



CLIMATE CHANGE AND DEVELOPMENT

CONSULTATION ON KEY RESEARCHABLE ISSUES

ANNEX II EAST AFRICAN ACTIVITIES REVIEW ACTS – VICTOR ORINDI AND OTHERS

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PROJECTS AND RESEARCH ON CLIMATE CHANGE AND VARIABILITY

Abbreviation

AIACC - Assessment of Impacts and Adaptation to Climate Change

CCD - Convention to Combat Desertification

CHAART - Center for Health Applications of Aerospace Related Technologies

CIDA

ENSO

GEF - Global Environment Facility GHA

GHACOF - Greater Horn of Africa Climate Outlook Forum

GISD - Geographic Information for Sustainable Development

ICRAF - International Centre for Research in Agroforestry

IRI - International Research Institute

ICPAC - IGAD Climate Prediction and Application Center

KARI – Kenya Agricultural Research Institutes

KEMRI - Kenya Medical Research Institute

MARA - Mapping Malaria Risk in Africa

NASA - National Aeronautics and Space Administration

NECJOGHA - Network of Climate Journalists in the Greater Horn of Africa

NEMA - National Environment Management Authority

NIMA - National Imagery and Mapping Agency

PFIA - Promoting Farmers Innovations in Africa

SESS - seconded environmental and social specialists

SIDA

SMA - Sudan Meteorological Authority

TAG

TARDA - Tana-Athi River Development Authority

UNDP - United Nations Development Programme

UNFCCC - United Nations Framework Convention on Climate Change

USAID

US-EPA

USGS - United States Geological Survey

VDCs – Village Development committee's

WB - World Bank

A. Health related projects and research in East Africa

- 1) UNEP/START/TWAS/GEF *Assessment of Impacts and Adaptation to Climate Change in Multiple Regions and Sectors* (AIACC, 2002) which is a regional study aimed at improving the understanding of the relationship between climate change parameters (precipitation and temperature) and the incidences of malaria and cholera in Lake Victoria Basin of East Africa. It is part of a 3 year project carrying out investigations in 46 developing countries and funded by GEF, USAID, CIDA, US-EPA and the World Bank. In East Africa, the countries involved are Kenya, Uganda and Tanzania. Experience from this project will be used in implementing preferred adaptation strategies to strengthen local coping capacity and monitor performance. http://www.aiaccproject.org/aiacc_studies/aiacc_studies.html. Examples of such projects include:
 - a) **Capacity Building to Evaluate and Adapt to Climate Change-Induced Vulnerability to Malaria and Cholera in the Lake Victoria Region (Shem Wandiga, National Academy of Sciences, Kenya)**: This is one of the projects of AIACC and it bears the project code AF19. The focus of this study is to improve the understanding of the relationship between climate change parameters (precipitation and temperature) and the incidences of malaria and cholera in the Lake Victoria region (Kenya, Uganda and Tanzania). The study started with characterization of baseline temperature and precipitation variability and applies existing climate models and scenarios to estimate possible perturbations to these conditions. The study used GIS layers that were constructed using historical climate and disease data and used to select pilot study sites. A time series analysis was used to correlate the relationship between climate and disease incidences. In order to assess vulnerability of pilot groups, the teams used participatory methodologies and socio-economic analysis tools, including retrospective and prospective data analysis to estimate the excess risk of malaria and cholera that may be attributable to future climate change. The study team was expected to identify priority risk groups based on exposure potential, work with pilot populations (representative of priority risk groups) to distinguish risk management strategies and select preferred options to inform policy. From the experiences gained the project will implement preferred adaptation strategies to strengthen local coping capacity and monitor performance. The study will incorporate capacity building in global change research in all its activities, by engaging stakeholders and scientists in the region. The study began in 2002 and is on-going. http://sedac.ciesin.columbia.edu/cgi-bin/aiacc/webdata_surveys.pl
 - b) Project number AF14 in Sudan. This project is entitled: Environmental Strategies for Increasing Human Resilience in Sudan: Lessons for Climate Change Adaptation in North and East Africa. The project aims to identify cost-effective environmental management measures that can contribute most to the resilience and adaptive capacity of vulnerable communities and agricultural systems in Sudan and other drought-prone countries. A series of four case studies in disaster-

struck regions of Sudan will be utilized to explore the relative resilience of communities and the productive systems on which they depend (specifically agriculture, including food crop production, silviculture and animal husbandry) to climate-related disasters and long-term climate change. In addition, a series of synthesis reports and training modules, and the development of a national and regional network that includes relevant Sudanese and North African organizations, will serve to strengthen the capacity of key actors (including decision-makers, researchers, community-based groups and intergovernmental agencies) in Sudan and surrounding countries to respond to climate change vulnerability with affordable adaptation options. Through this research, the project may succeed in bringing to light those environmental management measures that can provide a 'triple dividend' - decreased climate-related disaster vulnerability, reduced demand for international humanitarian assistance in disaster response and recovery, and achievement of national and global sustainable development objectives. Two progress reports have so far been submitted: one in [January-July 2003 Progress Report](#) and another in [July 03-January 04 Progress Report](#) http://sedac.ciesin.columbia.edu/cgi-bin/aiacc/webdata_surveys.pl

- 2) **Multi-Centre Study on the Effect of Climate Variability on Malaria in East Africa:** The mapping malaria risk in Africa (MARA) project has identified malaria risk areas in east Africa and presented the data on a GIS platform. The current proposal will advance the results of the MARA project by identifying possible relationships between early indicators of climate variability and malaria (more information about MARA can be obtained at: <http://www.mara.org.za/propsumm.htm>). This project will also provide a means of adaptation to impacts of climate variability by vulnerable populations as indicated by the IPCC. The general objective of this project is to determine if there is an association between early indicators of climate variability, malaria transmission, morbidity and mortality. The **null hypothesis** to be tested is: Malaria transmission and incidence are independent of climate events. The areas of interest for this project are sites that have unstable malaria, these being, western highlands and the northeastern arid areas of Kenya, northern and northwest Tanzania. The specific sites are Kericho at 2000m, Wajir in Kenya and Western Usambara (1200-2000m) and Dodoma in Tanzania. The project will be carried out in two phases: Phase I will take 18 months and Phase II will take three years. This is a joint proposal between the Department of Tropical Medicine of Tulane University, the Kenya Medical Research Institute (KEMRI), and the IRI on "*Anopheles mosquitoes and climate in Kenya*" has been submitted to the NIH. Andrew Githeko, a trainee in Bamako, was one of the foreign collaborators from Kenya. <http://iri.columbia.edu/outreach/training/course/bamako1999/report/Bamako99report.html>
- 3) The National Aeronautics and Space Administration (NASA's) Center for Health Applications of Aerospace Related Technologies (CHAART) has undertaken a review documenting research undertaken in public health projects involving the world's major diseases that are thought to have environmental components that can be monitored using remotely sensed data. These include: Chagas' disease, cholera, dengue fever, filariasis,

hantavirus pulmonary syndrome, leishmaniasis, lyme disease, malaria, river blindness, plague, Rift Valley fever, schistosomiasis, trypanosomiasis (sleeping sickness), and yellow fever. Projects to map the vectors of these diseases by satellite have been tried in a wide range of countries, including: Belize, Benin, Gambia, Kenya, Mexico, Senegal, and USA. http://www.eohandbook.com/eohb05/ceos/part2_2.html

The National Imagery and Mapping Agency (NIMA) in conjunction with NASA is providing terrain elevation data of several areas of Africa (i.e., Niger Basin, Lake Victoria Basin, Kenya/Tanzania Coastal Zone, and the Four Corners/Limpopo Basin). This data is at 90-meter spatial resolution (i.e., for the selected areas, an elevation data point is provided every 90 meters), the best resolution available to date. This data is a result of a cooperative flight of the NASA Space Shuttle, known as the Shuttle Radar Topographic Mission in February 2000. The Geographic Information for Sustainable Development (GISD) project will demonstrate the application of this data. By 2004, processing of all of the 90-meter post spacing data collected during this flight was completed and is available to the public through the United States Geological Survey (USGS). This will be the first time that terrain elevation data will be available worldwide. This data will prove invaluable in sustainable development programs, including water flow analysis and modeling, disaster response/mitigation planning, and transportation and infrastructure initiatives. This project is funded by NOAA. <http://www.noaa.gov/lautenbacher/wssd-gisd.htm>

- 4) **Will the El Nino Southern Oscillation (ENSO) Increase Malaria in the East African Highlands?** (Kenya, East African Highlands) - Steve Lindsay, Ph.D., University of Durham, England This project was funded by NOAA in 1998.
- 5) **ENSO & Vector Borne Disease Pilot Project: Malaria and Mosquitoes (Kenya-East African Highlands)** - Andrew Githeko, Kenya Medical Research Institute, Kakamega. This project was funded by NOAA in 1998

B. Climate Change Information, early warning systems

- 1) **Climate Forecast Applications in Uganda: Packaging and Dissemination of Climate Forecast Information in Uganda** (Uganda) This project aimed at carrying out a survey among the Crop and Livestock farmers (peasants) and fishermen to establish the best method of conveying the climate forecasts to them. The project was completed in 2001 and report received during GHACOP 7. The study was funded by NOAA/OGP. http://www.ogp.noaa.gov/mpe/csi/econhd/2000/phillips_pr2002.pd
- 2) In the 2003 report "Best Practices for the Integrated Drylands Development Programme for Uganda", one of the best practices highlighted is the Radio and Internet (RANET) Uganda Program which is implemented in rural communities in Uganda by the [Department of Meteorology](#) and partners who include World Vision, Action Aid and Africa 2000 Network. RANET program ensures that farmers in rural communities timely access and use climate information forecasts, and other development information on internet, by using *WorldSpace* satellite and receivers together with computers. Through Partnership approach, 10 RANET sites in sub-counties have been established with World

Vision, 10 RANET sites with Action Aid, and 4 sites with Africa 2000 Network. [Click here](#) for a copy of the Best Practices report (WORD format). <http://www.wougnet.org/Support/WSprogram.html>

- 3) **Developing Awareness and participation strategy for use and dissemination of climate forecasts: The case of Kordofan State-Sudan. Principal Investigator: Mrs. Balgis Elasha, Cities for Climate Protection-Higher Council for Environment and Natural Resources (CCP-HCENR) Sudan.** This project aimed to develop a dissemination strategy of climate forecasts based on community participation. The project was due to start in January 2001. Clearance of the implementing NGO is being awaited. The study was funded by NOAA/OGP. <http://www.dmcn.org/general/paptable.html>
- 4) **Economic Evaluation of Seasonal climate Prediction in Sudan (Case Study of the 1999 Rainy Season). Principal Investigator: Dr. A.K. Abdala - Sudan Meteorological Authority (SMA).** The objectives of this project were; first to assess the impact of the 1999 floods on mechanized farming areas of Sudan and areas vulnerable to flooding in central and northern Sudan and secondly, to determine the benefit that might have been derived from the use of the climate prediction developed by the Capacity Building Training Workshop (CBTW) held in Nairobi Kenya for that season. This project is not yet started. Clearance of the implementing NGO being awaited. This study is funded by NOAA/OGP. <http://www.dmcn.org/general/paptable.html>
- 5) The International Research Institute (IRI) projects entail **Improvement of regional climate models, prediction and early warning in the GHA.** This activity contributes on improved monitoring, prediction and applications for timely early warning of climate related disasters in support of regional disaster preparedness and other sustainable development objectives in the Greater Horn of Africa (GHA) under the USAID/WMO supported IRI/ICPAC project. The IRI and IGAD Climate Prediction and Application Center (ICPAC) have provided framework for institutional capacity to apply climate information in mitigating impacts over the greater Horn of Africa. Enhanced collaborations between the two institutions has initiated framework in building regional and national capacity in seasonal forecast operations, training and applications activities with key partners in transforming climate products in vulnerability analysis, food security, and hydrological modeling and water resources assessments. <http://iri.columbia.edu/africa/project/ImproveForecastGHA/>
- 6) One of the IRI projects **Regional Climate Prediction and Risk Reduction in the Greater Horn of Africa Computing Infrastructure and Technical Support to the GHA Program** seeks to improve regional forecast skills and to implement sector based pilot application projects. The project depends on extensive collaboration with multiple partners. Towards the end of the project cycle, progress will be assessed and new goals and objectives formulated for subsequent phases. The goal of the project is: Improved monitoring, prediction and applications for early warning of climatic hazard events in support of disaster reduction and other regional sustainable development objectives. The time frame for the project is from February 28, 2002 - June 30, 2005. The External

Funders are United States Agency for International Development, Office of Foreign Disaster (USAID/OFDA) <http://iri.columbia.edu/africa/project/RiskReductionGHA/>

- 7) IRI has been working in Africa since 1991 and currently hosts programs in twelve countries on the continent with seven field offices in Nigeria, South Africa, Kenya, Angola, Malawi, Uganda, and - most recently - in Liberia. IRI started its first Africa democracy program in Nigeria and followed with programs throughout the continent. IRI continues to expand its reach in Africa this year by opening offices in both Uganda and Liberia and possibly beginning activities in Ethiopia and Tanzania. <http://www.iri.org/region.asp?region=1185560545>.

a) A pilot project by IRI entitled the **Rift Valley Fever Prediction Model for the Greater Horn of Africa and the Middle East** has been started to design a decision support model for the prediction of Rift Valley Fever outbreaks in the Horn of Africa. The model will provide an early warning with a longer lead-time so that livestock exporters and importers can take proactive appropriate decisions without disrupting the livelihood of the nomadic people in the region. <http://iri.columbia.edu/africa/project/RiftValleyFeverGHA/>.

b) The IRI pilot project in Kenya **Machakos, Kenya** has the following objectives: First, to assess and document adjustments to farm-level responses to seasonal forecasts, and elicit farmers' subjective evaluation of (dis)benefits. Second, to assess the potential to enhance the utility of seasonal forecasts by tailoring to farmer needs. Engage farmers in (preliminary) participatory evaluation of alternative climate information products, communication protocols and advisories; thirdly, to conduct economic evaluation of decision responses to seasonal forecasts and fourthly, to identify constraints to desired decision responses to forecasts, and conduct a preliminary assessment of the feasibility of working with suppliers of production inputs and credit to reduce input constraints. This project is on going in Machakos District of Kenya. In 2001, the IRI led by Jennifer Phillips run a workshop in Jinja, Uganda on "Climate Information and the Media." This workshop was funded by the USAID project on Capacity Building in Regional Climate Prediction and Applications for the Greater Horn of Africa. During the two-day workshop, the NECJOGHA (Network of Climate Journalists in the Greater Horn of Africa), a group of enthusiastic young journalists in East Africa who have formed a network of climate journalists in the Greater Horn of Africa was involved. This group was formed to help their communities by providing them with crucial information on climate and climate-related issues. The idea for this network was planted at this particular workshop.

Since that initial climate and the media workshop, the group of journalists belonging to Network of Climate Journalists in the Greater Horn of Africa (NECJOGHA), representing all ten countries in the Greater Horn, has met at each semi-annual Climate Outlook Forum held in East Africa. In March of 2002, NECJOGHA elected an interim governing committee, and the Network was "officially launched" at the Greater Horn of Africa Climate Outlook Forum (GHACOF) in August 2002. To date, five countries have interim national associations in place: Uganda, Tanzania, Burundi, Rwanda and Kenya. One topic keenly followed among members of NECJOGHA is that of using local

languages in broadcasts of climate information. Until recently, most climate information, especially seasonal climate forecasts, was broadcast by the Meteorological Services in the national language, which is often not the language spoken by most rural dwellers. <http://www.earth.columbia.edu/news/2002/story12-17-02.html>

- 8) a) The UNDP/GEF funded project on **'Coping with drought and climate change: best use of climate information for reducing land degradation and conserving biodiversity'** supports sustainable livelihoods of drylands populations in Burkina Faso, Ethiopia, Kenya, Mali, Mozambique, Niger, Senegal and Zimbabwe. The programme promotes an integrated ecosystems management approach that hinges on better use of local and scientific knowledge on climate in farming and herding. It offers farmers/herders options for long-term drought management to emergency responses. Given the complex but close linkages between droughts, land degradation, biodiversity and climate change, the programme is giving some attention to the interface among the three Conventions, UNCCD, and the Convention on Biological Diversity (CBD) and the United Nations Framework Convention on Climate Change (UNFCCC). <http://www.undp.org/seed/unso/concepts&programs/ccp.htm>

The programme was initiated in 1999, and has since accomplished six tasks: 1) developed the conceptual framework, 2) defined the elements of the programme, 3) built a network of partners; 4) linked programme to country priorities, 5) mobilized resources and 6) boosted country awareness and commitment.

The primary partners of this programme include, drought affected countries including Burkina Faso, Ethiopia, Kenya, Mali, Mozambique, Niger, Senegal and Zimbabwe, the United Nations Development Programme, Drylands Development Centre, the Global Environmental Facility (GEF), the US Drought Mitigation Centre of the University of Nebraska (USNDMC), the US National Oceanographic and Atmospheric Administration (NOAA), the World Meteorological Organization (WMO), International Research Institute for climate prediction (IRI) of Columbia University and regional bodies such as SADC, African Centre of Meteorological Applications for Development (ACMAD), Centre Régional de Formation et d'Application en Agrometeorologie et Hydrologie Opérationnelle (AGRYMET) and Drought Monitoring Centres located in Kenya and Zimbabwe.

The GEF secretariat has approved funding of \$US425, 000 for the project development fund Block-B (PDF-B). These funds will enable the eight African countries (Burkina Faso, Ethiopia, Kenya, Mali, Mozambique, Niger, Senegal and Zimbabwe) to develop 7-10 year project documents in tune with their national priorities. The specific activities to be undertaken are: 1) development of a full project brief, 2) needs assessment for capacity building, 3) development of resource mobilization strategies, 4) identification of demonstration sites, 5) on-site biodiversity and socio-economic mapping, 6) supporting on-going country efforts to raise awareness and establish consensus for the project.

UNDP is finalizing agreements on the disbursement of funding to participating countries for the development of the first phase of the project. The project was scheduled to begin in July 2002.
<http://www.undp.org/seed/unso/concepts&programs/ccp.htm>

b) SEI-Boston assisted in the development and implementation of national capacity strengthening projects in Sudan and Tunisia. They worked with national counterparts to organize and deliver workshops on vulnerability and adaptation to climate change, on GHG inventory preparation, and on GHG mitigation analysis. These projects, done on behalf of the UNDP/GEF, also support development of National Communications under the UNFCCC. 1995-present. http://www.seib.org/energy_enviro_climate_sp.html

- 9) **An Assessment of the Potential Benefits of Seasonal Rainfall Prediction in Relation to Hydro-Electric Power Generation in Kenya: A Case Study of the Impacts of the 1999/2000 droughts and the accompanied power rationing (Kenya)** - Christopher Oludhe, Department of Meteorology, University of Nairobi, Kenya. The overall objective of this study was to assess the impacts of the 1999/2000 droughts on hydropower generation in the Tana-Athi River Development Authority (TARDA) region of Kenya and also to determine the benefits that might have been derived from the use of DMCN-Nairobi Climate Outlook Fora. Its implementation started in November 2000 and the first progress report was submitted in February 2001. The study was funded by NOAA/OGP. <http://www.ogp.noaa.gov/mpe/csi/esd/africa/fundproj/energy/project1.pdf>
- 10) **Climate Forecast Applications in Uganda: Packaging and Dissemination of Climate Forecast Information in Uganda (Uganda)** - Paul Isabirye, Uganda Meteorological Department. This project aimed at carrying out a survey among the Crop and Livestock farmers (peasants) and fishermen to establish the best method of conveying the climate forecasts to them. The project was completed in 2001 and report received during GHACOP 7. The study was funded by National Oceanic and Atmospheric Administrative-Office of Global Programs (NOAA/OGP). http://www.ogp.noaa.gov/mpe/csi/econhd/2000/phillips_pr2002.pdf
- 11) The project **Early Warning Systems for Monitoring Livestock Nutrition for Food Security of Humans in East Africa** aimed at developing an early warning system for the arid regions of East Africa. It will provide information that can help adjust livestock number during drought to reduce negative impacts on the land. It was funded by USAID.
- 12) The Global Climate Observation System (GCOS) and its regional partners in Eastern and Southern Africa, the Drought Monitoring Centres in Nairobi (DMCN) now ICPAC and Harare (DMCH), organized a GCOS Regional Workshop for Eastern and Southern Africa (ESA) in Kisumu, Kenya from 3 to 5 October 2001. This workshop was the second in a series of ten regional workshops that GCOS has planned in response to the concern of the Conference of the Parties to the UNFCCC regarding declining climate observation networks for climate change monitoring, detection, attribution, and assessment of the associated socio-economic implications. This workshop was supported by the Global Environment Facility (GEF), the United Nations Development Programme (UNDP), the UNEP, and the World Meteorological Organization (WMO). This support enabled the participation of 25 Directors of the National Meteorological and Hydrological Services

(NMHSs) (or their representatives) and national climate change coordinators from some 22 countries of the Eastern and Southern African region.

<http://www.wmo.ch/web/gcos/GCOS%20Kisumu%20Report.pdf>

- 13) **Frost Prediction and Protection in Tea Producing Areas of Kenya.**
Principal Investigator: Mr. Stanslaus M. Gachara -Kenya Meteorological Department (KMD). The objectives of this project were to:
- Carry out a study aimed at developing operational tools for frost prediction and protection.
 - Evaluate and review the extent to which farmers and institutions in tea industry have been able to cope with frost problem in the past.
 - Devise a simple method for forecasting and early warning of drought
- The project started in November 2000 and the first progress report was submitted in February 2001. This project was funded by NOAA/OGP in the year 2000.
- 14) **Museum exhibitions of the drought monitoring centre-Nairobi and forum climate outlook products and the potential impacts on key development sectors in the country** (Kenya) - Simon Gatheru, National Museums of Kenya. The objectives of this project were: to disseminate information on seasonal climate outlooks through the use of an alternative dissemination approach (museum exhibitions) in order to capture the attention of the wide range of museum visiting clientele and to examine how the school children and the visiting public use information on seasonal climate exhibited in the museum.
- The exhibitions were successfully opened at the NMK Headquarters on 27th April 2001. This project was funded by NOAA/OGP <http://www.dmcn.org/general/paptable.html>
- 15) **Investigation on Utility of Weather and Climate Forecasts on Farming Activities in Kwale district, Kenya** (Kenya) - Josephine M. Mwinamo, Kwale High School, Kwale, Kenya. The objectives of this project were: to assess the relevance of seasonal forecasts to farmers in Kwale, to find out how best the farmers and other users can use such forecasts to improve their production activities and evaluate the agricultural potential of the district in terms of crop, fish and animal production, and the contribution of seasonal climate forecasts. The project was successfully completed and final report submitted to the DMCN. This project was funded by NOAA/OGP in the year 2000.
- 16) **Capacity building workshop on the role of media in the dissemination of daily and seasonal weather forecasts in Tanzania** (Tanzania) - Jerome Ng'itu, Tanzania School of Journalism. The objectives of this project were: to unveil the problems facing Tanzania Meteorological Agency (TMA) in using media to disseminate weather forecast reports and to create awareness among meteorological workers and the media on the need to work together. The project was successfully implemented as a two days' media Workshop on 8-9 February 2001 in Dar -es-Salaam. The final report was produced. The project was funded by NOAA/OGP in 2000.

- 17) **Harnessing Local Environmental Knowledge - Promoting Farmer Innovation (PFI)** Programme is a cross-cutting programme funded by the Government of the Netherlands. This programme has been implemented in three East African countries (Kenya, Tanzania and Uganda) within the framework of the Convention to Combat Desertification (CCD) and forms an integral part of National Action Programmes at country level. It is managed by the UNDP Drylands Development Centre and supported by UNDP country offices. The programme's focus is on innovators – local farmers who are experimenting and developing better land husbandry techniques themselves. It starts by documenting local farmer innovations such as improved water harvesting, erosion control and agro-ecological farming practices. Visits between innovators are arranged, networks are developed to exchange ideas among them, and then other farmers are invited to observe and learn from best-bet innovations. Under the farmer innovator methodology, roles of researchers, extension agents and farmers are significantly changed. The researcher comes to the field to join the farmer in monitoring and experimentation, and the extension agent becomes a facilitator to help the farmer spread knowledge and know-how. The innovative farmer is both a researcher and a source of learning and inspiration for his/her fellows. There is a new organic partnership between researchers, extension agents and farmers. The Programme is not only at the grassroot level but is having a real impact at policy level. In Kenya, for example, the approach is being incorporated in the new national agricultural extension system while in Uganda; the Modernization of Agriculture programme integrates the PFI approach.

The UNDP has entered into a collaborative PFI/Farmer Field School initiative entitled 'Farmer Innovations and New Technology Options for Food Production, Income Generation and Combating Desertification'. Funding was leveraged from UNDP's country office programme for activities for the first two years of this five-year initiative. The idea is to make use of PFI's expertise in identifying new technology to provide input into – and thus fortify – FAO's Farmer field school (FFS) programme in Kenya, under which farmer groups test technologies and disseminate them. This project, which began in mid 2001, may prove to be a model that can be copied widely elsewhere. GTZ is also using its own funds to extend the programme for 6 months – and potentially longer. Another indication of PFI's institutionalization and sustainability is that the four innovator clusters have applied to become sub-groups of an overall Innovators Association.

A phase two of the programme '**Promoting Farmer Innovations in Africa**' (PFIA) has been developed. It is designed to consolidate and build upon the positive experience of previous initiatives. PFIA will continue and expand as a priority, current farmer innovator programme already started in Ethiopia, Kenya, Uganda, Tanzania, Zimbabwe, Burkina Faso, Cameroon and Tunisia. New programmes will be initiated in a further six countries in four regional clusters of Eastern, Southern and West and North Africa. <http://www.undp.org/seed/unso/concepts&programs/ccp.htm>

- 18) The Biodiversity Support Programme (BSP) supported the [Ugandan Ministry of Natural Resources](#) to hold a national workshop in 1997 on developing a Climate Change

Adaptation Strategy for Uganda. Participants included: experts from all the relevant Ugandan Ministries/Departments, representatives from educational and research institutions, and NGOs. Prior to this, a series of reports was prepared by the five leading government agencies/sectors with three main components: 1) a case study of recent flood or drought event(s), including damage caused in that sector and actions taken to reduce damage before, during and after; 2) identification of adaptation/response options; and 3) identification and description of policies in that sector that affect adaptation. The Ministry of Finance and Economic Planning also prepared a paper on National Development Policy and how the policies are likely to offset climate change and vulnerability. Copies of these documents can be obtained from [Bwango-Apuuli](#). The third project phase will be finalized with a WRI/BSP publication on developing adaptation strategies in Africa with expected delivery date of July, 1998. <http://www.worldwildlife.org/bsp/bcn/learning/african/gcc1.htm>

- 19) A PhD research by Goulden.M, entitled: Human adaptation to climate variability and change in East African lakes and wetlands was scheduled to take place in Uganda, in association with the Makerere University. Both qualitative and quantitative methods such as questionnaire surveys and in-depth interviewing were used in several case study villages that have experienced differing resource fluctuations. The impacts of current climate variability were compared with possible future impacts under different scenarios of climate change. This was done by carrying out a physical analysis using rainfall data, satellite images and a lake water balance modeling approach which will first use historical climatic variables and then outputs from Global Climate Model. Key issues and contexts were explored in an initial 6 week field trip in February and March 2003. The phase of field work will be undertaken between October 2003 and March 2004. This research was funded by the Economic and Soil Research Council/National Environment Research Council (ESRC/NERC) <http://www.tyndall.ac.uk/research/phd/goulden.pdf>

20) The DMC Pilot Application Projects are meant to: 1. Assess and communicate examples of successful use of seasonal climate prediction products, clearly describing how the products influence decision-making, and the value of such products to specific sectoral users.

2. Assess and communicate examples of impediments to successful use of seasonal climate prediction products.

3. Develop new methodologies for better production, dissemination, interpretation, use, and evaluation of climate information and seasonal prediction products in the mitigation of extreme climate events. This is done through identification of the requirements for improved forecast prediction, delivery and application and is expected to lead to enhanced regional expertise to disseminate, interpret, and apply seasonal climate prediction products in the various socio-economic sectors often impacted by climatic variability.

4. Demonstrate how Seasonal Climate Forecasts (SCFs) can alter perceptions in the user community and change management decisions in sectors such as agriculture, food security, water resources management, hydropower, fisheries, forestry, public health etc.

5. Carry out research activities aimed at developing new applications tools that will enable decision-makers to take advantage of seasonal forecast information.

Pilot Application Projects involve partners from across the "end-to-end" spectrum ranging from the production to dissemination, interpretation, use, and evaluation of climate forecasts. Currently there are thirteen (13) pilot application projects, which have been funded through support received from NOAA/OGP. Individual Principal Investigators in collaboration with the concerned National Meteorological/Hydrological Services and the Drought Monitoring Centre, Nairobi, are implementing these projects. In addition, there are seven other projects, which have been reviewed but are not yet funded and another twenty-six (26) new (not reviewed) projects. The total cost for the ongoing thirteen projects is \$80,000. The budget for the seven already reviewed but not yet funded projects is \$81,015 while the new twenty-six projects require about \$376,022. <http://www.dmcn.org/general/pap.html>

- 21) A research: **Livelihoods, Vulnerability and Adaptation to Climate Change in the Morogoro Region, Tanzania** examines livelihood responses to climate variability and other stressors in the Morogoro region in south-eastern Tanzania, with an aim to understand the implications of these responses to adapting to changing climate in the region in the future. The results indicate how farmers have responded to draughts by expanding cultivations, reducing fallows, switching crops and engaging in wage employment or in charcoal, timber and brick production. Farmers also frequently migrate on temporary basis to locations which have favourable farming conditions or better access to markets. More permanent migration to towns and cities has also increased. Farming practices and heavy reliance on forest resources have resulted in soil erosion and deforestation which have reduced water retention, increased flooding after rains and reduced water flow between the rains. These environmental changes complicate living with increased climate variability in future because reduced natural resource base may not be able to provide the same safety net functions as it currently provides during periods of stress. This would be particularly problematic for those who live in more remote rural villages and who suffer from limited access to markets, public services and utilities. Efforts to reduce vulnerability to increased climate variability in the region would need to safeguard the natural resource base, promote market access and augment human capital. Natural resource base demands attention because its safety net functions are important to large proportions of rural and urban population and because the loss of ecosystem services would increase the exposure of large downstream populations to floods and scarcity of water. The promotion of market participation can provide incentives to diversification and intensification and help reduce dependence on risky agricultural production. Finally, diversification of livelihoods is constrained by deficiencies in physical health, skills and knowledge. Therefore, public spending and programs related to health, education and wellbeing can facilitate diversification in the future. http://www.uea.ac.uk/env/cserge/pub/wp/edm/edm_2004_12.htm
- 22) IUCN is implementing many projects to promote livelihood security and forest conservation. In East Africa, restoration is being used as a tool to promote both livelihood security and forest conservation. The following examples from the region make it clear that the lessons from East Africa are pertinent for the rest of the world:
- **Tanzania:** In the semi-arid Shinyanga region over 800 villages and their inhabitants improved their livelihoods by working in partnership with the government to revitalize a traditional practice of natural resource management. To date over 250,000 ha have been

restored to provide much needed forest products for local use, including fuel and building material, food and medicine, as well as important products to meet contingency needs.

- **Kenya:** Following a severe drought, the pastoralist Turkana people re-established about 30,000 ha of valuable woodland in one area to provide food security for humans and livestock, as well as to reduce wind erosion.
- **Uganda:** A Dutch-funded tree planting project to compensate for emissions from European power stations has broadened its initial narrow carbon sequestration objective to include a range of social and environmental benefits for the local community.

There is a clear message here for the next revision of the Poverty Reduction Strategy Papers (PRSPs) in these three countries, that the goods and services provided by forests and tree-dominated landscapes need to be incorporated into the PRSPs in a way that reflects their importance to the lives of rural people.

http://www.iucn.org/themes/fcp/experience_lessons/flr.htm

- 23) **Development and Climate Change in Tanzania: Focus on Mt. Kilimanjaro is an output from the OECD Development and Climate Change Project:** an activity being jointly overseen by the Working Party on Global and Structural Policies (WPGSP) of the Environment Directorate, and the Network on Environment and Development Corporation of the Development Co-operation Directive (DAC- Environet). The overall objective of the project is to provide guidance on how to mainstream responses to climate change within economic development planning and assistance policies, with natural resource management as an overarching theme. Lessons from this work are expected to have implications for the development assistance community in OECD countries, and national and regional planners in developing countries. <http://www.oecd.org/dataoecd/47/0/21058838.pdf>
- 24) Situated on the Kenya Tanzania boundary in Taita Taveta district, the 30 sq km Lake Jipe is dying. The lake has lost about 50 % of its water mass within the last 10 years, due to siltation caused by destruction of the water catchment area and farmlands, proliferation of the typha weed, and diversion of fresh water recharge from river Lumi. The lake has increasing salinity, decreasing depth and biodiversity. Hippos and crocodiles have migrated upstream due to salinity. The lake is of global importance and the only place in the world where the fish *Oreochromis jipe* is found, and which is on the verge of extinction.

In a joint effort to salvage the situation, the UNDP GEFSGP and the Biodiversity Conservation Programme (BCP) of the European Union have committed US\$416,000 (US\$250,000 from the GEFSGP and US\$166,000 from the BCP) for the rehabilitation of the lake. The two funds and other partners are working together through the local communities for:

1. Site wide baseline data collection and an EIA will precede implementation of rehabilitation projects.
2. De-siltation and restoration of the original course of river Lumi.
3. Removal of illegal water abstraction canals.
4. Rehabilitation of an existing water project to provide drinking water to the community.

5. Introducing agro-forestry.
6. Fish farming - raising endemic and other fish species in ponds.
7. Capacity building for sustainable fishing including right size of nets.
8. Protection of Njoro Springs
9. Bringing the communities from both sides of the boundary to hold consultations to reduce conflict.

Participation of local communities paramount
 The GEFSGP funds will be granted through six projects to community based groups coordinated by the East African Wildlife Society EAWLS. The BCP funds will be granted through a project implementation Committee (PIC) which will, in turn, work with community groups. These projects are due to implementation in October 2004.

GEFSGP Tanzania

For maximum lasting effect, the Tanzanian side of the lake will have to be addressed. "The UNDP GEFSGP Tanzania has expressed interest to do similar projects on the Tanzanian side", says Nehemiah Murusuri, the Tanzania GEFSGP National Coordinator

Increased populations in the Arid and Semi Arid Land areas place additional pressures on land utilization. Sharing fewer resources with increasing numbers of people requires intervention to radically boost the earning potential of the available resources, and ensure a sustainable source of income generation.

The limited income generation opportunities are all susceptible to drought and other conditions typical of the ASALs. The increase of populations in the areas place severe pressure on the limited resources, and biodiversity is under continuous and ever increasing pressures. Other identified threats include:

- Land subdivision
- Alternative land usage
- Cattle rearing
- Soil degradation
- Pests
- Unsustainable harvesting practice.

- I. 25) A UNDP funded project in Baringo District of Kenya entails: the planting of aloes which provides real opportunities for dryland rehabilitation. Aloes are xerophytic plants requiring very little moisture, adapt to the conditions of the drylands very well. Aloes occur naturally in many dryland areas, often preferring barren rocky outcrops, hillsides and inhospitable rangelands. Studies show that where aloes are introduced or encouraged they support other flora and fauna and could be instrumental in rangeland rehabilitation. Aloe propagation and cultivation is being undertaken in a project spearheaded by Land Mawe that aims at conserving aloe species, improving rangelands and providing communities with income generation opportunities.

26) The CLACC Fellowship Programme

The CLACC fellowship programme aims to build the capacity of civil society organizations in 12 LDCs, on issues relating to adaptation to climate change. In 2004, An ACTS fellow spent 2 months at CICERO, Norway and prepared 3 country reports on adaptation to climate change that are currently being reviewed for publication in *Ecopolicy Series (ACTS)* and *Gatekeeper Series (IIED)*. In early 2005, three fellows (one each from Sudan, Uganda and Tanzania) Linkages between climate change and desertification in East Africa one and a half months at ACTS (being the regional coordinating partner for East Africa) working on adaptation to climate change.

A Regional Policy workshop on vulnerability and adaptation to climate change was held in Nairobi in January 2005. it was co-organized with CICERO and IIED. The objective of the workshop was to provide experience of local adaptation and identify linkages between different policy areas that are critical to adaptation to climate variability and change in the Eastern Africa region. In-depth Country level studies are to be undertaken in between March and December 2005 in each of the study-countries by partners in each country and knowledge gained to be shared through national and regional level workshops. Activities include initiation of contacts with and information sharing with the official NAPA process in each country. Dissemination and mainstreaming phase will take place between January 2005 and June 2006 will include the development of region-specific web-based resources on adaptation to climate change in each region (in the appropriate language for the region). Also publications of reports (in local languages where appropriate), papers in journals, policy briefs for (national and regional) policy makers and articles in local and national (printed and electronic) media. Also, side-events at COPs, Subsidiary body meetings and other relevant international and regional meetings. These activities will contribute to output one under section 3.1 of the ACTS strategic plan “enhanced capacity to implement global Environmental agreements and programmes by African governments” and output 3 under section 3.2 “enhanced awareness among relevant stakeholders”

27) Linking Climate Adaptation (LCA)

The key research aim of LCA project is to determine what kind of procedural and institutional frameworks are needed to ensure that locally determined adaptation needs are linked ‘upwards’ to national and international policy and institutional structures. The project will identify conceptually which actors, funding flows and policy mechanisms must be linked to successfully support community led adaptation. These will assist communities and developing countries adaptation experts share theoretical, policy and experiential knowledge and contribute to easing capacity related bottlenecks. It will also identify longer-term research priorities needed to support community led adaptation in the future. This work is funded by DFID through IDS, Sussex and IIED, London

C. Food security and Agriculture

1) **Integrated Modeling and Assessment for Balancing Food Security, Conservation and Ecosystem Integrity in East Africa:**

This is a GL- CRSP project and was designed with a small component to develop a pastoralist socio-economic model that could be linked to the Savanna ecosystem model. In this way options and scenarios could be investigated for their impacts not only on the ecosystem but also on pastoralist households and their welfare. The activities of this subcomponent concentrated on two of the case study regions: Ngorongoro Conservation Area (NCA), N. Tanzania, and Kajiado District, Southern Kenya areas with very different specific problems but that share common problems relating to pastoralist, wildlife conservation, and agriculture.

A socio- economic household-level model was constructed and calibrated for NCA, and a range of scenarios were simulated, the model named PHEWS (Pastoral Household and Economic Welfare Simulator Model) produced results to show that all households depend on outside sources of calories.

The overall goal was to be able to predict interactions between livestock and wildlife in terms of spatial dynamic competition for forage and disease transmission and effects. The modeling work as well as the IMAS (Integrated Modeling and Assessment System) field studies were designed to quantify the impacts of land tenure, enterprise scale, and population increase and conservation policy on four objective functions: pastoral welfare, livestock production, wildlife and ecosystem integrity. This project was carried out in three years 1997-2000. No socio-economic work was carried out in Uganda during this phase. This project is funded by USAID.

http://nrel.colostate.edu/projects/imas/prods/finals/PHEWS_FR.pdf

2) In response to Climate Change Vulnerabilities the Global Change System for Analysis, Research and Training (START), the Third World Academy of Sciences (TWAS), the UNEP and the Intergovernmental Panel on Climate Change (IPCC) joined together with funding from the Global Environment Facility (GEF) and launched the project Assessment Impacts and Adaptations to Climate Change (AIACC). http://www.aiaccproject.org/meetings/Dakar_04/Dakar_final.pdf

3) CIMMYT with assistance from CIDA since 1985 for its East African cereals programs has developed many varieties of drought –resistant maize and wheat that have improved farm productivity which is still far from potential yields. This program is continuing its work to increase maize and wheat production further in the region in a sustainable manner. <http://www.gm-uncd.org/FIELD/Bilaterals/Can/can99en.pdf>

4) Kenya has described its Baringo lowlands as an ecological emergency. A shift from pastoralism to subsistence farming has removed vegetation and eroded the land. Under its People, Land, and Water (PLAW) program, IDRC is working with local communities in Kenya. This entails Rehabilitation of Arid Environments Charitable Trust to research

strategies to revegetate damaged land and establish cooperatives to manage natural resources sustainably. <http://www.gm-unccd.org/FIELD/Bilaterals/Can/can99en.pdf>

- 5) FEWS NET is following-up to establish the reasons for the apparent deterioration of food security in Shinyanga Region of Tanzania. As part of its routine food security monitoring system, the Ministry of Agriculture and Food Security (MAFS) of Tanzania assessed the situation in Shinyanga Region in January and observed rising levels of food insecurity. MAFS established that in four districts (Bariadi, Kishapu, Maswa and Meatu), the number of food insecure people has increased to about 77,660, from approximately 65,320 persons established by the Food Security Information Team (FSIT) in August 2004. Moreover, while FSIT predicted that food interventions would no longer be needed after February, MAFS reported that the food security situation would return to normal only after March 2005.

FEWS NET is also monitoring the Arusha Region, because the below normal vegetation conditions are affecting pastoral areas by threatening pasture availability, which in turn are likely to perpetuate poor livestock health and reduced calving rates and milk production, consequently lowering availability of livestock products for both household consumption and sale for income generation. The poor vegetation conditions observed in the southern sector may imply poor crop performance. No projects have kicked-off yet. (Tanzania Food Security Update February 2005) in

<http://www.fews.net/centers/innerSections.aspx?f=tz&pageID=monthliesDoc&m=1001529>

- 6) Kenya is among 9 countries of sub-Saharan Africa that have come together to form a consortium called the Desert Margins Initiative (DMI). The others are: Niger, Burkina Faso, Mali, Senegal, Botswana, Namibia, Zimbabwe, and South Africa. A "bottom up" approach is the basic premise for the development of the DMI as an integrated local, national, sub-regional, and international action research program for developing sustainable natural resource management options to combat desertification in the region. The organizations involved are: IDRC, the International Crops Research Institute for the Semi-Arid Tropics, Naimey, Niger (ICRISAT). The project is scheduled for 10 years, starting 2002. The key overriding goal of the DMI is to increase the food security of poor, rural populations and contribute to poverty alleviation by halting or reversing desertification. Its mission is to unravel the complex causative factors, climatic and human-induced; formulate appropriate holistic solutions; and develop integrated approaches to halt or reverse land degradation. The DMI partners have a 10-year project plan. This project aims to support DMI activities in three countries: Burkina Faso, Kenya, and Botswana. Global coordination of the program is being carried out by the International Crops Research Institute for the Semi-Arid Tropics, Naimey, Niger (ICRISAT). Research activities are under implementation at the national level through the national coordination committees. http://www.gm-unccd.org/FIELD/Research/PJ_DMI.htm

7) The purpose of a **marginal farmers' project in Eastern Province of Kenya** was increased food security of people in marginal farming areas in Kenya and marginal farmers taking greater control of the decisions that affect their lives. Increased food production of farmers in the Tharaka Nithi and Kathekani activity areas, and experience from there and elsewhere was used to inform and influence other organisations on ways of working with marginal farmers in Arid and Semi-Arid Land (ASAL) areas. The funding agency was the department for International Development (DFID) – UK while the contracting agency was the Intermediate Technology Development Group (ITDG). The total amount given was 316,377 GBP. The project started in 1997 and ended in 2001. http://www.gm-unccd.org/FIELD/Bilaterals/UK/Ken/PJ_Mar.htm

8) The objectives of the **Meru Dryland farming project in Kenya** were: To help settlers in the semi-arid zone adopting appropriate farming methods and improve their livelihoods without damaging the natural resource base and to reduce the vulnerability of poor people and to increase their productive capacity by:

- Helping farmers define their research and extension needs.
- Putting farmers in touch with resource institutions.
- Offering a wide range of options to farmers.
- Developing local extension systems.

This project was funded by DFID and took a period of five years starting in 1997 and ending in 2002. The recipient institution was SOS Sahel International. <http://www.sahel.org.uk/programmes/kenya.htm>

9) A special programme on **food production in support of food security (SPFS) in Tanzania was funded by FAO**. The main objective of the project was to generate adequate domestic and marketable food supply to feed the rapidly growing population, by increasing food production and productivity, in particular by reducing year-to-year variability of production, and to improve access to food. This was to be achieved using a multi-disciplinary and participatory approach on economically and environmentally sustainable basis. The implementing agency was the Ministry of Agriculture in Tanzania. Project duration was 3 years and 6 months. It commenced in 1995 and ended in 1998.

http://www.gm-unccd.org/FIELD/Multi/FAO/Tan/PJ_SPFS.htm

D. Livelihoods

- 1) a) The NGO Emergency Pastoralists Action Group project is meant to assist the pastoralist communities in Mandera and Gedo, who lost their livestock as a result of recent drought and civil war, to reintegrate into the local livestock economy. It will also improve access to veterinary services in the project area. The project is part of a broader programme aimed at strengthening the sustainable livelihood of the targeted population. It was funded by DFID (238,600 GBP). It started in 1995 and ended in 1996.

b) The purpose of the **Oxfam Wajir Integrated Development Project** was to reduce the poverty and vulnerability of pastoralists and settled communities in Wajir, by strengthening their sustainable livelihoods and improving their self reliance. This project was funded by DFID the project duration was 4 years. It started in 1995 and ended in 1997.

c) The project **Pastoralist Communities Management of Natural Resources in Kenya** aimed at enhancing the capacity of Samburu pastoralists to manage their livelihoods. To promote sustainable management of grazing land, forests, water resources and dry season refuges. This project was funded by DFID and lasted between 1998 and 2000. http://www.gm-unced.org/FIELD/Bilaterals/UK/Ken/PJ_Com.htm

- 2) **The Western Kenya Integrated Ecosystem Management Project (WKIEMP) seeks to improve the productivity and sustainability of land use systems in selected watersheds in the Nzoia, Yala and Nyando river basins through adoption of an Integrated Ecosystem Management (IEM) approach.** In order to achieve this, the project will: (i) support on- and off-farm conservation strategies through interventions focused on improving soil fertility, agroforestry, and introduction of value added cropping systems; and (ii) improve the capacity of local communities and institutions to identify, formulate and implement integrated ecosystem management activities (including both on-and off-farm land use planning) that capture local, national and global environmental benefits. The project will be implemented in three river basins of Western Kenya, namely, Nyando, Yala and Nzoia, which together support a population of 7 million people. The total area of the three basins is about 20,000 km² (Nyando, 3,550 km², Yala 3,364 km², and Nzoia 12,984 km²). The project area will consist of 9 focal areas (FA's) each measuring 100 km². Of these FA's, 3 will be in Nyando basin, 3 in Yala basin and 3 in Nzoia basin. The FA's within basins will be stratified by elevation zones to include lowlands (1334 - 1440 masl), midlands (1440-1890 masl) and highlands (1890 masl).
- Implementation:** The project will be demand-driven and implemented under a decentralized arrangement. At the village/community level, community groups will be the main bodies for planning and implementing approved development interventions. Community groups could be formal village organizations such as Village Development Committees (VDCs) or smaller groups of interest group members. The seconded environmental and social specialists (SESS) from the National Environment Management Authority (NEMA) and Kenya Agricultural Research Institute (KARI) will be responsible for ensuring that the environmental and social impacts screening and review system set out in this Environmental and Social Management Framework (ESMF) is integrated into the subprojects cycles. At the national level, the Technical Advisory Group (TAG) will provide lead coordination and ensure that results meet the targets set by the project. The project will be supervised by the World Bank (WB) and financed by the Government of Kenya (GOK) and the Global Environmental Facility (GEF). The Kenya Agricultural Research Institute (KARI) and the World Agroforestry Centre (ICRAF) will implement the project. WKIEMP is a five-year project with a budget of about US\$

4.5 million. The estimated cost of mainstreaming the ESMF in the WKIEMP is US \$675,000.

http://www-wds.worldbank.org/servlet/WDSContentServer/WDSP/IB/2004/10/08/000012009_20041008100037/Rendered/INDEX/E974.txt

3) **The Ecological Sources of Conflict Project in Sub-Saharan Africa**

During the first phase of this project, research was undertaken in Rwanda, Burundi, DRC, Sudan, Somalia and Ethiopia to identify the extent to which environmental factors have contributed to political conflicts in the region. The findings of this project were subsequently published by ACTS in collaboration with the Africa Security Analysis Programme of the South Africa-based Institute for Security Studies (ISS), and published in June 2002 in a book entitled 'Scarcity and Surfeit: The Ecology of Africa's Conflicts'. The book has influenced a number of important actors and it is believed that it has contributed to the focus on natural resource management in peace processes such as the IGAD peace processes for Somalia and southern Sudan.

The second phase of the project, which has been completed, examined the role of land access and livelihoods changes in conflicts and post-conflict reconstruction in Burundi, Rwanda, and Eastern DRC. The project aimed to influence land policies and refugee repatriation processes in the three countries through advocacy and information dissemination. This project was funded by USAID and has run for 5 years (1999-2004)

4) **Linkages between climate change and desertification in East Africa**

In this research, it is argued that policy measures aimed at ameliorating the effects of climate change can effectively build on measures to combat desertification. The research looked at how the global issues of climate change and desertification can be effectively addressed at the local level in sub-Saharan Africa, by carrying out case studies in two dryland areas: Same District in Tanzania and Kitui District in Kenya, further described in Eriksen (2000). The first part of the research focused on physical and social linkages. This question is approached by distinguishing physical and social linkages between these issues at the local level and investigating how these local linkages are reflected in local action and livelihood options. The second part of the research reviews how the local linkages and related actions are incorporated into government policies. <http://ag.arizona.edu/OALS/ALN/aln49/eriksen-part1.html#intro>

- 5) UNDP/GEF funded another project in Kenya: **PDF A-Removal of Barriers to Energy Efficiency in the Biomass Sub-sector in Kenya PIMS 3166**. The main objective of the project was to remove barriers to energy efficiency and energy conservation in the biomass sub-sector in Kenya. The project was expected to establish a coherent, comprehensive policy and institutional framework to promote sustainable biomass energy production and use. Promote public awareness and education on sustainable production and use of biomass energy. To identify and

implement projects and programmes that are technically, economically and environmentally feasible to advance the goals of sustainable production and use of biomass energy. To introduce incentives to facilitate effective private-public partnerships to advance the goals of sustainable production and use of biomass energy. Ultimately, the project aims at strengthening the legal and institutional frameworks for integrating cross-cutting Sectoral policies, as well as ensuring continuous capacity building, research, enhanced technologies, development and sustainable production in the biomass sub sector. Source: Project Document UNDP/GEF Republic of Kenya.

6) **Vulnerability of Water Resources to Environmental Change in Africa**

This project was implemented through assessment of the vulnerability of water resource in Africa. It involved collaboration between UNEP DEWA, DPDL, ROA, DGEF, GEMS water Programme, and several Africa region Institutes dealing with water-e.g. Centre for Environment and Development for the Arab Region and Europe, Africa Water Forum, START, University of Benin for West Africa in cooperation with Dakar University CAD and NEPAD. GEMS Water will assist in the implementation. The duration of the project was 12 months, and it commenced in April 2003. In this project the assessment of the vulnerability of water resources data trends, interrelated causative factors and up to date information in Africa. Other related aspects that were covered in the project were the networking of available information on water quality that touches on Lakes and pollution of shared river basins.

Panafrican START Annual Report 2002/2003.

- 7) In November 2003, the GEF Council approved a \$60 million, six-year UNDP/UNEP joint proposal to fund 130 climate change enabling activities in the regions of West and Central Africa, South and East Africa, the Arab States, Europe and the Commonwealth of Independent States, Asia, the Pacific, the Caribbean, and Central and South America. UNDP will be the lead Implementing Agency on 100 of these enabling activities, and UNEP will be the lead on the remaining 30.