra River in the west, to Prampram in the east. The Central Coast is 321km and comprises mainly rocky beaches interspersed with short sections of sandy beaches between 2-10 km long (ibid).

In the event of sea level rise, low lying sandy coastal areas such as the Volta delta will be profoundly affected. The expected sea level rise will also result in the following:

- Direct inundation (or submergence) of low lying wetland and dry land areas;
- Erosion of soft shores by increasing offshore loss of sediment;
- Increases in salinity of estuaries and aquifers;
- Raised coastal water tables; and
- Exacerbated coastal flooding and storm damage.

According to an EPA Report (2000) these impacts will in turn influence coastal habitats, biodiversity and socioeconomic activities. There would be changes in water quality, which would affect most of the fresh water fish. Valuable agricultural lands would be inundated, thus depriving women of their livelihoods in both farming and fisheries activities. Certain beach facilities would be endangered and some of the groundwater resources would be salinated.

The population along the coast is concentrated within the main urban centers (Accra-Tema, Sekondi-Takoradi and Cape Coast). Apart from the urban centers, the main economic activities of the people living in the coastal zone is fishing and farming. Incomes are low averaging below \$150 per person per year for most districts within the zone (Anon., 1996).

The preliminary assessment of the impacts of sea level rise carried out by experts for the EPA in 2000 showed that about two-thirds of the total land area potentially at risk of flooding and shoreline recession in Ghana lies within the East Coast. Other areas that may be impacted adversely are the West Coast and limited sections of sandy beaches within the Central Coast. A total of 1,110 km² of land area may be lost as a consequence of a one-meter rise of sea level. The population at risk was estimated at 132,000, most of them within the East Coast.

Temperature rise in sea level would have a negative effect on productivity in areas such as lagoons where salinity may increase and young fishes may die. Warming-induced changes in current patterns may also bring more nutrients to the surface and provide more food for the fish (IPCC 1996). The Intergovernmental Panel on Climate Change (IPCC 2001) predicted changes in the abundance, distribution and species composition of some fish populations, as well as the collapse of other fisheries, although the expansion of others is also possible.

The fisheries sector seems to be under represented in development policies and plans of most countries. However, the two main sources of quality protein available in Ghana are livestock and fish. In Ghana and many African countries, the popular option for protein is fish, which is relatively available most parts of the year and its cost also favours most people in the poverty bracket. Fish provides the consumer with about 60% of animal protein (DFID, 2004).

The role of the sector in terms of poverty reduction is very important. This is due to the fact that most of the poor mainly women and other vulnerable people rely on the fisheries sector either directly or indirectly for their livelihoods (ibid).

Post-harvest fisheries activities provide a wide range of full-time and seasonal livelihood opportunities to many women and the loss or decline of these opportunities through the impacts of climate change would significantly increase the risks for many of the women who are already living on the margins of poverty (ibid).

Even though fishing is undertaken on a continuous basis in Ghana, the significant bumper harvest occurs between the months of July and September.

One of the main activities along the coast is fishing and related activities. Men usually go out to sea but when the boats land, women and sometimes children take over the purchasing, storage, processing and marketing of the fish.

The women in the fisheries business are mostly poor income earners who manage large households. A case study undertaken in the Central Region has indicated that women fish processors are aging and there is not the likelihood of the younger generations continuing with that livelihood (Okorley et al).

The fish stocks in Ghana are generally thought to be at or near their maximum levels of exploitation. Future expansion in production is likely to come from aquaculture which has been slow in development (DFID, 2004).

The drop in marine fish production was a result of declining stocks of fish due to the proliferation of demersal trawling activities in the near shore waters, absence of a legal framework and an active fisheries resources management, and rising costs in fisheries operations.

With the impacts of climate change, women who play an important role in the fishing industry either as intermediaries or through direct involvement with fishermen will see their income go down significantly. As income levels for many involved in the fisheries sector decline with the seasonality of fisheries and increased competition over resources, so indebtedness is on the increase. In some cases this has led to the negative livelihood strategy of taking children from school and forcing them into child labour (ibid).

Taking into account the importance of the fishing industry in the economy, climate change impact could give rise to job loss and the increase in the price of fish. In addition, climate change may affect women's access to food by lowering their incomes from coastal fishing due to sea level rise.

2.3.1 Current Policy Intervention

The open access fish policy introduced in the first Republic allows both domestic and foreign fishers to exploit fish resources without subjecting fishers to quotas or assessing the quantity of fish stock. This policy has been in existence since the 1960s.

Currently, the British Department for International Development (DFID) is assisting the Fisheries Department of MOFA to develop new knowledge (strategies, management systems, methodologies and tools) which will improve post harvest utilization of fish and which is also appropriate to poor producers, processors, traders and consumers.

It is anticipated that this programme will eventually lead to a fisheries policy, which will take account of the impacts of climate change on the livelihoods of the women in the sector.

2.4 Water Resources

Water is essential to man, animals and plants. Without water there will be no life on earth. From the very beginning of human civilization, people have settled close to water, which covers more than $\frac{3}{4}$ of the earth. It nourishes our

ecosystem, powers our industry, grows food, and makes life itself possible (GEF 1998). The water environment provides 16% of the world's protein, with Asia and Africa relying on fish protein for close to one third of an average diet.

Irrigated agriculture accounts for 93% of water consumed by all sectors. Water use for irrigation, according to a GEF Report will double, and this will result in the annual loss of irrigated land to water logging and salination. This activity could equally, dry up more rivers and damage more coastal ecosystems (1998).

The water environment includes another world of wetlands, aquifers, rivers and ocean ecosystems that provide monetary benefits each year. These life supporting systems are now under threat by over-fishing, loss of floodplains and wetlands, increasing discharges of pollution, siltation from deforestation and land erosion, and flow reductions carried by waterfall irrigation practices and dam construction.

The scientific community has warned that the degradation of marine, coastal, and river ecosystems is expanding beyond national boundaries. Water problems that used to be local in scope have crossed boundaries, inextricably linked through the global hydrological cycle to urbanization, watershed degradation, deforestation, biodiversity loss and climate change (GEF, 1998)

Despite a significant improvement in the proportion of the total population provided with potable water in Ghana, 70% of people living in rural communities with populations between 500 and 5000 have no access to potable water. Only 15% of the populations in rural communities of below 500 have access to potable water (Ayensu, 1994).

Women's livelihoods are directly linked to adequate quality and quantity of water resources and related services. In the rural areas particularly, it is the women's responsibility to make sure that there is water for the family to wash, cook and also for farming activities. Activities such as processing palm fruits into oil, batik, tie and dye processing also requires a lot of water by the women. In Ghana, water for farming activities in the rural areas, especially in the northern parts is either in the form of small-scale irrigation systems or hand dug wells.

Prospects for economic growth remain highly dependent on water and other natural resources. Much as water availability and scarcity will be impacted by long-term climate change, it is also determined by changes in demand due to socio-economic changes and water management.

Water scarcity has always been a potential source of social upheaval and thus increasing other problems latent in climate variability such as migration from drought-affected areas. This onerous burden lies mostly on the women and

children who have to carry water over long distances. Water scarcity also affects agricultural production and complicates food security issues.

Another area of concern is safe drinking water which is indeed important in the control of many diseases. Hokes (1983) has observed that 80% of all diseases in the world are associated with the use of unsafe water. In such situations women and children suffer more in impaired health from contaminated or too little water, and lose more in diminished livelihoods and lost lives.

With climate change and recurring droughts particularly in the northern parts of the country, and chronic water shortages, the poor majority, especially women and children, usually pay high price for water. They pay more in cash to buy small amounts of water and they expend more in calories carrying water from long distances.

In assessing the impacts of climate change on water resources, three basin systems were studied by the EPA. These were Pra from the southwestern, Ayensu from the coastal and the White Volta from the Volta systems.

Some of the major findings were:

- Change in precipitation or rise in temperature can cause a reduction in runoff;
- Climate change may cause reductions in groundwater recharge of between 5 and 22% by the year 2020;
- Irrigation water demand could be affected considerably;
- On the socio-economic aspects, there may be secondary impacts on health, nutrition and energy-based industrial activities; and
- Hydropower generation could be seriously affected.

2.4.1 Current Policy Intervention

The Water Resources Commission is the agency that gives central direction to water resources management. In addition to such official arrangements, there are also some customary laws and practices that cover water conservation, pollution control, protection of catchments and fisheries.

Water management and irrigation extension services have taken into account specific constraints, capacities, felt needs and the willingness of women to take responsibility for the management of these schemes.

2.5 Land

About 57% of the total land area of Ghana is suitable for agriculture. However, there are many indications of land scarcity in Ghana as a result of degradation,

access and cumbersome land tenure systems. Gradual increase in population has also reduced availability of family lands, thus limiting access to farming lands for women.

Land is a very important input for agricultural production. Apart from the matrilineal and patrilineal inheritance systems through which women could acquire land for farming, there are other tenure agreements like renting, sharecropping, leasehold and pledging.

Apart from being the most important productive input into agricultural production, land rights are often women's entry point for accessing other productive services such as credit, irrigation water, and often, produce from trees. More often, women's ability to purchase land is limited due to inadequate financial resources. This makes women to rely more on family lands or lands from inheritance.

Women face major challenges in the legal system, which works to their disadvantage as far as land interests are concerned. Even though there are constitutional provisions, which protect women's land rights, they experience discrimination under customary law and practice in most parts of the country.

Land tenure systems and social relations that structure access to and control of resources have been affected by the changes in resource exploitation with implications for the ability of particular social groups to make livelihoods, which are adequate and sustainable (Tsikata *et. al*,2004)

Without secure land rights, women have little or no access to credit and other agricultural inputs and services. Furthermore, insecure land tenure systems reduce their incentives and desire to maintain soil quality because they have no permanent rights to the land.

Female heads of households, however, are significantly less likely to have obtained land through purchase and rental, indicating that they may be disadvantaged, relative to men, in land sales and rental markets. Female heads of households appear disadvantaged in all modes of land acquisition, although their relative disadvantage is less significant for acquiring family land.

2.5.1 Current Policy Intervention

The Land Policy of Ghana aims at the judicious use of the nation's land and all its natural resources by all sections of the Ghanaian society in support of various socio-economic activities undertaken in accordance with sustainable resource management principles and in maintaining viable ecosystems. Areas of actions are:

- Securing Ghana's international boundaries and shared water resources;
- Facilitating equitable access to land;
- Security tenure and protection of land rights;
- Ensuring planned land use; and

- Developing effective institutional capacity and capability

In addition to the above policy, the Ministry of Lands and Forestry is implementing the Land Administration Project (LAP). Gender activists, working on the Women's Manifesto, have called on the Government to ensure that achieving equity in access to and control of land becomes an integral component of the LAP.

They are demanding, as part of the government's land administration reform programme, the abolition of customary laws on access to land and inheritance, which are discriminatory and unconstitutional.

These were part of a ten-point demand contained in the Manifesto regarding the issue of land, the aim of which is to address the phenomena where customary land tenure system discriminates against women in both matrilineal and patrilineal societies.

2.6 Health

People depend for their well-being on the health of the societies in which they live. This depends in turn on a decent level of sustained economic development, on a healthy environment and a proper use of its resources. The achievement of sustained development, the promotion of health, and the rational use of environmental resources are simply inseparable.

All over the world, in developed and developing countries alike, climate change is undermining development and damaging human health. This state of ill-health saps the strength of the work-force, obstructs development, leads to greater environmental loss, and causes even more diseases (UNEP 1986).

Three kinds of health impacts have been looked at. These are:

- Direct and foreseeable impacts: this involves heat waves and other extreme events; air pollution and aeroallergens;
- Indirect effects: this involves food production and supply; vector-borne infectious diseases; water-borne infectious diseases and effects of social and economic disruptions; and
- Diverse health consequences: infections, nutrition, psychological and other events that occur in demoralised and displaced populations in the wake of climate induce economic dislocation, environmental decline and conflict situations. (Githeko and Woodward 1995).

According to an IPCC Report (2001), Africa has a number of climate sensitive diseases, the most prominent being malaria, cholera and meningitis. In West Africa, some of the diseases were linked to epizootic diseases with increased risks during the wet season.

The report observed that cholera pandemic is active extensively across Africa. It is likely that warming Africa's lakes will cause conditions that increase the risk of cholera transmission.

Major epidemics of bacterial meningococcal infection usually occur every five to ten years within the African meningitis belt, and typically start in the middle of the dry season and end a few months later with the onset of the rains. In 1996, between February and April, the disease affected hundreds of people in parts of Northern Ghana, many of whom died.

Since this disease is limited to the semi-arid areas of Africa, it is assumed that future distribution could expand due to increased warming and reduced precipitation.

Individual, community and geographical factors all contribute to capacity to adapt to change in climate. These include the level of material resources, effectiveness of governance and civil institutions, quality of public health infrastructure, access to relevant local information on extreme weather threats, other social economic factors, and pre level existence of disease.

Tables 1 and 2 outline an indication of how extreme weather events which are attributed to climate change could impact the health of women and children and consequently affect their socio-economic activities.

Climate change is predicted to cause serious health problems related to cardiovascular, respiratory and other diseases. In times of water scarcity, women and children are affected most since they are the ones who often travel long distances in search of water thus exposing them to fatigue and other physical injuries. Women and children are also exposed to water-related health risks since they are responsible for drawing water from various sources and have to contend with unhygienic and unsanitary conditions.

In the event that climate change results in flooding, women and children would be most vulnerable to death and injury from flooding and other extreme weather events due to their limited involvement in planning for disaster preparedness.

Women and children are most vulnerable to hunger related deaths and illness, which would be indirectly exacerbated by climate change through food and water shortages. Cases of cholera, diarrhoea, malaria, malnutrition, and heat related deaths may increase depending on varied climate scenarios.

Particularly concerning is the rapid increase in the prevalence of vector-borne diseases such as malaria with the susceptibility zone for vector-borne diseases growing as a result of temperature increases and seasonal abundance of mosquitoes. Children and pregnant women are particularly susceptible to malaria, which also contributes to prenatal mortality, low birth weight and maternal anaemia.

Table 1: Mechanism by which above-average rainfall can affect health (source)

Event	Type	Description	Potential health impact
Heavy precipitation	Meteorological	Extreme event	Increase mosquito abundance or decreased if breeding sites are washed away
Flood	Hydrological	River/stream over tops its banks	Changes in mosquito abundance, contamination of surface water
Flood	Social	Property or crops damaged	Changes in mosquito abundance, contamination of water with faecal matter and rat urine
Flood	Catastrophic flood disaster	Flooding leading to >10 killed, and/or government call for external assistance	Increased risk of respiratory and diarrhoeal diseases, deaths drowning, injuries, health effect associated with population displacement, loss of food supply psychosocial impacts

Table 2: Mechanism by which below average rainfall can affect health (source)

Event	Type	Description	Potential health impact
Drought	Meteorological	Evaporation exceeds water absorption, soil moisture decreases, Several indices have been developed based on meteorological variables	Changes in vector abundance if vector breeds in dried up river beds
Drought	Social	Reduction in food supply or income, reduction in water supply and quality	Food shortage, illness, malnutrition increase risk in infection, increase risk of diseases associated with lack of water for hygiene
Drought	Agriculture	Drought severity index drier than normal conditions leading to decreased crop production	Depends on social economic factors, i.e. other sources of food available and the means to acquire them
Drought	Food shortage /famine/drought disaster	>10 killed and 200 affected, government calls for external assistance	Health impacts associated with population displacement

The vast majority of the world's people in the developing world like Ghana continue to depend on traditional medicine, which is the primary form of health-care that is directly dependent on biodiversity and traditional knowledge. In Ghana, the Center for Research into Plant Medicine in Akwapim-Mampong has developed various medications for some diseases.

Other traditional medicine practitioners also rely on indigenous knowledge and numerous biological resources to provide remedies for a number of common ailments. Climate change could result in changes in the availability of certain types of plants needed for medicinal purposes, with its attendant effect on the health of those relying on medicinal plants for their health needs.

2.6.1 Current Policy Intervention

The Ministry of Health has identified malaria as the leading cause of out-patient morbidity in the country, and therefore one of the priority diseases targeted for control in the medium term. The Roll Back Malaria Programme is part of a massive campaign in the use of insecticide-treated mosquito nets as a preventive measure against malaria.

The Ministry of Health has various programmes that seek to:

- Increase access to health services;
- Improve the efficiency of health service delivery;
- Foster partnership with other agencies in improving health by:
 - i Addressing inequalities based on gender, poverty and disability;
 - ii Expand water availability, sanitation and the health environment;
 - iii Improve nutritional status.

The recently launched National Health Insurance Scheme will also help to improve financing of the health sector and provide access to quality health services to most Ghanaians.

2.7 Energy

There is no energy source without some environmental impact. Hydropower involves building dams, which sometimes displaces communities or create conflicts. It could also have effect on the biodiversity of the area in which the hydropower resource is located. Wind and solar energies require installations which may affect habitats or amenities. The use of biomass to generate alcohol as a fuel or as an energy source for household use involves cultivation and harvesting and hence competes for land with agriculture, forestry or nature conservation.

Commercial energy production also causes severe impacts on the environment, in the form of acid rain, methane emissions, oil spills, and air pollution by sulphur dioxide, nitrogen oxides and carbon dioxide when coal or gas are burned (Caring for the Earth, 1991).

The bulk of Ghana's energy consumption is from biomass in the form of firewood and charcoal which account for about 59 percent of total energy consumption. Electricity and petroleum products account for 9% and 32% respectively. Per

capita energy consumption is estimated at 360 kilograms of oil equivalent (koe). The total energy consumption of Ghana is estimated at 6.6 million tons of oil equivalent (Ministry of Energy).

The household sector alone accounted for 52% of the total energy consumption in 2000. Household energy consumption is primarily for lighting and cooking. About 67% (24,890 GWh/yr) of total energy consumption in the household is used for cooking (ibid).

Majority of households in Ghana use biomass as their main source of fuel for cooking. Firewood and charcoal alone account for more than 93% of energy used for cooking. Liquefied Petroleum Gas (LPG), kerosene and electricity use, though cleaner, account for only 4.1%, 1.1% and 0.4% respectively. The use of other fuels such as crop residues and cow dung contribute about 1.4% (ibid).

The role of women in the energy sector is very significant since in both their reproductive and productive activities energy is expended in some form. The biggest percentage of all the energy requirements in the rural household is biomass derived in the form of firewood. It must be appreciated that a lot of work and emphasis are being put on the production and conservation of this source of energy by women.

Biomass energy, comprising fuel wood and charcoal, accounts for large quantities of energy consumption for women in their livelihoods. Utilization of biomass as an energy source contributes a lot to deforestation in Ghana, especially where it is used for the production of charcoal for urban areas and institutions.

In most households where firewood is the main cooking fuel, traditional tripod styled stove or the 3-stone stove are used. This stove is inefficient, emits smoke into the cooking environment and also blackens the cooking pot.

Studies have shown that whilst the stove is highly inefficient, its level of smoke emission into the cooking environment is also detrimental to the health of the users, mainly women and children. The result is a high incidence of eye, chest and respiratory diseases for women and children in rural areas who use firewood for cooking. The situation is no different for the urban poor who also rely on biomass for their energy needs.

There are three main problems associated with the open fire stove used by most women in the country. These are:

- Relatively high fuel wood consumption, which has negative consequences in the rural areas in terms of time spent in collecting or buying firewood;

- Health and environmental effects from smoke particles; difficulty in sitting close to the stove to cook due to excessive heat transfer from the stove to the environment as well as the smoke from the fuel wood;
- General inconvenience such as increased workload of women and children who collect firewood.

2.7.1 Household Energy for Lighting

According to the Ghana Living Standards Survey-4, about 60% of all households in the country (both urban and rural) still use kerosene for lighting. Grid electricity for household lighting in Ghana accounts for only about 39%. About 1% use other sources such as candles and generators.

The situation is worse in the rural areas where as much as 82% of the population still uses kerosene, candles and other traditional fuels as sources of light. The share of grid electricity accounts for only 17.1%. Generators, dry cell batteries and automobile batteries together account for the remaining 0.9%.

2.7.2 Current Policy Intervention

2.7.2.1 Sectoral Development Policies versus Climate Change

Achieving a level of industrialization, which provides significant employment opportunities and economic diversification, is the main agenda of the Government. This is highlighted in the concept of Golden Age of Business of the Government. The level of becoming a middle level industrial country requires substantial financial investment and energy inputs.

Developing the human resource base for industrialization as well as sound rural livelihoods also requires provision of broad educational opportunities to the population and developing rural infrastructure. Manufacturing industries typically suffer from high operating and capital costs and poor infrastructure, such as roads, communication as well as water and electricity supply.

The rate of electrification presents the challenge of providing energy in a suitable form to a large population, primarily rural but increasingly urban, while at the same time minimizing GHG emissions and maximizing carbon sequestration.

Rural electrification is seen primarily as a means of providing lighting to households. Switching the form of energy used by the urban poor from charcoal to kerosene or gas can reduce the rate of deforestation due to the reduced demand for biomass for fuel wood or charcoal. With the new goal of carbon sequestration, increasing the quantity of biomass is more important than ever. In

most countries, including Ghana, however, rates of biomass harvesting exceed natural regeneration and effects of regeneration efforts.

2.7.2.2 *Impact of Climate Change on Energy and Industrial Production*

The energy sector has already started showing signs of being susceptible to climate change, particularly the effect of highly variable precipitation patterns on hydropower production. The drought of the early eighties (1980-1983), did not only affect export earnings through crop losses but also caused large-scale human suffering and called into question the nation's continued dependence on hydroelectric power. As a result of the hydrologic failure during the drought, the development of petroleum fired thermal plants is now seen as the major alternative source of electricity in Ghana.

Aspects of climate change, such as decreased precipitation and increased temperatures in some areas, are likely to cause a reduction in biomass production, particularly due to water stress on the woody plants and also to general land degradation. Decreased agricultural productivity due to changing agro-ecological zones, lack of water for irrigation, and outbreaks of pests and diseases would also decrease the amount of biomass available for energy (e.g. biomass from sugar production, stalks and twigs from small-scale cropping and tree trimming, biogas from animal manure and waste wood from timber industries).

2.7.2.3 *Contribution of Sectoral Projects to Climate Change*

Renewable Energy Program

The Renewable Energy Program aims at promoting the development of Renewable Energy Technologies that are less polluting than the conventional fossil fuels. This program covers a number of specific projects namely biomass and solar energy.

Biomass Energy Projects

The biomass energy projects being undertaken include:

- Developing a National Wood Fuel Policy, this would ensure that the production and use of wood fuels are made environmentally friendly and sustainable. The District Assemblies could adopt such policy guidelines as bye- laws;
- Conserving forest resources through improved methods for charcoal and firewood production;
- Decreasing consumption of firewood and charcoal by using more efficient cooking devices;

- Expanding the productivity and use of existing bio-energy sources such as biogas from organic, animal and municipal waste; and production of briquettes from logging and wood processing residues;
- Planning for the future security of biomass supply through the implementation of a sustainable program of forest regeneration and afforestation.

Solar Energy Program

At the moment direct solar radiation does not represent a major form of energy in Ghana. It is only used in its natural form in drying several items including agricultural crops, fish, sawn timber, clothing etc. The Ministry of Energy has, therefore, embarked on a program to assess, demonstrate and evaluate the technical, economic and social viability of promoting solar energy technologies in Ghana, especially with regard to the development of rural communities. The specific solar programs that are currently underway are:

- The prospects for solar water heating in Ghana;
- The prospects for solar crop drying in Ghana;
- Off-grid solar PV electrification pilot project in the West Mamprusi District of the Northern Region; and
- Feasibility study for a pilot solar thermal plant in Ghana.

Off-Grid Solar PV Electrification Pilot Project

Ghana receives solar irradiation level ranging from 4-6kwh/m² daily with corresponding peak annual sunshine duration of 1460-2190 hours (Ministry of Energy). The specific objectives of two of the solar projects currently in progress are:

- To design, install and monitor pilot solar PV electricity system for Wechiau;
- To establish the technical performance, social acceptability and cost-effectiveness of their operation;
- To prepare an action and work program whereby solar PV electricity will form an integral part of the overall National Energy Program; and
- To establish locally manufacturing capacity in solar technology such as charge controllers and inverters.

National LPG Promotion Program

The LPG Program was initiated in 1990 to promote the wider use of Liquefied Petroleum Gas as a substitute for charcoal and firewood in order to slow down

the rate of deforestation caused partly by the production and use of wood fuels. However, due to the comparative high cost women prefer to patronize biomass energy for cooking.

2.8 Ghana Poverty Reduction Strategy (GPRS) and Women

The above policy interventions were being implemented until the development of the Ghana Poverty Reduction Strategy (GPRS) in 2003. The GPRS is currently the key development policy framework for the country. It is the country's response to addressing the issue of poverty.

The GPRS recognizes a casual link between poverty and the environment and therefore makes references to the need for Environmental Impact Assessment (EIA) and Audits to ensure that the growth arising from GPRS is sustainable.

Even though issues on women are cross-cutting there are certain critical areas where the GPRS focuses on women.

The GPRS discusses the poverty profile dimension in Ghana and outlines programmes of Ministries, Departments, Agencies and private sector needs to be implemented to achieve poverty reduction. The strategy on production and gainful employment to which agriculture is key, seeks among other things to improve public sector delivery of programmes and also provide sufficient incentives to stimulate the private sector. The activities are aimed at increasing and sustaining production for local consumption and export, and expanding employment especially in geographical areas that have high poverty profiles.

The GPRS identified a connection between education, female headed households and income earning capability as a source of worry considering the fact that only 6% of females aged 15 years and above had attained higher than secondary school education. Nearly 35% of all household heads are female out of which about 61% fall in the poorest 20% of the population.

The GPRS recognizes and outlines new and existing measures to help women improve their activities in the agriculture sector. For example, to make it possible for women to work harder and make bigger contribution to production of goods and services in the country, successful women entrepreneurs will be helped to expand their activities. Other actions that will make it possible for women to get better production, processing, marketing and management skills have also been proposed.

In addition various measures have been proposed to provide better extension services to women. This will include making it easy for women get more credit, land and simple technologies.

The strategy in the GPRS for increased production is to target women's activities with support programs including credit, improved technological services and facilities, and skills upgrading in management and finance. Credit supply for production would be both adequate and long term.

Support for agro-processing would be targeted to women who already are in the extraction of crops like groundnuts, shea nuts, palm fruits and others. Other agricultural products with enormous potential for processing are cassava, maize, cotton and fish, where particular attention would be paid to small and micro-scale producers. Support would be given in the form of processing equipment, which may be owned and operated by groups.

With the indication of depletion in marine fish stocks, the promotion of inland fisheries like aquaculture will be supported.

The GPRS recognizes the preponderance of water-borne diseases and the vulnerability of 81% of the rural population and even among some urban districts who depend on untreated water. Research has also shown that water quality in the peri-urban areas have fallen due to increasing demands on waste management systems that cannot cope with urbanization. As a result, pollution of water and the physical environment are increasing which may have serious health implications especially for women and children.

Access to potable water and sanitation has been identified within the GPRS as the key to achieving health outcomes and sustained poverty reduction. Strategies for providing safe water will focus on improving access through the following:

- Acceleration of rural water provision, with emphasis on guinea worm endemic communities;
- Effective management of urban water systems;
- Safe liquid and solid waste management; and
- Capacity building for environmental health.

On land, the GPRS proposes the provision of protection of land rights and prevention of abuse of traditional and institutional procedures which place the poor, illiterate and women at most risk. Land tenure reforms would be accompanied by close monitoring to detect adverse effects for which safety nets would be provided.

The provision of legal security of tenure will promote the transformation of the agricultural sector from subsistence farming into a dynamic and profitable entrepreneurial activity.

According to the GPRS, improving the health status of the poor (most of whom are women), is crucial for poverty reduction, since ill health is both a

consequence and a cause of poverty. The Ministry of Health has highlighted three priority interventions namely:

- Bridging equity gaps in access to quality health and nutrition services;
- Ensuring sustainable financing arrangements that protect the poor; and
- Enhancing efficiency in service delivery.

Energy for domestic use is predominantly biomass based. These are hard to come by in some areas due to depletion. The following will be undertaken to increase availability of energy:

- Assist communities to develop woodlots;
- Introduce renewable energy technologies such as solar PVs and biogas; and
- Introduce and promote energy efficiency technologies for domestic users.

The use of energy supplied to rural areas must be maximized given the difficulties involved. The situation where substantial funds are expended in overheads in order to introduce only single-phase power supplies that cannot be used in agro-processing is not cost-effective. As much as possible, three-phase supplies will be extended to rural communities to open up options for processing. Promotion of agro-processing will therefore be facilitated by the availability of such energy supplies.

The promotion of liquefied petroleum gas will be stepped up once the West African Gas Pipeline Project comes to fruition. Widespread fuel-wood extraction that is contributory to soil fertility depletion and reduced productivity can be minimized by the introduction of LPG into rural communities. In addition, a rural kerosene program will be initiated and implemented to enable communities have easier access to the commodity.

Promoting and increasing these energy sources will contribute greatly to reduction in the amount of time and effort expended by women in the search and transportation of fuel wood. Freed time and energy for women will enable them expand activities such as in agricultural production or industrial processing and marketing.

CHAPTER THREE

3.0 ROLE OF WOMEN IN SUSTAINABLE DEVELOPMENT

The dominant paradigm of development, often referred to as the modernization theory, evolved in the Western industrialized countries after World War II (Melkote, 1991: Rogers, 1976: Servaes, 1991 cited in Singhal and Sithapinnonda, 1996). In this perspective, development was viewed as a type of social change in which new ideas were to be introduced into a social system in order to produce more per capita incomes and higher levels of living through modern production methods and improved social organization (Skair,1993 Rogers an Svenning: ibid).

This method of rapid material intensive growth is adversely affecting the environment in many ways. Croplands are dwindling and a good proportion of agricultural lands are losing fertility; grasslands are overgrazed and fisheries are being over harvested thus limiting the amount of additional food from these resources. Water bodies have suffered extensive depletion and pollution, severely restricting future food production and urban expansion. Further, natural resources that help in stabilizing the climate, moderate water supplies and harbor a majority of the planet's terrestrial bio-diversity continue to recede (Postel, 1994).

In developed countries, signs such as global warming, ozone layer depletion, acid rain, desertification, pollution of both water and air, all associated with industrialization are prevalent.

The initial reaction to such an environmental damage was a reactive approach characterized by an increase in clean-up activities. According to Jepma and Munasinghe (1998), most recently attitudes towards the environment have evolved to encompass proactive design of projects and policies that seek to anticipate and limit degradation though not always successfully.

The writers continue to state that within the proactive context, human beings are currently exploring the concept of sustainable development - an approach that will permit continuing improvements in the present quality of life at a lower intensity of resource use, thereby leaving behind for future generations an undiminished or even enhanced stock of natural resources and other assets.

Sustainable development is an overreaching objective for human society that has emerged at the end of the twentieth century (WCED 1987). The interaction between sustainable development and global climate change is especially important in view of the wide-ranging impact that the latter is likely to have (Jepma and Munasinghe 1998).

While no universally accepted practical definition of sustainable development yet exists, there is increasing agreement that it should incorporate three critical elements, namely economic, social and environmental in a balanced manner.

The economic approach to sustainability is based on the concept of the maximum flow of income that could be generated whilst at least maintaining the stock of assets that yield these benefits (Hicks and Lindhal). Problems of interpretation arise in identifying the kinds of capital, such as natural and human, to be maintained and their substitutability, as well as in valuing these assets, particularly ecological resources.

The social concept of sustainability is people-oriented and seeks to maintain the resilience of social and cultural systems and their capacity to withstand shocks. Greater equity and the reduction of destructive conflicts are important aspects of this approach. Preservation of cultural diversity and cultural capital across the globe, and better use of knowledge concerning sustainable practices embedded in less dominant cultures are desirable. Modern society must encourage and incorporate pluralism and grassroots participation into a more effective decision making framework for sustainable development.

The environmental view of sustainable development focuses on the resilience of biological and physical systems. Of particular importance is the viability of subsystems that are critical to the global stability of the overall ecosystem

It is perceived that climate change might affect prospects for sustainable development. In fact, scientists have clearly indicated that global warming will have serious implications for all three elements.

The economic approach is to maximize the net benefits from use of the global resources represented by the atmosphere. The stock of atmospheric assets that provide a sink function for GHGs has to be maintained at a level that ensures future benefits (in terms of avoiding damage due to climate change) that equal or just exceed the cost of measures required to restore the sink function to that level. The underlying principles are based on optimality and the economically efficient use of scarce resource that is the global atmosphere.

Vianno Mell also states that women give continuity to life, dealing on a daily basis with land, water, food and garbage and therefore are the ones most interested in a healthy environment, since they and their children are the first victims of pollution (1994, 71).

Furthermore, there is a symbiotic relationship between human beings and the soil, vegetation, animal life and climate in the different areas of the world, particularly in Africa.

The effect of climate change is felt particularly strongly by mothers and children since it determines, *inter alia*:

- The probability of infections by microbes and parasites and consequently the morbidity of mortality rates;
- Extremes of climate and their very strong influence on the health of children (lung disease, acute symptoms of dehydration in nursing infants);
- Agricultural production and its nutritional value;
- The opportunities for development and a healthy environment (UNICEF 1972: 29).

In most parts of the world and in developing countries in particular, women represent the majority of the population. In economically developed countries they represent a minority, mainly because of the improvement of life expectancy (UNESCO, 1981). Despite a relative demographic decline in the industrialized countries, women remain a readily identifiable and particularly important group within all social categories.

Consequently by virtue of their numbers and role in managing natural resources, women are a tremendous resource for developmental activities within their communities. They are also a potentially influential group whose co-operation and goodwill is essential to cultivate.

Women have a crucial role in the achievement of sustainable development for the years ahead. However, Norgaard and Howarth (1991), caution that incorporating environmental measures in development policies will not bring sustainability itself, unless the present generation is committed to transferring to women and communities sufficient resources and capital assets to make development sustainable.

The link between climate change and the development nexus has become topical in recent meetings of UNFCCC. One of the underlying themes in the climate change/development debate is that of gender, and in particular the multiple roles played by women, many of which involve environmental management (Dankelman and Davidson, 1988; Sen and Grown, 1987).

According to Barret and Brown women in Africa are substantial users of environmental resources. Through their roles in production, reproduction and community management they have responsibility for environmental use, for redistribution of environmental resources and potentially for the destruction or conservation of these resources (**Source**).

In Ghana, women's livelihoods depend on all the areas that are vulnerable to the impacts of climate change and since about one third of women are already below

the poverty line; climate change will exacerbate the hardships that women go through.

3.1 Sustainable Livelihoods (SL) Process

Climate change has been identified to have very serious negative effects on the socio-economic development of the country if the potential impacts are not recognized for appropriate measures to be put in place. Ghana has identified a number of sectors that can be impacted upon by climate change. These include water resources, agriculture, fisheries, energy health and industry.

Generally, communities go through a process in their attempt to sustain their livelihoods. This process starts when they are faced with a vulnerable situation that threatens their livelihoods.

Women have different roles in the society and these are reinforced by traditions, customs, attitudes, practices and institutional structures. There is the need to recognize the fact that women and men experience life differently and therefore finding out about the assets and adaptive strategies for women is essential in formulating policies.

The sustainable livelihood approach requires that we acknowledge and take into account the distinctive roles of women and the specific obstacles that they face in undertaking their daily livelihoods. This approach has a better potential for ensuring sustainability because it tends to go deeper into livelihood systems and to examine areas such as natural resource endowment and the relationship of communities to policy and local governance.

The sustainable livelihood approach integrates environmental, social and economic issues into a holistic framework for analysis and programming. This strengthens the fact of identifying the types of assets which women use and also how their existing livelihoods can be improved with new and appropriate technologies and the corresponding social and economic investments.

Programme development should therefore begin not only with community needs assessment but also with community strengths and assets assessment. This ensures the building of self-esteem and self-reliance. Adopting a livelihood perspective to development planning and programming is to address issues in a multi-dimensional and multi-sectoral manner.

CHAPTER FOUR

4.0 RESEARCH ON WOMEN'S VULNERABILITY TO CLIMATE CHANGE

4.1 Translating the Sustainable Approach into Action

Sustainable livelihoods is a framework, which is used to remind us of the complexity of development and uniqueness of situations at the people level. Sustainable livelihood can also help in shaping the development agenda that is focused on the key issues of sustainability, legitimacy and empowerment. This involves participatory and interactive components, which include:

- Understanding adaptive strategies;
- Analysing current policies and governance issues that impinge on people's livelihood strategies;
- Identifying appropriate technologies that can improve productivity, efficiency and sustainability;
- Identifying social and economic mechanisms that can help existing livelihood strategies by improving productivity or creating new opportunities;
- Developing indicators to monitor the impact of different programmes

4.2 Sustainable Livelihoods Analysis

In order to understand issues that militate against women's livelihood with respect to climate change, focus group discussions were held with women in three different communities, namely, Tema, Kwanyako and Keta,.

4.2.1 Fisheries (Urban - Tema)

Tema is a fishing community, which is about twenty-two kilometers from Accra the capital city. Group discussions were held with twenty (20) women.

Vulnerability Context

The women perceived that the method of fishing by the big fishing trawlers have been preventing the fish from moving down to the areas where the artisanal fishermen haul their fish and therefore depriving the fishermen from getting substantial catches since the fishermen are unable to go further out into the sea.

The women also had the perception that these trawlers use chemicals to catch the fish and consequently other fishes leave the area. The taste of the fish has also changed due to the perceived use of chemicals by the trawlers.

In addition to the above, fish is available almost throughout the year, so the fish business is not as lucrative as it used to be. Frozen fish supplied by the trawlers was also too expensive for the women who process fish.

Until five years ago, the women could store smoked fish for about one year but the taste and texture of the fish had changed due to the fishing process of the trawlers and subsequently they are unable to store the fish for more than four months. One woman indicated that there could be other causes that had been affecting the fishing industry but she had no idea what these were.

Livelihood Strategies

Selling of fresh fish, smoking and selling of smoked fish were the principal livelihood strategies for the women.

Petty trading was undertaken in addition to the fish business. One woman was also a dressmaker and another prepares and sells kenkey. Significantly, one woman owned shares in a canoe.

Financial Strengths

Resources available to most of the women for their economic activity ranged from one hundred thousand (¢100,000) to two million cedis (¢2,000,000.00). One woman, who had shares in a canoe, had ten million cedis at her disposal. Profits made ranged between five thousand (¢5,000) and two million cedis (¢2,000,000) per day. Two women were not able to determine how much profit they make. Four of the women had been assisted by a Christian non-governmental organization with credit to procure and smoke fish.

Financial Weaknesses

A greater majority of the women could save between one thousand (¢1,000) and ten thousand cedis (¢10,000) per day. A few of them saved up to a hundred thousand cedis a day and only one woman was able to save one million cedis a day. With the exception of four women who saved with the banks, all the rest saved their monies daily with informal saving schemes.

Human and Social Strength

There is a general association of women in the fisheries business but it is not formally managed and most of the women are members by default. An

association of fish processors had been formed and the four women who are members were the ones who were assisted by a non-governmental organization with credit facilities.

All the women had access to electricity from the national grid. With the exception of one woman who uses liquefied petroleum gas for cooking, all the others use charcoal for cooking.

Human Social Weakness

Majority of the women did not have the benefit of formal education. Some had one or two years of primary education and a few had education up to the equivalent of the junior secondary school.

Prevalent health problems for the women were malaria and eye infections due probably to the method of smoking fish.

Natural Strengths

The sea with its fisheries resources.

Natural Weaknesses

Fish depletion and changes in fish resources as a result of climate change and other factors; flooding of coastal zone, which could affect lagoon biodiversity.

Livelihood Outcomes

Ability to give their families better quality of life.

Livelihood Aspirations

Access to credit with low interest facilities

4.2.2 Farming (Kwanyako)

Kwanyako is a farming community within the Ayensu basin in the Central Region.

Vulnerability Context

The women realized that there had been changes in the climate in relation to their farming activities for the past five to ten years. However, most of them were of the view that it was a natural phenomenon and there was nothing they could do about it. Only two women attributed the changes to deforestation and therefore the need for people to plant more trees. Even though the Ayensu River

flows continuously throughout the year, linkages were made to the seasonal flooding based on the volume of rain in a year.

Livelihood Strategies

Majority of the women engage in mixed crop farming within varied farm sizes in the range of thirty-six (36) square meters to two (2) hectares. Crops cultivated include long term ones like oranges, cocoa and oil palm. The short-term crops were maize, beans, cassava, yam and sweet potatoes among others.

Engaging in the cultivation of long-term crops by the women is one of the strategies to supplement their livelihoods after harvesting of the short-term crops. In addition to the farming, the women sell their farm produce and others process maize into kenkey and banku. Selling of kenkey is within and outside the communities.

Financial Strength

The women farmers in the Kwanyaku area spent amounts ranging between a hundred thousand and two million cedis (¢100,000 – (¢2,000,000) as inputs for their farming activities. The amounts depend on the size of the farm and the type of crops to be cultivated.

After harvesting, profits made were between fifty thousand and one million cedis (¢50,000 – (¢1,000,000) for the season.

Financial Weakness

Profit made by the women after harvesting were mostly kept at home with very few of them saving in the banks. In addition to using some of the money for daily expenses, most of the women use the money to undertake other economic activities like trading or in processing farm produce into food like kenkey and banku.

However, the women could not give a clear indication of specific amounts used for the various activities. Due to their inability to save at the banks, there is no avenue for expansion of their farms and other economic activities.

Human and Social Strengths

A few had been to the level of junior secondary and only one woman had tertiary level of education.

The water treatment plant is located in the town so everybody has access to treated water and electricity.

All the women are members of church based associations.

Human and Social Weakness

Majority of the women had not been to school, whilst some had some primary level education.

As individuals, the women do not realize the need to avail themselves to the extension services of the Ministry of Food and Agriculture. There is also no association through which these women could access resources for their farming activities.

Natural Strengths

Farmlands were available to the women through family inheritance mostly. Only two women who had large farms had included rental lands in addition to their family lands.

Natural Weakness

Constant deforestation which leads to soil erosion and depletion of soil nutrients.

Livelihood Outcomes

Considering that most of the women did not have the benefit of formal education, they have ensured that their children and grandchildren go through the education system.

Livelihood Aspirations

The major concern for the women was to be able to access credit facilities with very low interest rates for expansion of their farms.

4.2.3 Fishing (Rural - Keta)

The women in the Keta District are involved in the smoking of sardines, shrimps and anchovies; in salting of cassava fish and barracuda and drying of all the fish stock they get along their coast.

Vulnerability Context

All the women have observed a dramatic change in the weather over the years. The women have noticed these changes over three and ten years ago. Though all of the ten women mentioned inadequate and erratic rainfall pattern being a

cause, the women from Dzita opined that they have observed that the current flow of the Volta River from its Estuary is so swift. This has led to a deposition of a considerable amount of silt making the beach very shallow, which is not favourable for fish to breed.

Equally, the women mentioned that some of the fishermen were using unapproved nets for fishing. This disturbs the breeding grounds and destroys fingerlings.

The women have also observed that there are too many people involved in the fishing business; therefore, the competition is keener.

In each case, the women's story was the same: Their fish stocks are in rapid and serious decline due to a combination of fishing in Ghanaian waters by trawlers, and more recently pirate fishing vessels operating in the international waters of the Atlantic Ocean and the use of unapproved nets by some local fishermen.

Livelihood Strategies

The women undertake petty trading in addition to the fishing business.

Financial Strength

Capital for their business ranges between five hundred thousand and eight million cedis (¢500,000 – ¢8,000,000). All the respondents indicated that during the bumper harvest there is a glut of fish. They therefore lose heavily during this period. However, during the lean season they make between 75% - 300% profit of their total sales.

Again, the study showed that eight out of ten of them save daily with local informal saving schemes.

Financial Weakness

During bumper harvest there is so much fish and they do not make any profit.

Human and Social Strengths

Some of the women had formal education from primary to the junior secondary level or its equivalent.

These women manage the processing and retailing of fish, often organising themselves into co-operatives. Finally, they also finance the purchase of fishing gear and provide money to buy fuel for the men to go to sea.

Human and Social Weakness

A few of the women had no formal education.

The dwindling fish stocks dramatically affect the whole social structure of these communities. For example, the women are less able to pay medical bills. So it has an effect on the health status of the women and children. Equally, they are less able to afford children's school fees which impacts on the future employment prospects of the children. Their eyesight is also affected from the smoke and heat during smoking.

Natural Strength

They have access to the sea and lagoons with their fishery resources.

Natural Weakness

Reduction in fishery resources from impacts of climate change

Livelihood Outcomes

Provide better social amenities for their children.

Livelihood Aspirations

The women enumerated the following:

- Access to credit facilities with low interest rates.
- Assisting them to buy modern equipments such as scaling machines, gloves, wire mesh, gas stoves, improved ovens for smoking, and improved salt vats.
- Putting up cold storage facilities to store fish during bumper harvest so as to reduce their dependence on the mangrove wood fuel.
- Assisting them to construct a drying patio, this will improve the unhygienic manner of drying fish.
- Providing modern equipment for processing and drying fish.

4.2.4 Farming (Coastal - Keta)

The main crops grown in the Keta area are shallots, okro, pepper, and tomatoes. However, a few of the women cultivate cassava and corn in addition to the crops mentioned.

Vulnerability Context

Even though the women have observed changes in the planting season, most of them were not sure about the exact time these changes occurred or for how long. Only two of them thought the changes were associated with the climate.

Livelihood Strategies

According to the women they have all changed crops and this is because of the change in the weather. From June-September, they cultivate tomatoes and pepper. Prior to that, they were cultivating okro. Shallot cultivation is done all year round.

Only one respondent stored tomatoes and processed corn.

Financial Strengths

Two of the women operated with a capital of six million cedis (¢6,000,000), whilst the rest have between a hundred and five hundred thousand cedis (¢100,000 – ¢500,000).

Financial Weakness

A few of the women have capital of their own. The rest of the women have debt capital, which has to be repaid. Most of the women thought they make profit but they cannot quantify this, because their business is seasonal and they do not keep records.

Some also are not able save because after meeting all their expenses, especially the moneylender's interest, there is no surplus left.

Human and Social Strengths

Three women had primary education, two had middle school level, and two had secondary school education.

As a group they could easily access money from the rural banks, and lately they had been assisted through the District Assembly Poverty Alleviation Fund.

All of the women are members of church based social association.

Human and Social Weakness

Out of the ten women sampled four did not have any formal education.

Natural Strengths

Land for farming activities and salt production.

Natural Weakness

Persistent flooding from the sea and lagoons resulting in erosion, heavy siltation and salt water intrusion into the wells and boreholes.

Livelihood Outcomes

Provide better social amenities for their children.

Livelihood Aspirations

Access to more capital with low interest rates to enable the women expand their business.

CHAPTER FIVE

CONCLUSIONS AND RECOMMENDATIONS

5.1 CONCLUSIONS

The two major issues that emanated from the study are lack of knowledge on the causes and impacts of climate change and inadequate capital for the women in their economic activities. Discussions with the women revealed that much as they have experienced the changes in the climate, the vast majority of them do not have any idea about the causes. Therefore, any fruitful discussions on the impacts and policies to mitigate climate change must consider the differential knowledge of women on developmental issues.

Sustainable development demands recognition and value for the different ways in which women's lives intertwine with environmental realities including climate change. Women's involvement must extend to the availability of simple and relevant information; access to appropriate technological innovations; extension and resource management services.

As key stakeholders, women could enhance their roles in national development on the basis of scientific and technological upgrading of their activities. The fundamental concept is that strategic extension of innovations to women will improve their contributions to national development and promote national welfare.

5.2 RECOMMENDATIONS

Arising from the study, the following recommendations are being made:

- Awareness creation programmes on climate change and its impacts on development, especially in the areas and sectors where Ghana is most vulnerable;
- Awareness creation programmes on the effect of climate change on the socio-economic activities of women;
- Education for women on the importance of forming groups to facilitate access to financial resources in view of the fact that individual women find it difficult in accessing credit on their own;
- Provision of extension services to the women farmers on appropriate technological innovations, improved storage facilities and resource management services;

- Provision of extension services to the fish processors on improved methods of smoking and salting;
- Provision of more storage facilities for fish to reduce post harvest losses, retain wholesomeness and ensure stable prices.

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APPENDICES

1.0

WOMEN AND CLIMATE CHANGE

QUESTIONNAIRE

1. Name:
2. Profession: Fishmonger
Trader
Housewife
Other.(specify).....
3. Age:.....
4. Education: Primary
Junior Secondary
Senior Secondary
Tertiary
Other (Specify)
5. Marital status: Single
Married
Widow
Divorced.
6. No. of children:.....
7. No of people in household:.....
8. When is fish bumper harvest: July August September
9. Have you noticed any changes in the bumper harvest season: yes no
10. If yes, what are the changes:.....
.....
11. If yes, how long have you noticed change? 2 years
5 years
10 years
More than 10 years

13. What do you think are the causes of these changes?.....

14. Do you process fish? Yes no
15. If yes, how? Smoking salting drying
 Other (specify).....
16. How do you store your fish?.....
17. Do you have capital for your economic activity: yes no
18. If yes how much capital: ₪100,000- 500,000; 500,000- 1,000,000; over 1,000,000
19. How much profit do you make per month:.....
20. How often do you save: daily weekly monthly
 other (specify).....
21. Are you able to access credit: yes no
22. If yes, where: bank moneylender other (specify).....
23. If no, why:.....
24. Which social association do you belong to? Church
 Civil
 Other (specify).....
 None
25. What is your source of power? National grid
 Kerosene
 Generator
 Other (specify).....
26. What is power mainly used for? Lighting Cooking
 Other (specify).....
27. What do you use in cooking? Charcoal Firewood Gas
 Other (specify)

2.0

WOMEN AND CLIMATE CHANGE

QUESTIONNAIRE

1. Name:
2. Profession: Farmer
Trader
Housewife
Other.(specify)
3. Age:
4. Education: Primary
Junior Secondary
Senior Secondary
Tertiary
Other (specify)
5. Marital status: Single
Married
Widow
Divorced.
6. No. of children:
7. No of people in household:
8. Type of crop (s):
9. Size of farm:
10. Type of farmland: family rental (abunu/abusa) other (specify)
11. Have you changed crops: yes no
12. If yes why:.....
.....
13. What was previous crop (s):.....
14. Have you noticed any changes in the planting season: yes no

32. What is your source of power? National grid
Kerosene
Generator
Other (specify)
33. What is power mainly used for? Lighting Cooking Other (specify).....
34. What do you use in cooking? Charcoal Firewood Gas
Other (specify).....

3.0

WOMEN AND CLIMATE CHANGE

QUESTIONNAIRE WATER RESOURCES

1. Name:.....
2. Profession: Fishmonger
Trader
Housewife
Farmer
Other. (Specify).....
3. Age:.....
4. Education: Primary
Junior Secondary
Senior Secondary
Tertiary
Other (Specify)
5. Marital status: Single
Married
Widow
Divorced.
6. No. of children:.....
7. No of people in household:.....

8. What is the name of the river/stream.....
9. Does it flow throughout the year? Yes No
10. If no, for how long does it dry up: 1 – 3 months
3 – 6
6 – 9
9 – 12
11. Have you noticed any changes in the river system? Yes No
12. If yes, how long have you noticed changes? 2 years
5 years
10 years
More than 10 years
13. What do you think is the cause of these changes?.....
.....
14. Where do you get your drinking water from? Treatment Plant
Borehole
Hand Dug Well
River
Other (Specify)
15. If drinking water is from river/stream, do you boil before drinking? Yes No
16. Do you get water throughout the year? Yes No
17. If no, for how long do you get water in a year: 1 – 3 months
3 – 6
6 – 9
9 – 12
18. Do you have irrigation facilities? Yes No
19. If yes, what crops do you irrigate?.....
20. Do you have capital for your economic activity: yes no
21. If yes how much capital: ₪100,000- 500,000; 500,000- 1,000,000; over 1,000,000
22. How much profit do you make per month:.....

23. How often do you save: daily weekly monthly
other (specify).....
24. Are you able to access credit: yes no
25. If yes, where: bank moneylender other (specify).....
26. If no, why:.....
27. Which social association do you belong to? Church
Civil
Other (specify).....
None
28. What is your source of power? National grid
Kerosene
Generator
Other (specify).....
29. What is power mainly used for? Lighting Cooking
Other (specify).....
30. What do you use in cooking? Charcoal Firewood Gas
Other (specify)