

***REPORT***

**ERATA Hotel,  
Accra, Ghana  
27-29 APRIL  
2004**

**Netherlands Climate Change  
Studies Assistance programme  
Phase 2**

***Inception Meeting***



**REPORT on INCEPTION MEETING of the**

**NETHERLANDS CLIMATE CHANGE STUDIES ASSISTANCE  
PROGRAM PHASE 2**

**HELD AT ERATA HOTEL, OKPONGLO, EAST LEGON, ACCRA  
27<sup>TH</sup> APRIL 2004**

**SUMMARY OF DISCUSSIONS AND RECOMMENDATIONS**

1. The workshop recommended that the EPA should provide a forum for strong sub-regional dialogue on effort in addressing impacts of climate change. Participants expressed concern that activities of some of our neighbouring countries tend to neutralize Ghana's efforts in addressing the impact of climate change.
2. The participants urged that, in order to give much weight to climate change and its vulnerability in Ghana impacts of climate change should be well packaged in a way that politicians can understand and appreciate to generate political attention among key policy makers.
3. It was agreed upon that, the NCCSAP 2 should focus on women instead of gender. Thus, the study should embrace economic and cultural aspects of women's livelihood both in urban and rural areas.
4. Root crops such as yam, cassava and cocoyam were recommended to be studied in the NCCSAP 2 project because they are considered as food security crops. Sweet potato was, however, not considered because it is a drought resistant crop.
5. The participants, noting the strategic importance of land tenure on climate change vulnerability, recommended that land tenure should be incorporated in climate change issues. This is because land policy in most communities does not allow tenants to adopt long term farming practices.
6. With the whole country gradually becoming vulnerable to climate change, participants recommended that farming practices and experiences gained from northern part of Ghana, which has had adverse weather conditions, should be transferred to the southern part of Ghana as a precautionary measure against harsh climatic conditions in the future.
7. It became evident, that the Eastern coast of Ghana is the most vulnerable to climate variations. Others are the three (3) Northern regions.
8. Participants highlighted that Africa is found to be most vulnerable to climate change in that, the continent still depends on the weather for most of its socio-economic activities. There is therefore, the need to shift from rainfall agriculture to irrigated agriculture.
9. Population increase was considered to be an important socio-economic scenario.
10. Women were considered to be the most vulnerable to climate change because most of their activities are affected by climate change.

11. On linkages between climate change and health, it was explained that climate change would:
- Result in insects infestation which would affect livestock and crop yields;
  - Affect fish yields resulting in protein deficiency.
  
  - The use of nitrogen base fertilizers such as Nitric Oxide would result in airborne diseases, which will affect childcare
  - CSM prevalence may increase due to increase in temperature
  - Hot temperatures would result in dehydration, which could affect breast-feeding by women.
12. The programme of activities for implementation of the project was finally agreed as follows:

Task	Action by	Date
1. Finalizing of TOR	Co-ordinator	Mid – May 15, 2004
2. Contract Signing	EPA	End of May, 2004
3. Baseline Data – Scenarios Development socio-economic	Meteorological Service	Mid June, 2004
4. Submission of Methodology be used	All Groups	End of June 30 <sup>th</sup>
5. Workshop on baseline data, Climate Scenarios, socio-economic	Secretariat, Accra	22-23 July 2004

## **INTRODUCTION**

The inception meeting of the Netherlands Climate Change Studies Assistance Programme Phase 2 was held at ERATA Hotel in East Legon, Accra. 30 resource persons from major stakeholders of climate change and 7 media practitioners attended the workshop. The full list of the participants is given in Appendix 2.

The meeting, which started at 10.00am, was chaired by Dr. F. A. Yeboah, Senior Lecturer at the Kwame Nkrumah University of Science and Technology (KNUST) Medical School, Kumasi. Mr. D. S. Amlalo, on behalf of the Executive Director of Environmental Protection Agency, delivered the welcome address. In his address he stated that the Netherlands Climate Change Assistance Phase II (NCCSAP2) is a follow up programme to the NCCSAP1, which was implemented, between 1998 and 2000. He also announced that the Water Resources and Coastal Zone Vulnerability and Adaptation report which was completed in 2000 as part of NCCSAP I was adjudged one of the best adaptability report worldwide and, therefore, recognized the implementation of the second phase as yet another challenge.

The Executive Director indicated that, the Agency believes in “the principle of inclusion” which basically considers the management of the nation’s environment and its resources as the responsibility of all. He therefore urged all stakeholders present to actively participate in the meeting to contribute to meet the task ahead of us. In conclusion, he was hopeful that the experts would work hard to ensure that Ghana’s NCCSAP2 will be successful.

## **THE PURPOSE OF NCCSAP 2**

The National Climate Change Coordinator, Mr. W. K. Agyemang-Bonsu disclosed that the climate change is basically due to emissions of Greenhouse gases (GHGs) from the developed countries. Parties of developed countries are therefore responsible to take the lead in combating climate change and its adverse effects on vulnerable countries.

The aim of the Netherlands government assistance was to enable Ghana implement the provision of the climate change convention in order to raise awareness, increase the involvement of policy makers in climate change debate, and promote exchange of experience between developing countries among others.

He pointed out that the project is designed to involve all stakeholders in mainstreaming climate change activities into the Ghana Poverty Reduction Strategy (GPRS), relationship between gender and poverty, strengthen the knowledge base of all stakeholders on the impacts of climate change in the area of fisheries, agriculture gender and land management. It was disclosed that the NCCSAP2 would be implemented over 3 years in two phases. The first phase would be run for 18 months.

**KEY NOTE ADDRESS**

Honourable Dr. Matthew Antwi, Deputy Minister of Environment and Science delivered the keynote address. Before declaring the inception meeting officially opened, the Deputy Minister pointed out that Government recognises integration of the environment into our socio-economic development. He emphasised that Ghana has taken interest in global partnership in finding solutions to problem of climate change. On the basis of that, the Government ratified the Climate Change Convention in 1995, and the further adoption by resolution of the Kyoto protocol in 2002 by Parliament.

As a Party to the Convention, Ghana is committed to the development of periodic update of emissions of greenhouse gases in order to minimise the causes of climate change and to mitigate its effects. He appreciated the relationships that exist between the activities of the Phase 2 (human health, cocoa production, root crops, women and climate change. and the President's Special Initiatives (PSIs) and promised that government will develop flexible policies, to allow for the changing climatic conditions. He expressed appreciation to the government and people of Netherlands for the support.

**CLIMATE CHANGE IMPACTS AND ADAPTATION**

The paper on Climate change impacts and adaptation was presented on behalf of Executive Director (ED) by Mr D.S.Amlalo, Director of Operations. He conveyed the EDs gratitude to the stakeholders for participating in the workshop at a very short notice.

The Executive Director of EPA pointed out that recent regional climate change, particularly, temperature increases have affected many physical and biological systems. There are preliminary indications that some human systems have been affected by increases in floods and droughts. Natural systems are vulnerable to climate change and some will be irreversibly damaged. That human systems are sensitive to climate change and some are vulnerable mainly water resources, coastal zone, agriculture (especially, food security), forestry, marine systems (fisheries), human settlements, energy, industry insurance and other financial services and human health.

The Executive Director further stated that the vulnerability of these systems varies with geographical location, time, socio-economic and environmental conditions. According to him, there are a number of projected beneficial impacts on other studies.

In his conclusion, the Executive Director said that recent vulnerability and adaptation assessment carried out in Ghana for water resources, coastal zone and agriculture confirms most of these IPCC regional vulnerability and adaptation assessment. It is thus increasingly clear that there is the need to work together to develop a national strategy plan for adaptation to climate change.

## **OVERVIEW OF CLIMATE CHANGE STUDIES IN GHANA**

The National Coordinator, said the objective of the United Nations Framework Convention of Climate Change (UNFCCC) is to achieve stabilization of GHGs concentration in the atmosphere at a level that will prevent dangerous anthropogenic interference with the climate system.

He declared that the essential point here is critically the time factor, thus any delay in taking meaningful, effective, complementary and cooperate actions to implement the provision of the convention could lead to non-achievement of the very objective of the convention. The implications of delayed actions are as follows:

- i) Natural Adaptation becomes impossible
- ii) Food production would be severely threatened, and
- iii) Chances of achieving sustainable economic development both within developed and developing countries would become further removed from reality.

He indicated that, Ghana has no contribution to global greenhouse emissions as of 1996. Since the country was a net greenhouse gas sink with a per capita removal capacity of  $-2.3 \times 10^{-4}$  Gg carbon dioxide (CO<sub>2</sub>) equivalent. However, the carbon sink decreased by 400% between 1990 and 1996. The National Coordinator, attributed the decrease in carbon sink to the following:

- Increase in GHG emissions from all sectors
- Seasonal biomass clearing annually for farming, grazing land, mining and settlement
- Increasing use of charcoal and fuel wood
- Minimal restoration of deforested lands
- High population growth leading to shortening of fallow periods and
- Decreased stocking level of timber in the high forest areas.

### ***Vulnerability And Adaptation Assessment In Ghana***

Models were developed for a 30year national climate change scenarios in the following sectors: water resources, agriculture, coastal zone and forestry.

The vulnerability and adaptation further revealed a temperature rise of 1°C over a period of 30years and reduction in rainfall and runoff of approximately 20% and 30% respectively. It was also projected that the yield of maize would decrease to 6.9% in the year 2020, however, the yield of millet which is drought resistant will not be affected.

***Measures To Reduce The Impacts***

Two major mitigation measures were mentioned by the National Coordinator to reduce the impacts of climate change. These include the use of renewable energy and forest protection/restoration options.

**INTRODUCTION OF SCOPE OF ACTIVITIES UNDER NCCSAP II AND FEEDBACK-INPUT FROM STAKEHOLDERS ON THE RELEVANT ISSUES TO BE ADDRESSED UNDER THE SELECTED SECTORS**

***Scope of Activities***

In his presentation, the National Project Co-ordinator indicated that generally, mainstreaming climate change policies into national development plans has been a big challenge to many countries. He however, informed the participants that, noting effort to integrate change into national development plans and programmes could yield some positive results.

The National Coordinator expressed concern that notwithstanding threats of climate change on our environment, adaptation measures has received very little success because adaptation has not had the required attention. He, therefore, stressed on the need:

- ❑ To continuously bring adaptation issues to government's attention.
- ❑ To overcome the challenges associated with accessing funds for climate change adaptation programme. The challenge stems from the fact that adaptation measures are localised in nature.
- ❑ For extra effort to attract funding due to the fact that Ghana does not fall within the least developing countries (LDCs).
- ❑ To take advantage of the window opportunity presented by the NCCSAP2.

The National Coordinator emphasized that the planned output for the NCCSAP 2 therefore will fulfil Ghana's commitment of regular reporting on update of climate change and to build national capacity for programmes formulation with emphasis on poverty alleviations.

He further stated that, the NCCSAP 2 would be implemented in two phases over a three (3) year period. The first phase will concentrate on the following areas:

- i. Human Health vulnerability and Public Health adaptation to climate change - risk and response undertaken;
- ii. Fisheries vulnerability and adaptation assessment conducted;
- iii. Land management, including soil erosion/land degradation and wildlife and biodiversity impacts and adaptation assessments.
- iv. Vulnerability of agriculture to climate change with particular focus on the impact of climate change on cocoa production and root crops such as yam, cassava and cocoyam.
- v. Women and vulnerability to climate change.
- vi. Capacity building, public awareness raising, sensitisation and dissemination of outcomes of the initial national communication and its related studies taking into consideration the outcome of the IPCC TAR of importance to the African region.

- vii. Mainstreaming climate change into the GPRS is a critical piece of the NCCSAP 2 for Ghana.

The Phase two (2) of the project will also include the following:

- Completion of a national adaptation policy, land use planning;
- Implementation of concrete projects identified for the water resource Vulnerability assessment carried out.
- Further defined water resources vulnerability assessment for Part 1 and
- Produce Ghana's second national Communications report.

### **Discussions and recommendation (Day 1)**

- 1) Participants expressed concern that activities of some of our neighbouring countries tend to neutralize Ghana's efforts in addressing the impact of climate change and recommended that the EPA should provide a forum for strong sub-regional dialogue on effort in addressing impacts of climate change.
- 2) The participants urged that, in order to give much weight to climate change and its vulnerability in Ghana impacts of climate change should be well packaged in a way that politicians can understand and appreciate to generate political attention among key policy makers.
- 3) It was agreed upon that, the NCCSAP 2 should focus on women instead of gender. Thus, the study should embrace economic and cultural aspects of women's livelihood both in urban and rural areas.
- 4) Root crops such as yam, cassava and cocoyam were recommended to be studied in the NCCSAP 2 project because they are considered as food security crops. Sweet potato was, however, not considered because it is a drought resistant crop.

### **VULNERABILITY AND ADAPTATION ASSESSMENT: *A Case study***

Rev. Prof. Mensah Bonsu, Senior Lecturer in the University of Cape Coast, presented a study on possible adverse effects of potential climate change in cereals production in Ghana. The study indicates that while temperature is increasing, rainfall is rather decreasing. The impact of climate will have an adverse effect on the future yield of the crop if mitigation and adaptation strategies are not put in place.

The study projected a general reduction in yield of maize. Again, the General Circulation Model (GCM) indicated that the predicated temperature and solar radiation would increase steadily up to the year 2020, suggesting that the impact of climate change on global warming is being experienced.

It was also brought to light that, to propose any adaptation measure, the following information is required:

- ❑ Data on key domestic export crops
- ❑ Land use within different agro-climate zones by crop types
- ❑ Conversion rates of agricultural land use relative to non-agricultural land use
- ❑ Yield of harvested crops by crop types
- ❑ Current and historic land/soil management practices and their influence on soil organic matter build up
- ❑ Costs of fertilizers and other agro-chemicals and their impacts on crop yield in reference to soil types in the different agro-climate zones.
- ❑ Information on food imports and exports
- ❑ Information on climate data (temperature, precipitation, solar radiation)
- ❑ Rural/urban population and migration rates
- ❑ Employment by the major sectors of the economy vis-à-vis agriculture
- ❑ Comparison of the ways from the agriculture sector with the other sectors of the economy.
- ❑ Information on rural infrastructure development and amenities: good drinking water, schools, hospitals, good access roads, etc
- ❑ Extent and types of irrigation facilities by land use.

Based on the study, the following adaptation measures were suggested:

- i. Breeding for low input and drought persistent genotypes
- ii. Breeding for extra early or early maturity genotypes
- iii. Adoption of soil and water conservation practices
- iv. Replacing maize with drought resistant crop like sorghum and cowpea in the transition zone
- v. Concentrating on groundnut production in the Sudan savanna zone
- vi. Adoption of low plant population
- vii. Diversifying crop production, that is, dry season farming of vegetables (onions and tomatoes) along major river banks
- viii. Concentrating rice production in wetlands (i.e. valley bottoms) in the high rainfall areas (birds scaring is necessary)
- ix. Training the youth in alternative enterprises (e.g. masonry, carpentry etc)

Rev. Prof. Mensah Bonsu proposed the following studies as essential to deal with any future impact of climate change on maize production:

- ❑ Studies to collect crop and soil parameters that are necessary in assessing future impact of climate change in agriculture.
- ❑ Research into land use options to off set potential impact of climate change on agriculture
- ❑ Simple water harvesting techniques in drought prone areas to conserve rain water
- ❑ Institutional framework to educate farmers on practices that are likely to accentuate the adverse effects of climate change on agriculture
- ❑ Studies to assess future climate change on planting seasons

Finally, he stressed on the fact that agriculture in Ghana depends mostly on rainfall, thus making crop production vulnerable to climate change.

## ADDRESSING GENERIC ISSUES FOR VULNERABILITY AND ADAPTATION ASSESSMENT

### ***A - Getting Started***

Mr. Agyemang-Bonsu said that in trying to assess the impacts of climate change and strategies, a number of important questions should be addressed. He observed that quick decisions are made in the interests of “getting started” which later came to be regretted. It is therefore necessary to:

- i. Take a little extra time and
- ii. Exercise a little patience

At the outset to make sure that the choices have been made wisely and with a much understanding and forethought as practicable.

The questions that needs to be addressed are:

#### ***1. How is the problem to be defined?***

- i. At the outset it is important to have a good sense of the definition of the problem to be studied.
- ii. Each sector should begin with general problem statements,
- iii. Problem definition must be treated in a holistic manner
- iv. Problem definition should be broken down into the various components below;

#### ***2. What are the goals of the Assessment?***

- i. Goals of the assessment are specified by client e.g. EPA on behalf of government to service policy interest of government.
- ii. It is important to clarify the objectives at the outset since they determine to a larger extent the problem definition, scope and boundaries of assessment.

#### ***3. What time? What Space?***

- i. Spatial extent of the assessment and length of time into the future depends on seeing the objectives
- ii. The sort of climate change to be considered is crucial.

#### ***4. What are the Assessment Boundaries?***

Questions of boundaries came up in two related ways:

- i. Geographic boundaries, e.g. national, regional, river basin etc
- ii. Study depth, e.g. damage to mangrove forests as a result of climate change may affect breeding of fish species, etc

#### ***5. What Plans should be made for the Communication and use of results?***

- i. What outputs will be most useful to policy makers
- ii. How will the results of the assessment be made available to policy and decision making process? etc

**6. What types of methods and tools should be used?**

The range may include the following:

- i. Quantitative, and predicted models
- ii. Empirical studies
- iii. Expert judgements
- iv. Experimentation
- v. Use of GIS and remote sensing

**7. How do we keep on track and assess progress?**

- i. Climate impact and adaptation assessment studies are complex, multidisciplinary
- ii. This could send assessment to teams in different directions
- iii. Study teams should have frequent meetings.

***B. Socio-Economic Scenarios***

In his introductory remarks, Mr. Buabeng of KNUST indicated that one of the current concerns of today's development is the issue of climate change and the impact on human populations. Climate Change is impacting on every aspect of human activities, such as agriculture, forestry, livestock, healthcare, energy production and consumption biodiversity and fishery.

He defined scenarios as a "coherent internally consistent and plausible description of a possible future of the world". The presenter distinguished between scenarios, forest and projections. He emphasised that socio-economic scenarios are scenarios of the state and size of the population and the economy in the broadest sense. It also comprises technology, legislation, culture, governance and environmental changes associated with the socio-economic.

***Scenarios Development***

Mr. Buabeng indicated that in practice the development of the scenario must be limited to those variables, which lend themselves to climate change impact analysis. He outlined list of variables in the these sectors: General, Water Resource, Coastal zones, Agriculture, Human Health, Energy, Forestry, Livestock, grassland, Wild life/ Biodiversity and Fisheries (refer to appendix 2).

Scenarios development can be both simple and complex. In view of that, scenario development requires multidisciplinary approach.

***Building scenarios***

Scenarios are often based on expert judgement, extrapolation of trends, international comparisons and model. Models play a very important role in scenario development establishing relationships e.g. population structure and economic growth, healthcare in terms of mortality/birth rates etc.

### ***Use of Scenarios***

Socio-economic scenarios are used to provide the contrast in which change will have its impacts. An impact analysis usually starts with an analysis of a sector system (e.g. agriculture, health in the current situation.)

### ***C. Climate Change Scenarios***

Mr. Kwashigah of Ghana Meteorological Service explained that, the potential threats of global warming and the consequent change in climate has resulted basically through anthropogenic interference. He defined climate change scenarios as an internally consistent estimate of future climate change that is constructed from methods based upon scientific principles and that can be used to give an understanding of the response of environmental and social systems to future climate change. He explained that population change and industrialization has affected the concentration of CO<sub>2</sub> in the atmosphere. Thus, global atmospheric CO<sub>2</sub> concentration started increasing since 800AD with alarming rate of increase between year 1800 and 2000.

He concluded that uncertainty about the future should not obscure the need to prepare and take the necessary precautions. Prospect of a successful adaptation will be greatly enhanced if the potential impacts of climate change are assessed and allowed for the development process.

### ***D. Integration***

Defining the scope of Integrated Assessment (IA), the National Co-ordinator stated that, IA take into consideration the interaction between diversity of impacts of climate change in the context of other changes.

The purpose of Integrated Impact research is to enable researchers to place climate change impacts in a broader context such as natural resource management, sustainability of ecosystems, or economic development and to consider associate broader questions.

That, IA is more ambitious than sectoral studies and consequently more difficult to achieve, as it places additional demands on component studies, may lead to sufficient knowledge of interactions. In most cases, it requires interdisciplinary team and cooperation between people who are not used to cooperating with one another.

He outlined the following guidance as current practice in IAs:

- i. Linkages between climate change sensitive issues (e.g. Water management, agriculture, forestry, fish and wildlife, infrastructure planning and economic development) are complex, so there is a need for multi-disciplinary collaboration in a holistic and pragmatic manner.
- ii. IA represents an attempt to evaluate impacts, costs, benefits and response options for a system.

He also identified 3-level of approaches to IA as follows:

- i. Level 1: based on consistent database scenarios
- ii. Level 2: Seeks to avoid overlap and tries to establish consistency between analysis of various sectors affected by climate change and
- iii. Level 3: Where models are linked that important feedbacks are taken into consideration that IA involves outreach to and inputs from people affected by climate change.

### ***Consistency in Scenarios and Data***

The presenter mentioned that, it is important to establish concurrence and consistency between sectoral impact studies. Studies should investigate the same scenarios for climate, population, economics etc and use the same reference year, the same units and consistent database.

### ***Consistency between Sectors***

The presenter indicated that consistency could be established if:

- i. There is in-depth discussion between sector experts
- ii. An integration formed is made up of expert team leaders from all sectors
- iii. Learning about other disciplines and novel challenges for one's own discipline, is demonstrated.

### ***Advantages of IA***

The Coordinator mentioned that a successful IA should lead to the establishment of a new database and a broader net work of informed scientist and stakeholders, which could further lead to a well informed country- scale research and policy response.

### ***Constraints of IA***

He expressed concern that, IA can be difficult to pursue, particularly given the complex and uncertain nature of climate change. Budgetary constraints are a limitation to research and there is also difficult in maintaining consistency in large multi-disciplinary group, especially in reaching consensus of choices.

## **E. Adaptation To Climate Change Theory And Assessment**

The National Climate Change Co-ordinator simply defined ***vulnerability*** as susceptibility to harm or damage potential and ***adaptation*** as response to climate change that may be used to reduce vulnerability. He backed the theoretical aspects of adaptations by Articles 4.1 (b), (c) (q) of the UNFCCC and Kyoto Protocol Act 12.8.

He identified potential adaptation measures to respond to climate change and coded the 8 commonly used adaptation classified groups as follows:

- |                      |   |
|----------------------|---|
| 1. Bear Losses       | 5. Change use                                       |
| 2. Share Losses      | 6. Change location                                  |
| 3. Modify the threat | 7. Research and                                     |
| 4. Prevent effects   | 8. Educate, inform and encourage behavioural change |

## Discussions and recommendation (Day 2)

- 1) Noting the strategic importance of land tenure on climate change vulnerability, and position that land policy in Ghana place in issue of land distribution among family and tenants within communities, the participants recommended that land tenure should be incorporated in climate change issues.
- 2) On the issue of land use trends and adaptation of major food security crops in Ghana, participants recommended that farming practices and experiences gained from northern part of Ghana, which has had adverse weather conditions, should be transferred to the southern part of Ghana as a precautionary measure against harsh climatic conditions in the future.
- 3) It became evident, that the Eastern coast of Ghana is the most vulnerable to climate variations. Others are the three (3) Northern regions. The impact was attributed to industrialization in the east and intensive agriculture in the north.

## SECTORAL ISSUES

### TERMS OF REFERENCE AND WORK PROGRAMME FOR CONSULTANTS

Mr. Agyemang-Bonsu presented the Terms of Reference (ToR) for all sectors namely; Human health, Fisheries, Land Management, Agriculture, linkages climate change and Ghana Poverty Reduction Strategy (GPRS), women, poverty and climate change.

For each of the sectors, Mr. Agyemang gave the background and outline of major tasks to be carried out as follow:

#### **a. Human Health Vulnerability and Public Health Adaptation to Climate Change**

##### ***Background***

He noted that change in the world's climate would influence the functioning of many ecosystems and their member species. Likewise, there will be impact on human health. The WHO estimated in its "World Health Report 2002" that climate change was estimated to be responsible in 2000 for approximately 2.4% of worldwide diarrhoea, and 6% of malaria in some middle-income countries.

##### ***Major Tasks***

- i. Provide an in-depth study and analysis of technical and policy options for the consequences of climate change.
- ii. Formulate appropriate health related climate change adaptation policies
- iii. Assess the socio-economic implications of climate change on human health
- iv. Participate in the integrated assessment of climate change impact and formulation of appropriate national adaptation policy.

## **b. Fisheries**

### ***Background***

For the past four decades, climatic conditions have been found to be changing in the country. This period coincided with the fluctuation in the landing of the most significant pelagic species exploited by the canoe fleet.

### ***Major Tasks***

- i. Provide technical indication of the impact of climate change resulting from changes in precipitation and sea surface and inland water temperatures on species population growth rate, yield and adaptability.
- ii. Formulate appropriate response measures for climate change policy formulation
- iii. Address the perception of climate change risk and vulnerability for rural women and provide the appropriate adaptation options and development opportunities for agriculture if traditional wild fishes are very susceptible to changes in climate
- iv. Evaluate other socio-economic implications of climate change on fisheries
- v. Participate in the Integrated assessment of climate change impacts and formulation of appropriate national climate change adaptation policy

### ***Fisheries Vulnerability and Adaptation Assessment***

The exact cause effect relationship between climate change and fish stock variability are poorly understood because the relationship is difficult to define. Considering the fact that nearly 25 percent of the Ghanaian population live in the coastal zone and about 10 percent depend on the coastal fishery livelihood. It is likely that any changes in the production of the fishery may impact on the socio-economic lives of the people.

Inland waters are affected hydrologically, physically, chemically and biologically by climate change. One reason for their vulnerability is that lakes, rivers, and wetlands reflect human and natural events in their watersheds. Interactions with changes to their watersheds, riparian, shorelines and use of water combine to make lake and stream ecosystem vulnerable. Potential changes in quantity and quality of water reduce the ability of these waters to provide goods and services.

## **c. Land management**

### ***Background***

In addition to Ghana commitment to the Climate Change Convention, Ghana is also committed to Conventions of Biological Diversity and Desertification. Land Management was made to include soil erosion/land degradation, wildlife and biodiversity.

***Major Tasks***

Study the synergies between UNFCCC, CBD and CCD policies, programmes and actions that and the address these conventions at national level.

- i. Assess the important climate change impacts on biological diversity and desertification and land degradation
- ii. Assess the impact of climate change on land use planning
- iii. Explore how these environmental problems (UNFCCC, CBD, CCD) are underlain by water availability and access
- iv. Assess the socio-economic implications of climate change on land management
- v. Develop adaptation and response measure and formulate proposals for inclusion in the national adaptation policy framework through the participation in the integrated adaptation assessment.

**d. Agriculture**

***Major Task***

- i. Investigate the impacts of climate change on crop yields
- ii. Assess the socio-economic implications of climate change on crop yields and their implication for national food security and income/revenue.
- iii. Formulate appropriate adaptation options
- iv. Participate in the development of national adaptation policy framework through and integrated assessment process.

**e. Women and Climate Change**

***Major Task***

In keeping with the spirit of NCCSAP 2, the group will study women's livelihoods, vulnerable to climate change, by producing a technical paper that tackles methodological issues in a livelihood framework and which address problems in the health, agriculture, fisheries and land sectors.

- i. The group will participate in the climate change adaptation policy framework development

Work Programme was agreed upon with the participating group and finalized as attached in table 1.

## **WOMEN VULNERABILITY TO CLIMATE CHANGE**

The Resource person, from Ghana Atomic Energy noted that, women are managers of essential household resources; hence their daily activities have direct interactions with the environment and are likely to be affected by climate change.

She emphasized that women in Ghana cultivate both food and cash crops and are also engaged in other livelihood economic activities to ensure family survival and to alleviate poverty. Women vulnerability to climate change mean more time and effort for activities i.e.

- ❑ Stress on fragile farming systems
- ❑ Reduction in valuable agricultural lands or elimination of valuable coastal areas.
- ❑ Travel long distances to farm
- ❑ Change in distribution and quantities of fish and sea foods and sea water intrusion.

### ***Agriculture***

On issues of climate change on women's vulnerability, the resource person she expressed the need to mitigate against reduction; in crop production; fisheries and livestock by ensuring production supply of drought resistant seeds; better strategy of marketing of farm produce, need for integrated pest management and sensitization of impacts of climate change.

### ***Health***

On health issues, it was observed that women are more prone to water and air-borne diseases than men due to their constant contact with the fragile environment.

### ***Land***

On land issues and climate change with regards to women vulnerability, the resource person stated that access to land is a major problem in some communities. It was recognized that the current land tenure system does not allow tenants to adopt long term agriculture practises.

### ***Strategies***

She expressed the hope that the GPRS and the MOFAs gender strategies are currently incorporating women vulnerability to poverty and climate change.

## **LINKAGES BETWEEN CLIMATE CHANGE AND GHANA POVERTY REDUCTION STRATEGY (GPRS)**

Mr. Nelson of National Development Planning Commission define GPRS as an operational medium term development framework which consist of the poverty framework and programme, projects and activities for realizing the objectives of the policy framework. He explained that, the broad objectives of the GPRS include ensuring macro-economic stability, increased production and gainful employment, facilitate direct support for human resource development and basic services,

support for human resource development and basic services, expanding special programmes to support vulnerable groups and enhancing good governance.

He, therefore, linked climate change issues to GPRS by saying that addressing deforestation, water and air pollution, improving inadequate sanitation and waste management, land degradation and coastal erosion include the use of natural resources in the creation of wealth. Under this objective the strategic environmental assessment (SEA) has been proposed to ensure that sound environmental management contributes to poverty reduction in Ghana.

He pointed out that climate change appears abstract and not a political vital focus of development policy. He therefore recommended the need to generate political attention to climate change risks among key political decision makers and the public. He, however, concluded that the process of integrating environmental issues into national poverty planning has not been smooth given the broad issues involved.

### **Discussion and recommendation (Day 3)**

- 1) Participants recommended to EPA, the need for Ghana to shift from rainfall agriculture to irrigated agriculture. It was highlighted that Africa is found to be most vulnerable to climate change in that, the continent still depends on the weather for most of its socio-economic activities
- 2) Population increase was considered to be an important socio-economic scenario. And women were considered to be the most vulnerable to climate change because most of their activities are affected by climate change.
- 3) On linkages between climate change and health, it was explained that climate change would:
  - Result in insects infestation which would affect livestock and crop yields;
  - Affect fish yields resulting in protein deficiency.

### **CONCLUSION**

Participants expressed concern that Ghana, like other developing countries is vulnerable to Climate change, and climate impacts would affect the livelihood of all. In this regard, the NCCSAP 2 should find suitable vulnerability and adaptation measures and packaged them in a way that decision makers would understand and appreciate.

It became evident, that the eastern coast and the three (3) northern regions of Ghana were the most vulnerable to climate variations due to urbanization and adverse weather conditions. The implementation of NCCSAP2 should however, be designed to capture and transfer to the southern part of Ghana some farming practices and experiences gained from the north, as a precautionary measure against harsh climatic conditions in the future. Root crops such as yam, cassava and cocoyam, which were food security crops but not resistant to drought were considered to be studied in the NCCSAP 2.

The workshop concluded that, the EPA should provide a forum for strong sub-regional dialogue on effort in addressing impacts of climate change with its neighbouring countries as some of their activities tend to neutralize Ghana's efforts in addressing the impact of climate change.

## Appendix 1 - A G E N D A

### **April 27, 2004**

0900 - 0930 -	Registration of Participants	
0930 - 1000 -	Welcome Address	Mr. J.A. Allotey Executive Director (EPA)
1000 - 1020 -	Purpose of the NCCSAP2	Mr. W.K. Agyemang-Bonsu National Climate Change Coordinator
1020 - 1050 -	Keynote Address	Hon. Dr. Mathew Antwi Deputy Minister of Environment and Science
1050 - 1110 -	Coffee Break	
1110 - 1140 -	Climate Change Impacts and Adaptation	J.A. Allotey Executive Director (EPA)
1140 - 1220 -	Overview of Climate Change Activities in Ghana	W.K. Agyemang-Bonsu National Climate Change Coordinator
1230 - 1330 -	General Discussions	
1330 - 1500 -	Lunch Break	
1500 - 1630 -	Introduction of scope of activities under NCCSAP2 & feedback/inputs from stakeholders on the relevant issues to be addressed under the selected sectors	W.K. Agyemang-Bonsu National Climate Change Coordinator
1630 - 1650 -	Coffee Break	
1650 - 1730 -	General Discussions	
1730 -	Close	

### **April 28, 2004**

0900 - 0930	- Registration of Participants	
0930 - 1000	- Self-Introduction	
1000 - 1030	- Vulnerability and adaptation assessment - A case study	Rev. Prof. Mensah Bonsu
1030 - 1100	- Addressing Generic Issues for vulnerability and adaptation	W.K. Agyemang-Bonsu

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	Assessment – Getting started	National Climate Change Coordinator
1100 - 1130	Coffee Break	
1130 - 1300	- Generic Issues • Socio-Economic Scenarios	Stephen N. Buabeng BIRD (KNUST)

Climate Change Scenarios Mr. Minia Meteorological Services  
Department

1300 - 1330	- General Discussions	
1330 - 1500	- Lunch	
1500 - 1600	- Generic Issues	
	• Integration	W.K. Agyemang-Bonsu National Climate Change Coordinator
	• Adaptation to Climate Change Theory and Assessment	“
1630 - 1650	Coffee Break	
1650 - 1800	- General Discussions	
1800 -	- Close	
 <b>April 29, 2004</b>		
0900 - 1030	- Sectoral Issues	
	• Agriculture	W.K. Agyemang-Bonsu
	• Human Health	
	• Fisheries	
	• Land Management	
1030 - 1100	Coffee Break	
1100 - 1330	Sectoral Issues Continue	
1330 - 1500	Lunch Break	
1500 - 1530	Women Vulnerability to Climate Change	Mrs. Patience Damphey Ghana Atomic Energy
1530 - 1600	Linkage between Climate and Ghana Poverty Reduction Strategy Initial Reflections	Mr. Winfred Nelson NDPC
1600 - 1620	Coffee Break	
1620 - 1700	Work programme and discussion on TOR for Consultants.	
1700	Close	

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**Appendix 2: List of Participants**

<u>Name</u>	<u>Institution/ Organisation</u>
1. Mr. Kweku Sersah Johnson	MES
2. Mr. S. Osei-Amakye	EPA
3. Mr. Winfred Nelson	NDPC
4. Ms. Vida Ampofo	Graphic
5. Mrs. Sally Biney	EPA
6. Mrs. Shelia O. Ashong	Private Consultant
7. Mr. Delali Nutsukpo	MOFA/DCS
8. Mr. William Abaidoo	EPA
9. Ms. Regina Sagoe	Crops Research Institute
10. Ms. Harriet Esantsi	Ministry of Trade, Industry & PSI
11. Mr. S. A. Akraasi	CSIR WR
12. Mr. Martin C. Aharbo	GEO
13. Mr. Rosalind Quartey	Ghana Statistical Service
14. Mr. W. K. Hayfron-Acquah	EPA
15. Mr. D. S. Amlalo	EPA
16. Ms. Esther Twumasi	EPA
17. Dr. Joyce Dontwi	MOFA/Fisheries Directorate
18. Mr. Kenneth Peprah	PLEC – Ghana, University of Ghana
19. Matilda Manu	TV 3
20. Lydia Annan	TV 3
21. Christopher Sowah	TV 3
22. Ofori Amofo	TV 3
23. Mrs. Patience Dampsey	G. A. E. C
24. Mr. Emmanuel Tachie-Obeng	EPA
25. J. Arthure-Quayson	Ghanaian Times
26. Eunice Asieduaa	Ghanaian Times
27. Mrs. Angelina Mensah	EPA
28. Mr. George Awudi	FOE – Ghana
29. Dr. F. A. Yeboah	SMS, KNUST
30. Mr. S. N. Buabeng	BIRD
31. Mr. Osei Karikari	EPA
32. Dr. Mathew K. Antwi	MES
33. Dr. T. Agyepong	
34. Mrs. Vera Graham	Ministry of Education Youth & Sports
35. Mr. Albert Boateng	EPA
36. Mr. William K. Agyemang-Bonsu	EPA
37. Mr. Kafui Quashigah	Meteorological Services
38. Rev. Prof. Mensah Bonsu	University of Cape Coast
39. Dr. G. J. Anim-Kwapong	Cocoa Res. Institute of Ghana
40. Prof. Ben. Baffoe-Bonnie	KNUST/SMS