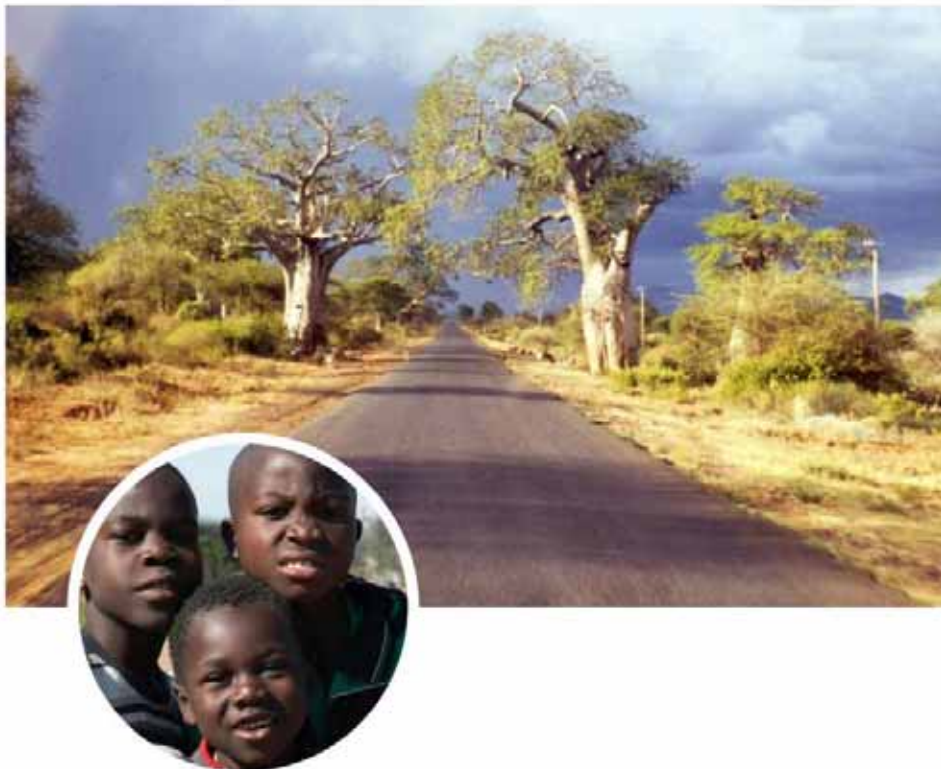


Stocktaking report on Climate Change cooperation in Tanzania

June 2009



PEMconsult with INKAconsult and COWI

List of Abbreviations

CC	Climate change
CCU	Climate Change Unit
CDM	Clean Development Mechanism
CEEST	Centre for Energy, Environment, Science and Technology
CIDA	Canadian International Development Agency
CIF	Climate Investment Fund
COP	Conference of the Parties
COSTECH	Commission for Science and Technology
DANIDA	Danish International Development Assistance
DFID	Department for International Development
DKK	Danish kroner
DoE	Division of Environment
DP	Development Partners
DPG	Development Partner Group
DPG-E	Development Partner Group-Environment
EIA	Environmental Impact Assessment
ETSP	Environmental Impact Assessment Section
EISP	Environment Implementation Support Programme
EMA	Environmental Management Act
ETF-IW	Environment Transformation Fund International Window
EU	European Union
EUR	Euro
EWG	Environment Working Group
FAO	Food and Agriculture Organisation of the United Nations
FCPF	Forest Carbon Partnership Fund
GBS	General Budget Support
GBS-PAF	General budget support performance assessment framework
GCCA	Global Climate Change Alliance
GEF	Global Environmental Facility
GoT	Government of Tanzania
IDRC	International Development Research Centre
IFAD	International Fund for Agricultural Development
IPCC	International Panel for Climate Change
IUCN	International Union for Conservation of Nature
JAS	Joint Assistance Strategy
JAST	Joint Assistance Strategy, Tanzania
JICA	Japan International Cooperation Agency
LGA	Local Government Authority
MDA	Ministry, Departments and Agencies
MEA	Multilateral Environmental Agreement

MFA	Ministry of Foreign Affairs
Mkukuta	Swahili acronym for: National Strategy for Growth and Poverty Reduction
MNRT	Ministry of Natural Resources and Tourism
MoF	Ministry of Finance
MoU	Memorandum of Understanding
MoAFS	Ministry of Agriculture and Food Security
MoW	Ministry of Water
MPEE	Ministry of Planning, Economy and Empowerment
MTEF	Medium Term Expenditure Framework
NAPA	National Adaptation Programme of Action
NBS	National Bureau of Statistics
NCAP	National Climate Action Plan
NCCC	National climate change committee
NEAC	National Environmental Advisory Committee
NEMC	National Environment Management Council
NEP	National Environmental Policy
NGO	Non-governmental organisation
NORAD	The Norwegian Agency for Development Cooperation
NSGRP	National Strategy for Growth and Reduction of Poverty
PAF	Performance Assessment Framework
PMO-RALG	Prime Minister's Office, Regional Administrations and Local Governments
PS	Permanent Secretary
RDE	Royal Danish Embassy
REDD	Reduced Emissions from Deforestation and Forest Degradation
SAREC	Sida's Department for Research Cooperation
SIDA	Swedish International Development Cooperation Agency
TA	Technical assistance
TFS	Tanzania Forest Services
TMA	Tanzania Meteorological Agency
ToR	Terms of Reference
UDEM	Urban Development and Environmental Management
UN	United Nations
UNFCCC	United Nations Framework Convention on Climate Change
UNDP	United Nations Development Programme
UNEP	United Nations Environmental Programme
UNESCO	United Nation Educational, Scientific and Cultural Organisation
UN-Habitat	United Nations Human Settlements Programme
UNICEF	United Nations Children's Fund
UNIDO	United Nation's Industrial Development Organisation
USAID	United States Agency for International Development
USD	United States dollars
VPO	Vice President's Office

WB
WHO
WWF

The World Bank
World Health Organisation
World Wildlife Organisation

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Summary of findings

‘Climate change’ as a specific theme is relatively novel in development cooperation, and funding for mitigation of and adaptation to climate change is expected to increase substantially over the coming years. The Development Partner Group on Environment (DPG-E) agreed with the government of Tanzania that the development partners would undertake a stocktaking exercise on the climate situation in Tanzania and a programme for strengthening coordination of climate change activities in Tanzania..

A team of consultants funded by the EU, NORAD and Danida, – and reporting to the Development Partner Group on Environment (DPG-E) – paid two visits to Tanzania from 27 October to 18 November 2008 and from 26 January to 6 February 2009.

Main findings within climate information:

Climate change in Tanzania is real, in particular in relation to temperature increase. However, there is still a high degree of uncertainty when it comes to knowledge about specific changes and impacts, as well as the relative weight of global warming compared to other changes in the physical environment with potential implications for local climate, e.g. in local land use.

Tanzania has some basic systems to measure the climate situation. However, there is a worrying decline in the monitoring system maintained by Tanzania Meteorological Agency, TMA and other institutions, such as the Water Resource Department. Moreover, there is limited capacity to produce and disseminate good weather forecasting and climate modelling. This gives rise to an urgent need to upgrade these systems in an institutionally, technically and financially viable manner. Some initiatives to this effect are being undertaken in relation to TMA and in the water sector.

Research centres are carrying out several studies of more specific issues, and at least two institutions are working on downscaling global climate models to regions of Tanzania in cooperation with foreign universities.

Main finding within policy and institutional context:

Climate change is an emerging subject in Tanzania, and although the issue is attracting some attention, there is still limited understanding and priority given to the problem within sector institutions, central economic institutions and the private sector. To a large extent, this is also the case within the wider development partner community.

Given the relatively limited systematic knowledge about actual climate change and variability, the response to climate change is bound to remain an exercise in the management of uncertainty. Improved vulnerability assessments and building of resilience in most vulnerable population groups, geographic areas and economic sectors could be important first steps towards securing adaptation. In this context, it is important to stress that adaptation to climate variability is not

new to Tanzania, and efforts should be made to build on existing experiences of such adaptation.

Ultimately, addressing climate change requires mitigation and adaptation considerations to be integrated into all aspect of development activities. It encompasses, for instance, promoting low-carbon economic growth, carrying out data collection and research, building resilience in local communities to variations in climate conditions, mitigating climate change through reforestation and soil conservation, adapting crops and cultivation technologies, as well as adjusting to and taking advantage of developments in global markets. Accordingly, most climate change related activities are about mainstreaming and/or integration, and hence not within the implementation responsibilities of DPGE and VPO.

Adaptation to and mitigation of climate variability already takes place in sectors such as renewable energy, participatory forest management, water shed management etc. Nevertheless, climate change is far from being systematically mainstreamed in national development planning, such as the MKUKUTA, sector and local government plans. There has also been limited consideration of the potential impact of climate change on growth and poverty strategies.

Tanzania has prepared a NAPA to address short-term needs. The NAPA includes a good description of the main problems, a set of key priorities and selected project briefs. Water and agriculture are the main priority areas. Currently only limited funding for the plan has been achieved. However, as clearly stated in the NAPA, it was not intended to address issues related to monitoring or forecasting of climate change and its impacts, research, capacity development, information exchange, awareness-raising or mainstreaming. VPO is currently considering the preparation of a more comprehensive national strategy.

According to the Environmental Management Act, the VPO is the Designated National Authority in the field of climate change and the contact point for UNFCCC. The VPO has key responsibility for policy development, coordination and monitoring, for approving CDM projects, guiding mainstreaming in the sectors, and participating in international negotiations. Furthermore, the VPO is responsible for overseeing the implementation of UNFCCC. Tanzania Meteorological Agency (TMA) is the focal point for IPCC.

Tanzania has a disaster management unit within the Prime Minister's office and a Food security department within the Ministry of Agriculture and Food Security. Work in this field is guided by the Tanzania Disaster Relief Committee, TANDREC and is primarily focussing on mitigation and less on prevention. The Food Security Division is jointly with TMA managing several weather stations. Further they prepare yearly vulnerability assessment in relation to food security in close cooperation with its Development Partners, NGO's, national and local institutions.

There are relative weak links between institutions working with disaster management and food security, on the one hand, and entities involved in climate change, on the other. For instance, vulnerability assessments made in relation to food security are not used to substantiate the planning of climate activities, while the results of downscaling activities performed by research

institutions are not fed into the work with food security.

The main findings within coordination and funding:

The funding landscape for climate change is undergoing rapid development. It is fairly complex, and financing is managed through a multitude of mechanisms, often with their own priorities and decision-making structures, such as global and regional funds, international NGOs, research networks, large foundations, development partners' headquarters, and partly through development partners' country missions. Furthermore, more market-based mechanisms are likely to emerge in the future. A major part of the new funding is outside the UNFCCC system. Major focus areas for funding are forest management and technological transfer. It is uncertain how much of the funding will become available to Sub-Saharan Africa, and adaptation, which takes centre stage in that part of the world, seems to receive slightly less attention than mitigation. There is a need for developed countries to provide additional funding to enable countries Tanzania to meet the climate challenge

The funding landscape and cross-cutting nature of climate change activities poses a challenge to DPGE. Most members have their resources directed towards management of project and programme activities, and have limited resources to influence international funding arrangements and carry out mainstreaming activities. If substantial funding emerges, it will require major efforts to ensure that spending is consistent with national priorities and plans, as prescribed by the principles of the Paris Declaration, and is channelled to the relevant sectors. It could call for strengthening the capacity of both development partners and government in order to ensure efficient coordination, as well as maximum access for Tanzania to these emerging funds, or at least for setting very clear priorities for activities.

The team has sought to establish an overview of DP funded climate activities in Tanzania. It is, however, difficult to paint a complete picture, as many climate activities funded from sources outside Tanzania as individual agreement and as DPGE have yet to clearly define which activities they consider climate change activities falling within their responsibility. Some donors are mainly focusing on mainstreaming, e.g. SIDA and the Netherlands, while others, such as Norway, are channelling substantial funding towards undertakings explicitly labelled as climate activities. The "One UN" programme is advancing internal coordination among UN organizations, as well as with governments and other development partners. However there is a need to ensure coordination between this and other programmes, such as Danida's support for VPO/DOE. Several DPs support relatively uncoordinated capacity development within CDM.

As mentioned above, many climate change issues – such as forestry, renewable energy, food security, water resource and soil management, support for national institutions, including TMA, and research – are partly being addressed already by established sector groups in the context of their regular activities to address mandated responsibilities. They form part of sector plans, and are coordinated between responsible ministries and their respective DPs in accordance with the JAST.

As climate change rises to the top of the international development agenda, many development activities will be labelled as pertaining to climate change, as is already seen in the case of, for example, Norway's REDD programme, and/or there will be renewable energy programmes financed by climate change funds, and others by traditional development assistance.

At present, there is no clear common understanding among development partners of what constitutes a climate change activity. Nor is there agreement on whether DPGE should address specific climate projects only or ought to concentrate on the wider issue of mainstreaming. Furthermore, there is no clear plan for how to cooperate within DPGE, with VPO and with sector groups on the issue.

Main findings within research and information sharing:

Several global, regional and locally-funded programmes and joint undertakings are ongoing or in the pipeline within Tanzanian research institutions in cooperation with foreign research institutions. The research covers issues such as local adaptation strategies, downscaling of climate modelling and assessment of impact on crops and markets. However, the exchange of research results between researchers and the dissemination to different user groups is very limited and conducted fairly independently of nationally defined priorities.

NGOs are increasing their climate work, mostly as mainstreamed activities, having several fairly effective coordination forums. Nonetheless, NGOs request greater involvement of the GoT and DPs.

Mitigation and adaptation to climate change have to respond to rapidly changing realities, as our understanding of the problems improves and as additional funding materializes. The dynamics of the situation requires flexibility and efficient responses aimed at optimizing the policies, strategies and priorities, as well as institutional arrangements, coordination and information flows in order to meet the climate challenges and enable Tanzania to take advantage of new funding opportunities.

Summary of recommendations:

The DPGE needs to decide to what extent it will focus on mainstreaming, compared to more specific climate activities capable of catalysing and facilitating aspects important to promote the wider climate change agenda, such as support for an expanded NAPA, support for VPO and TMO, for pilot activities within mainstreaming, piloting community adaptation and research. Furthermore, there is an urgent need to strengthen information management and flows, which is a problem at all levels from dissemination of weather forecasts to interaction around government initiatives, exchange of research results, and information-sharing among members of the DPGE. Finally, it is critical for coordination and for alignment of climate support for government policies and plans that the DPGE endeavour to influence regional and global funding arrangements.

The team has included a series of recommendation on how to strengthen climate interventions in Tanzania and DPGE coordination efforts. These include: Support to prepare a new national

strategy and for a core DP-funded programme, including support for mainstreaming CC in Mkukuta and in the water and agriculture sector, a fund to upscale and test local adaptation strategies, improved information exchange at all levels, particularly in relation to research, support for TMA and monitoring of climate change. It is proposed that the DPGE contract a half-time academic secretary to assist in the group's work.

1. Background

Climate change as a specific theme is relatively novel to development cooperation, and funding for mitigation of and adaptation to climate change is expected to increase substantially over the coming years. However, there is no clear picture of how the funding landscape will evolve. Current practices seem to favour global funding mechanisms, but nobody has produced an overview of existing programmes addressing climate issues in Tanzania, describing the activities of the various institutions. Consequently, the Development Partner Group on Environment (DPG-E) has agreed with the government of Tanzania that the development partners will undertake a stocktaking exercise regarding the situation of climate-related activities in Tanzania.

The team was tasked with preparing a stocktaking report and a proposal for a comprehensive programme to coordinate donor support for climate change as input to a government-led roundtable discussion.

Based on comment from VPO to the terms of reference for the assignment, it was agreed with the DPG-E to further emphasise the intended stepwise approach and seek closer dialogue with the GoT on the preparation of the roundtable discussion. As a consequence, the team was to prepare: 1) Broader proposals for strengthening the coordination of DPG-E's support for the GoT, and 2) proposals for how DPG-E could jointly support the elaboration and implementation of a new expanded NAPA. This would serve as an input to the dialogue between the GoT and DPs, and finally to a roundtable discussion with participation of ambassadors and ministers. It is expected that a more detailed plan can be drawn up after this high-level roundtable.

Within this understanding the objective of the assignment has been adjusted to:

- 1: To provide basis for Government and donor coordinated approach to climate change adaptation and mitigation
- 2: To provide the basis for development of a frame for donor support to Tanzania on climate change adaptation

The main focus will be on the DPGE's activities, but it is hoped that the report can inspire broader discussions and further improvement of cooperation between development partners and Tanzanian institutions.

A team of consultants funded by the EU, NORAD and Danida – and reporting to the Development Partner Group on Environment (DPG-E) – was contracted to support the process. The team was composed of Lillah Soerensen, Cowi Consult, Hubert Meena, CEST, Raymond Colley, PEM Consult, and Hans Hessel-Andersen, Inka Consult (team leader).

The team has paid two visits to Tanzania, of which the first took place from 27 October to 18 November 2008. The second visit took place from 26 January to 6 February 2009. During the second visit, a roundtable attended by ministers and ambassadors was planned but postponed. The present report is the product of these two missions.

During its first visit to Tanzania, the team met with a broad group of stakeholders: the VPO, sector institutions, NGOs, universities and development partners. Several meetings were held with the DPG-E and with the DOE. However, it has to be noted that, for various reasons, development partners were mainly available during the second half of the visit, and it was not possible to meet with representatives of some key national institutions, such as the Divisions for Disaster Management and for Poverty Eradication (Mkukuta), which was unfortunately still difficult during the second visit. Furthermore, a smaller than anticipated team necessitated some revision of the work plan. See the methodology chapter for details.

By the end of the first mission, a debriefing meeting was held on 17 November at the office of the PS of the VPO. The PS, a representative of DOE, representatives of DFID, Danida, Norway and the team attended the meeting, during which the following points were agreed:

- The DPs will continue to develop their internal coordination.
- The DPE-G and GoT will continue to develop coordination through existing forums, such as the Environmental Working Group, the Climate Change Steering Committee and the National Technical Climate Committee.
- The DPs will provide funding for the government-led preparation of an expanded NAPA or broader National Plan/Strategy to meet the challenges of climate change. In this context, the DPs will support the strengthening of national capacity to address a wide range of climate change issues.
- The DPs and GoT will continue to cooperate on the implementation of concrete activities, including the NAPA.
- A roundtable will be arranged between ministers and ambassadors to be held on 26 January 2009 to discuss future co-operation related to climate change.
- A working group will be established for preparation of the roundtable, including two representatives of the GoT and two of the development partners.

It should be noted that the roundtable was not held as planned, but is expected to take place at a later date. By the end of the second mission, a presentation of findings was held with the DPG-E on the 6th of February. The agreements made have guided the finalisation of the present report.

The team's work has been based on the definition of climate change, mitigation and adaptation made by IPCC and UNFCCC.

1.1 Definitions used in the present presentation

Climate Change: “Climate change refers to a statistically significant variation in either the mean state of the climate or in its variability, persisting for an extended period (typically decades or longer). Climate change may be due to natural internal processes or external forces, or to persistent anthropogenic changes in the composition of the atmosphere or in land use.” (IPCC 2004).

Mitigation: “In the context of climate change, a human intervention to reduce the sources or enhance the sinks of greenhouse gases. Examples include using fossil fuels more efficiently for industrial processes or electricity generation, switching to solar energy or wind power, improving the insulation of buildings, and expanding forests and other "sinks" to remove greater amounts of carbon dioxide from the atmosphere”.

Adaptation: “Adjustment in natural or human systems in response to actual or expected climatic stimuli or their effects, which moderates harm or exploits beneficial opportunities.”

2. Methodology

As described in the introduction, the assignment has been carried out through two visits to Tanzania, providing inputs to a continuous dialogue between the GoT and DPs on cooperation in the field of climate change. Since climate change is an emerging issue for both the DP and GoT, it is to be expected that the best ways of cooperating and coordinating within this area will be gradually clarified as the understanding of the problem progresses. As a consequence, it has been the team's approach to enter into close dialogue with partners aimed at facilitating an agreement on the framework and scope for co-operation.

A reference group was established during the first visit, composed of the members of the DGP-E, in order to facilitate clarification and agreement within the group of the key elements of coordination. The team prepared written inputs to the group aimed at determining the types of climate programmes to be coordinated, the scope for joint interventions, options for coordination set-ups, agenda of the upcoming roundtable etc. The reference group of DPs met four times. However, only at the last meeting of the first mission did a representative cross-section of DPs participate. During the second visit, the team met with members of DPGE to receive feedback on the first draft of the stocktaking report and proposals, and for a final debriefing.

In addition to the joint meeting, the team met the development partners separately. The interviews were based on an interview note sent to the DPs.

Given the timeframe and resources available, there is no intention to prepare an in-depth analysis of all climate change issues in Tanzania, but rather to identify how critical CC issues can be coordinated in the country, and how the DPs and government can ensure that: a) funds are targeted at the true priorities; b) actions funded are integrated into the agreed development framework, so that they are part of a national development perspective, undertaken by the appropriate institutions, and that the funds are properly managed and accounted for; and c) duplication is avoided. Furthermore, the report has been prepared with the understanding that it is important to take a flexible approach and be able to adjust interventions and coordination frameworks, since understanding of the impact of climate change will continue to evolve along with international agreements and funding schemes.

As climate change is a cross-cutting issue, many of its components have long been dealt with at the level of sectors and LGAs, though possibly from a different perspective or under different headings, such as renewable energy, watershed management, water saving etc. Other issues are new or have only recently taken centre stage, as climate change is materialising, for instance capacity building for CDM, climate modelling, testing of methods to monitor carbon sequestration in forests, and numerous new funding modalities are emerging.

Consequently, the first concern to be clarified in order to define coordination within the DPG-E is what type of projects the DPG-E should focus on in its overview intended to substantiate this

stocktaking. **Should projects/programmes be registered based on the origin of funding or by purpose?** This dilemma comes to the fore within forest management and renewable energy, where some DPs categorise their projects based on the origin of funding rather than on the nature of activities. For instance, Norway characterises a large forest programme as a climate change activity, whereas the World Bank and Danida do not. Halfway through the mission, the team prepared a small note discussing these issues.

No final decision was made by the DPG-E on this matter, and for the purposes of the first mission, it was agreed that: 1) the overview of DP-funded climate activities would simply reflect those identified by the development partners, and 2) based on these inputs, the team would provide preliminary suggestions as regards the scope of climate-change activities to be coordinated and by whom.

The stocktaking report will be based on several methodologies used with the aim of enabling comparison between data obtained using different sources, thus crosschecking the information and agreements/disagreements between stakeholders. The approach represents a mix of in-depth review of documents and qualitative approaches, such as individual interviews and focus group discussions. Questionnaires were used as guidance for interviews.

In addition to the DGP-E and the VPO, the team also met with government and development partner representatives from sectors, LGAs and others. Priority was given to sectors where an early impact of climate change is expected, where substantial funding is available for mitigation and adaptation in the short term, and where benefits can be achieved by building resilience. The team met with GoT representatives in the fields of energy, water, agriculture and food security, health and forestry. Furthermore, one LGA was met. The purpose was to establish an overview of existing coordination mechanisms in the sectors, identify which major climate activities they are currently engaged in, whether mainstreaming of climate issues has been considered, and how they cooperate with the VPO.

The team consulted with representatives of universities, some of their international partners and NGOs to identify ongoing activities, the extent to which these organisations communicate with government, and the degree to which research results are exchanged and made available to wider groups of users.

The team was unable to meet the Division of Disaster Management and the Division of Poverty Eradication during the two visits, among other reasons because staff were occupied with the parliamentary sessions. However the team has instead met with secondary sources to further clarify how climate change is considered in relation to national strategies, and how it links to disaster management.

Through the Internet and direct contacts to organizations and key persons made prior to arrival in Dar es Salaam, the team established an overview of trends in emerging global and regional funding sources. During the visit to Tanzania, the team sought to update and supplement this general picture with information on programmes funded through DPs' headquarters and through

country missions. The purpose was to ascertain the areas in which funds are available and to what extent they form part of development partners' country programmes and are controlled by the country missions.

As the funding landscape is very similar to what is seen in the field of HIV/AIDS, albeit even more complicated, selected DP and GoT representatives were consulted on experiences of aligning global funding to the JAST in line with the principles of the Paris Declaration.

The work plan and methodology have, for reasons beyond the control of the team, been adjusted, compared to what was outlined in the TOR and the inception report. For instance, the second visit was planned to serve as preparation for technical and/or high-level roundtables. However, since these were postponed, the second visit was mainly used to consolidate the report and proposals.

The final team was smaller and had a composition different from what was outlined in the TOR, e.g. the anticipated expertise in international climate change with strong scientific knowledge was not recruited. Only one local consultant was contracted in order to prepare the mission, albeit so late that little preparation had been completed at the time of the team's arrival. Furthermore, since representatives of most development partners were unavailable during the first weeks of the mission, and as only the reference meeting held at the end of the visit was attended by a substantial number of DPs, it was not possible to initiate a sufficiently participatory process and receive feedback until very late. Finally the VPO's comments on the objectives of the mission made it necessary to refocus the work of the team.

2.1 Structure of the report

After the introduction, which briefly defines climate change, adaptation and mitigation, section 2 discusses the methodology of the present review and outlines the limitations of the field study. Section 3 provides background information on actual climate change and its impacts, as well as on the level of information available in Tanzania, while section 4 provides an overview of ongoing DP-funded activities addressing climate issues within government, research entities and NGOs. Section 5 examines the institutions involved, including their mandates and understanding of climate change. Section 6 provides an overview of current coordination mechanisms in Tanzania within environment and climate change, and in development cooperation in general. Section 7 provides an overview of major global and bilateral funding sources and the direction that they are taking, while section 8 draws conclusions and issues recommendations. Part II of the report presents the team's proposals for how DPG-E should approach coordination, as well as suggestions for the main elements to be included in a new and expanded NAPA.

3. Climate Change in Tanzania

3.1 *National and international climate change context*

IPCC global and regional predictions

The Intergovernmental Panel on Climate Change (IPCC) was established in 1989 to assess the available scientific information about the impacts of climate change, and potential response strategies. The IPCC submitted its First Assessment Report in 1990 and is tasked to publish comprehensive reviews every five years of the status of climate change and climate-change science. The Fourth Assessment Report (FAR) published in 2007 estimated that the global mean surface temperature has risen by around 0.7°C in the past century and is likely to increase by around another 3°C over the course of this century. It notes that warming over land areas will generally be greater than over oceans, and that this is particularly likely in Africa.

Rising temperatures imply increased water vapour in the atmosphere and therefore more rainfall. The FAR notes that trends in precipitation are highly variable, and that – while some, mainly northern, regions have reported increased rainfall – drying has been observed in other regions. It is clearer that there has been a significant increase in the number of heavy precipitation events, even in those regions which have experienced an overall decline in rainfall, although, the FAR acknowledges that only a few regions have sufficient data to assess such trends reliably.

According to the FAR (Africa chapter p. 443), “very few regional to sub-regional climate change scenarios using regional climate models or empirical downscaling have been considered in Africa mainly due to restriction in computational capacity and lack of human resources”. Nevertheless, recent advances in climate modelling allow some prediction of climate changes at regional and sub-regional levels. The FAR reports that in East Africa the temperature increase over the coming 80 years is likely to lie between 3°C and 4°C. While noting that the reliability of current models is unclear, due in part to limited modelling or observations specific to the region, FAR also suggests that there is likely to be an increase in annual rainfall in East Africa. At present, however, tentative results indicate that there has been greater rainfall over the north-eastern sector of eastern Africa (Ethiopia, Somalia, Kenya and northern Uganda) and opposite conditions over the south-western sector (Tanzania, southern parts of the Democratic Republic of the Congo and south-western Uganda).

A general rise in the intensity of high-rainfall events is expected to lead to an increase in the number of extremely wet seasons to roughly 1 in 5, compared to 1 in 20 in the recent past. At the same time, the FAR finds it likely that more people in East Africa will experience less water stress in the future. The FAR points to the importance of analyzing the impact of climate change in the context of other equally important changes in, for instance, land use patterns.

3.2 Current situation according to national sources

State of climate change

Trend analysis results for the period 1961–2005 show a statistically significant rise in annual temperature throughout the country ranging from 0.1 to 1.8⁰C with the increase being least at the coast and higher towards the southwest. (CEEST, 2007).

No clear trends in rainfall amount are predicted or discernable, but it is thought that rising temperatures will lead to more intense bouts of rainfall, which will occur at less predictable intervals. This is in accordance with what has been observed in many parts of the country (i.e. intense unseasonal rainfall, unpredictable rainy seasons etc. – these are widely reported, but the analyses to verify that changes are beyond normal variability have not yet been completed). There are no conclusive data on the sea level, but Ardhi University has initiated satellite-supported measurements of the sea level rise off Dar es Salaam in cooperation with NASA and Purdue University. Several research programmes are currently working on downscaling the global circulation models to improve predictions of climate developments at the local level in Tanzania.

Climate change impacts

The National Communication and the NAPA suggest that recent droughts, together with the associated food and hydroelectric power shortages, were the result of climate change. Furthermore, recent unusual variability in rainfall, including the virtual disappearance of the short rains, has led to reductions in some crop yields, both staples (maize) and cash crops (coffee, coconuts, cotton). There are reports of some villages self-relocating in the Pangani and Rufiji River Basins, due to shortages of water and loss of income from agriculture. The loss of some small islands (Maziwi and Fungu la Nyani) is mentioned in the National Adaptation Programme of Action, NAPA. As a complement to the NAPA, a more comprehensive analysis of the agriculture, water and health sector has been carried out by VPO.

The effects of climate variation are real, but it cannot yet be confirmed that these are due to long-term changes. Time series data on climate and hydrology of the major river systems are available in the archives of the TMA and Ministry of Water.

Mapping of vulnerabilities

In the context of the NAPA and the Initial National Communication, only smaller-scale studies on vulnerabilities have been included in relation to food security assessments and by universities in specific locations. In the preparation of the second communication, vulnerability assessments of several sectors will be prepared, although the scope of the studies are not clear. In relation to disaster management, a national vulnerability assessment was prepared by Ardhi University in 2002. In 2006, the World Food Programme prepared a vulnerability assessment in relation to food security. Both assessments identify the most vulnerable communities and are highly relevant to similar assessments to be performed in the area of climate change. The Prime Minister's Office in cooperation with the Ministry of Agriculture's Food Security Division prepares yearly Food Security Vulnerability Assessments. International and local NGOs and development partners, regional and local authorities and government institutions are involved in

this work.

United Nations Framework Convention on Climate Change

The United Nations Framework Convention on Climate Change (UNFCCC) came into force in March 1994. The Government of Tanzania ratified it in 1996. The Convention sets an ultimate objective of stabilizing greenhouse gas concentrations "at a level that would prevent dangerous anthropogenic (human induced) interference with the climate system." It places the heaviest burden for fighting climate change on industrialized nations, requiring them to cut emissions and to provide most of the money for efforts elsewhere. The Convention accepts that the share of greenhouse gas emissions produced by developing nations will grow in the coming years. It nonetheless seeks to help such countries limit emissions in ways that will not hinder their economic progress. Current estimates find that about 20% of emissions stems from deforestation, which explains the attention to reforestation in emerging funding.

Tanzania's Initial National Communication

According to the UNFCCC, developing countries are encouraged to submit an Initial National Communication (INC), which should include a national inventory of sources of greenhouse gases and their removal by sinks, identification of vulnerable sectors and actions to be taken for sustainable future socio-economic developments. Tanzania's INC was submitted in March 2003. It remains the most comprehensive and authoritative account of climate change in Tanzania, although the knowledge base continues to improve.

The INC was divided into six major themes as described below.

- **Inventory of greenhouse gas emissions and removals:** An inventory of GHG use and removal was compiled. Much of the basic data was missing and had to be estimated. The result showed that around 60% of all GHG emissions could be attributed to deforestation and land use changes, 13% to agriculture and only 12% to burning of fossil fuels.
- **Mitigation study:** Technological and other options for the mitigation of greenhouse gases in Tanzania were identified in various sectors.
- **Impact of climate change and vulnerability assessment:** The consequences were predicted of an average annual temperature increase of 2-4°C along with increased variability in rainfall. Agricultural impacts were predicted due mainly to decreases in crop yield and to some areas no longer being able to sustain traditional crops. Major rivers were predicted to have changes in runoff.
- **Policies and adaptation measures:** The policy context provided by the long-term national development plan and the national environmental policy was set out. It was acknowledged that, at that time, policy development was ongoing and no specific measures to address climate change were in place.
- **Ongoing research and available data:** It was acknowledged that the capacity for monitoring climate trends was lacking and that most of the data used in climate change studies came from Europe and North America.

- **The institutional framework for implementing a climate change strategy:** The main institutions were identified as DoE and TMA, as well as key sector entities (in energy, natural resources, agriculture, industry). A National Climate Change Steering Committee with CEEST as secretariat was attributed a major role.

National Adaptation Programme of Action

The Tanzania National Adaptation Programme of Action (NAPA) was prepared in 2007 to identify immediate short-term priorities that could be addressed by the UNFCCC LDC fund for adaptation to climate change effects and by other international funding agencies. The NAPA ranks sectors according to priority, identifies 14 priority projects, and includes some selected project briefs. Activities related to climate knowledge and forecasting, research, mainstreaming and capacity development are outside the scope of the NAPA. The NAPA itself acknowledges that more comprehensive analysis covering all areas is important and there are currently discussions within the VPO to expand the NAPA into a more comprehensive national plan.

Second National Communication

Studies are ongoing to prepare the Second National Communication to the UNFCCC for the Vice President's Office. The Studies were initiated in September 2006, is a three years project, which will run up to July 2009. The main objective of this exercise is to enable the United Republic of Tanzania to fulfil its obligations under the UNFCCC by preparing and report its National Communication.

The Second National Communication comprises the following studies, which lead to updating the Initial National Communication. These include:

- Climate change scenarios, whereby simulations have been undertaken using various Global Circulation Models to analyze the impact of changes associated with accumulation of greenhouse gases in the atmosphere.
- Inventory of GHG emissions.
- Technological and other options for GHG mitigation, analyzing interventions to reduce emissions in the various sectors, looking at their capacity to mitigate as well as the associated costs.
- Assessments of vulnerability and adaptation to climate change impacts in important sectors, including energy, agriculture, land use and forestry, tourism, water resources, coastal resources, livestock, and industry.
- Systematic observations.

It has not been possible to include the findings of the studies, as a consolidated draft of the second communication is still not available.

3.3 Sources of national climate knowledge

Climate and weather monitoring and forecast TMA is mandated to make observations on weather and climate, process the data to derive forecasts, and disseminate these to end-users. To do this, it has a network comprising:

- 26 synoptic weather stations
- 150 climatological stations but only 60 provide regular and continuous records
- 14 automatic weather stations
- 1650 rainfall measurement stations, but only 600 provide regular and continuous records
- 3 upper air measuring stations
- 15 agro-meteorological stations
- 1 radar

The climatological and rainfall stations are operated in conjunction with other government agencies Ministry of Agriculture and Food Security MoAFS and Ministry of Water and Irrigation MoWI, research institutions, private companies and schools. TMA states that the number of stations is insufficient, and that many are in disrepair. Furthermore, the collection of data is unreliable, depending on telephone and radio. In the recent past, TMA received data from around 120 stations, but there has been a gradual reduction in the number of MoW stations. These used to be situated along the major rivers, but have been allowed to fall into disuse. The TMA network has large gaps, especially in the south and west of Tanzania. TMA has handwritten records going back to 1872, but computerisation of these began only in 1992, and the vast majority is unanalysed. TMA's ability to provide early warning and to contribute to historic climate analysis is therefore currently far below its potential. TMA is not capable of downscaling global circulation modelling to the local level, and seems not to have developed modelling capacity adapted to local level predictions.

Sources of other information

There are organisations in all relevant sectors monitoring the activities that contribute to or mitigate climate change. The comprehensiveness of data collection and the quality of information analysis and management varies, in part depending on the resources available and the commercial utility of the data. The situation with regard to the most important information is as follows.

River discharges: Good information on daily volumes of water discharge and climate (temperature and rainfall) along the major river systems was collected by the responsible ministry for many years and was published in the Hydrological Yearbook. After recent reorganisations of ministerial responsibilities, the yearbook is no longer published. Similarly, as mentioned above, riverside weather stations have fallen into disuse. The Water Resource Department informs that it has 80 meteorological stations, of which only 40 are working. Rainfall data should be reported to TMA. However, in the new Water Sector Development Programme 2006-25, funding is allocated to rehabilitate and expand the hydrological, hydro-geological and hydro-meteorological network.

Forests: Data and maps describing forest coverage in Tanzania can be found in multiple sources. It is acknowledged, however, that such data are unreliable. The last systematic survey of forest cover took place long ago. A National Inventory of Biological Habitats is in preparation and a National Forest Resources Monitoring and Assessment will be initiated in March 2009. Further FAO/FINNIDA is funding a national forest inventory.

Agriculture: Data on agricultural yields are collected systematically by the MoAC from each district in the country, and are thought to be very reliable. They operate 600 rainfall stations supplying rainfall and crop data. Data are reported to TMA and also deposited with the National Bureau of Statistics, thus being readily available. The Department of Food Security in cooperation with a series of national and international partners prepares a yearly vulnerability assessment and operates 15 agro-meteorological stations jointly with TMA.

Sea level rise: It is widely believed that the sea level off the coast of Tanzania has risen due to climate change, because some small uninhabited islands are reported to have been submerged. There are no data that show trends over time. Tanzania Marine Institute conducted a special study to map the coast in preparation for the INC. No information has been published since then, although a Marine and Coastal Environment Management Project is ongoing in the MoNRT. Recently, Ardhi University has initiated satellite-supported measurements of the sea level rise off Dar es Salaam in cooperation with NASA and Purdue University.

Energy: The Ministry of Energy and Minerals (MEM) has assembled reliable and comprehensive data on energy use. The total annual energy used in Tanzania is estimated (MEM 2003) at 22 million tonnes of oil equivalent. The main source remains fuel wood and charcoal, which together account for 92%. The remainder is commercial energy, mainly electricity and petroleum-based fuel. Large hydroelectric plants generate most electricity, followed by thermal plants running on natural gas, which is gradually replacing heavy fuel oil. The national target for renewable energy generation, not including large sources of hydropower, is 3%. Currently around 0.5% is derived from such sources. TANESCO is not carrying out continuous hydrological monitoring in relation to hydropower.

3.4 Responses by GoT.

Government policy with regard to climate change is set out in the UNFCCC and the EMA. The Vice-President's Office is the Designated National Authority in relation to UNFCCC and is as such in charge of coordinating national policies. The VPO is performing a key role for Tanzania in international negotiations on climate change. A description of the responsibilities of VPO is included in chapter 5. Implementation of this policy has not progressed far. The initial Climate Change Committee, which provided a forum for national dialogue, has not been very active after the INC was produced, as the last meeting was held in 2003. Since then, several activities have been carried out. Some of these are preparation of the National Capacity Self-Assessment, while the NAPA was produced in 2007 through a consultative process involving key ministries. Sufficient funding has not yet been mobilised for implementation of these plans. Guidelines and a meeting of the CDM have been prepared, and one SDM project has been approved. Studies are ongoing to prepare the Second National Communication to the UNFCCC for the Vice President's Office. The Studies were initiated in September 2006 as part of a three-year project due to expire in July 2009.

The Tanzania State of the Environment Report contains the following conclusion on climate change:

“While it is difficult to accurately predict the consequences of climate change, enough understanding is available on the kind of risks posed. Access to water, food security, food production, health, and use of land and the environment will be adversely affected. Severe impacts such as: melting of glaciers, floods, frequent prolonged droughts, reduced water supply, decline in crop yield, particularly in Africa, increase of vector-borne diseases such as malaria and dengue fever, rising sea levels leading to displacement of people and disruption of both terrestrial and marine ecosystems and important natural habitats, are now vivid. The impacts of climate change are not evenly distributed; however, the most vulnerable, poorest countries and people will suffer the most. Poor countries are already struggling to cope with the current climate shocks, which set back economic and social development even with temperature increase of less than 1°C.

Climate change during this century is likely to entail increased frequency and intensity of extreme weather events, increases in sea level and ocean acidity that will not be reversible for centuries to millennia, large scale shifts in vegetation with major losses of climate sensitive plant and animal species, significant shifts in geographical ranges of diseases vectors and pathogens.”

4. Major planned and ongoing activities

An overview of planned and ongoing activities related to climate change has been conducted. Below, the GoT priorities are presented as stated in the NAPA; ongoing and planned activities funded by development partners are listed, along with activities of NGOs and research institutions. It is assessed to what extent these activities are well coordinated, supplement each other, and correspond to national priorities.

The overview of ongoing and planned activities related to climate change is divided into four categories: 1) UN organizations, 2) bilateral donors and multilateral banks, 3) research entities, and 4) NGOs.

4.1 National priorities as identified in the NAPA

The NAPA identifies 14 actions. These are a mixture between adaptation and mitigation activities, and are regarded as urgent priorities to be addressed on a short-term basis:

1. Increase irrigation by using appropriate water-efficient technologies to boost crop production in all areas.
2. Introduce alternative farming systems and relocation of water sources, including wells along low-lying coastal areas.
3. Develop water harvesting and storage programmes for rural communities particularly those in dry lands.
4. Launch community-based water catchment, conservation and management programmes.
5. Explore and invest in alternative clean energy sources, e.g. wind, solar, bio-diesel, etc.
6. Promote application of cogeneration in the industrial sector.
7. Conduct forestation programmes in degraded lands, using more adaptive and faster-growing tree species.
8. Develop community forest-fire prevention plans and programmes.
9. Establish and strengthen community awareness programmes to address major preventable health hazards.
10. Implement sustainable tourism activities.
11. Enhance wildlife extension services and assistance to rural communities in managing wildlife resources.
12. Introduce water harvesting and recycling.
13. Construct artificial structures, e.g., sea walls, artificially placing sand on the beaches and coastal drains, beach management system.
14. Establish a good land tenure system and facilitate sustainable human settlements.

These priorities have been translated into six high-priority projects in the field of agriculture, such as food security and water availability in drought-prone and inundated areas, reforestation, mini hydro activities, and a health project with the aim of combating malaria in more areas. It is acknowledged in the NAPA that broader issues, such as mainstreaming, research and capacity development, are not included.

So far, no funding has materialized for the proposed projects, although some GEF funding has recently been committed. Although most of the projects address problems at the level of individual sectors, the NAPA does not consider how climate change adaptation can be integrated into national and sector policies, plans and activities; and the projects proposed in the NAPA have not been included in the sector plan and budgets by the institutions responsible for each sector.

4.2 Main CC activities of the development partners in Tanzania

The interventions of the development partners have shown increasing attention to climate change related activities with still limited, but increasing funding level. These activities are involving a wide range of partners, such as NGOs, research institutions, government bodies, civil society and private sector entities.

The tables below present DP activities based on information provided by DPs. Information are collected from November 2008 to early February 2009. As development partners have not agreed on a specific definition of what constitutes a “climate project”, the team has included all projects as informed by the donors.

Table 1. Projects funded through UN organisations

Donor	Project activity
UNDP with FAO, IFAD, UNEP, UNESCO, and UNIDO	<p>One UN pilot programme. Budget USD 7,5 million for 18 months. Undergoing planning. Expected to start in January 2009.</p> <p>Mainstreaming CC in sectors and LGAs. Building capacity for CDM and for accessing international funding for adaptation. Building capacity for adaptation and mitigation. Demonstration projects on mitigation.</p> <p>With focus on climate change, land degradation/desertification and NRM.</p> <p>With VPO-DOE, PMO-RALG, MOFEA, MNRT, MAFC, MLDF, MoWI, MEM, MTI, NEMC and TMA</p>
UNDP, FAO, UNEP	UN-REDD pilot project for Tanzania for reduction in deforestation and forest degradation. 35 mi. US\$ programme for initially 9 countries. In Africa Tanzania, Congo and Zambia are participating. Programme funded by Norway.
UNDP	Biogas energy in prisons with the Ministry of Energy and NGOs, USD 150,000, 1 1/2 years.
	Mainstreaming Climate Change into integrated Water Resources Management in the Pangani River Basin. GEF, USD 2,575 million, 2007-2010.
	Transformation of the rural market for PV energy in Tanzania in cooperation with GEF, USD 2,250,000 USD, ongoing.
UNDP/UNEP	Capacity building for CDM, USD 200,000 in the pipeline, 2008-2009 with Ceest and EPMS.
UNEP	NAPA priority projects, implementation in collaboration with the VPO, USD 6,9 million USD (3,5 million from LDCF/SCCF and 3,4 million USD co-financing to be defined). In the planning phase, 2010-2014.
	Expedited financing for interim measures for capacity building in priority areas (Phase II), USD 100,000, 2007-2008 (18 months). GEF.
	Second National Communication in partnership with Ceest, USD 405,000 for three years

	ending in 2009.
UNIDO	Best practices in energy management in the industrial sector.
	Rural Micro-Hydropower Development. Objective: to identify potential sites for the development of small and micro hydropower schemes in partnership with International Network on Small Hydro Power (INSHP), The Ministry of Energy and Minerals, TANESCO and TaTEDO.
UNESCO	Building knowledge and partnerships for reducing biodiversity loss and adapting to climate change (in five countries), USD 20,000, 2008-2009.
UN-habitat	Promoting Energy Efficiency in Buildings in East Africa, USD 231,000.
FAO	Bioenergy and Food security project, USD 400,000, 2007-2009.

Table 2. Projects funded by bilateral and multilateral donors outside the UN

Donor	Project activity
USAID	TMA and Africa Hydronet training for RANET with WWF, USD 20,000, January 2008
	Mainstreaming climate information into decision-making in natural resource management. Planned for 2009. Potential budget USD 4 million, 2009-2012.
Netherlands	Netherlands Climate Change Assistance Programme (NCAP) in cooperation with CEEST, DOE, Envirocare, TaTEDO, and Communities in Rufiji and Kilimanjaro, EUR 200,000, 2006-2008.
	Capacity Development for Clean Development Mechanism (CD4CDM) in partnership with UNEP/Risoe Centre Denmark, CEEST, EPMS and DOE, EUR 2 million, 2007-2010.
Norway	Support for the UN REDD programme, up to NOK 20 million in 2009, disbursed through Oslo to UNDP HQ.
	Support for climate-change research programme. This is to be implemented by 3 Tanzanian universities and the Tanzania Meteorological Agency. Up to NOK 20 million annually, 2009- 2013.
	REDD activities: 1) Support for the national REDD strategy process in Tanzania, 2) NGO-operated demonstration programmes within the framework of REDD, 3) public-private partnerships with private sector partners, 4) REDD capacity-building programmes, 5) development of REDD demonstration areas and implementation of baseline studies, and 6) support for a national REDD fund. Up to NOK 60 million annually – still in the planning phase.
Danida	Capacity development, follow-up to NAPA. Implemented by VPO and TMA. USD 1 million, 2007-2010.
EU	Renewable energy, EUR 8 million.
	Global Climate Change Alliance, EUR 2,5 million.
	Regional Dryland Research Project in collaboration with IRDC and SADC.
Finland	Recognizing the role of forest and water in climate change adaptation implemented with IUCN. Climate Change and Development (Zambia, Tanzania, Mozambique), EUR 2,8 million, 2008-2010.
	Southern/Eastern Africa CDM Capacity Development (Ethiopia, Tanzania, Kenya, Mauritius, Zambia, Mozambique), USD 1,5 million, 2008-2009, in cooperation with Spain/Sweden and UNDP.
	National Forestry and Beekeeping Programme of Tanzania in partnership with the Ministry of Natural resources and Tourism and PMO-RALG, EUR 9,0 million, 2009-2011.
	National Forest Monitoring and Assessment of Tanzania (Forest Inventory) in partnership with the Ministry of Natural Resources and Tourism, FAO and WB, EUR 2,3 million, 2009-2011.
	Regional (SADC) capacity building Meteorological Project. Pipeline, 2009-2011, 800,000 Euro.
DFID	Regional Climate Change Programme for SADC (Malawi, Mozambique, Tanzania, Zambia, Zimbabwe, Angola), Climate Change Fellowship Programme for doctoral and post-doctoral studies in 12 African “Centres of Excellence”, USD 2 million.
	Bioenergy/clean energy: a regional project, Tanzania funding is GBP 500,000 per year for 5 years.
France	Rungwe Environmental Science Observatory network (RESON) including: French Institute for

	Research and Development, Institute for Resource Assessment, University of Dar es Salaam, Ministry of Science and Telecommunications, Researchers from Belgium, Germany, Britain and France, USD 120,000, 2007-2010.
Austria	CDM in Africa (Uganda, TZ, Ghana, Ethiopia), EUR 2,5 million, 2007-2009.
Germany	Preservation of the mountain forests in the Eastern Arc Region in cooperation with UNDP and the Ministry of Natural Resources and Tourism, EUR 2,171,210 million.
JICA	A programme in 20 countries, each of which is allocated USD 2-5 million, carried out by UNDP from Pretoria (information from UNDP).
SIDA	The Environment for Development initiative (EfD). Objective: to support poverty alleviation and sustainable development through increased use of environmental economics in the policymaking process. In collaboration with Environmental Economics Unit and Resources for the Future. Global Programme supported from Sida Head Quarters, 100 MSEK for 3 years for the global initiative. Country desk at UDSM Faculty of Economics.
	Renewable energy programme, but not classified Climate change. Facilitates solar power market in 17 regions with Ministry of Energy and Minerals, SEK 27 million.
	Biofuel task force, "Strengthen Policy, Legal, Regulatory & Institutional Framework to Support the Development of a Sustainable Biofuel Industry in Tanzania" in collaboration with Ministry of Energy and Minerals, SEK 12 million from 2009-2010. (Norway is also supporting NOK 11 million, but Sweden is lead).
	CDM Capacity Building in Kenya, Tanzania, Uganda with the Swedish Energy Agency Designated National Agencies, 2007-2009, SEK 13 million.
	Research capacity strengthening at UDSM, ARU. Support to 1) Institute of Marine Sciences IMS (research on coastal & marine management), 2) College of Engineering and Technology: research on renewable energy, 3) Faculty of Sciences: research on solar radiation, molecular biology, national reference for GMO, and 4) ARDHI University, research in land and water management. Approximately SEK 50 million, 2004-2009.
	Regional support (10 countries incl Tza) to WIOMSA, Western Indian Ocean Marine Sciences Association, Marine and Coastal management for Science in collaboration with WIOMSA secretariat (Zanzibar). SEK 46,75 million from 2007-2010.
	Support to research capacity strengthening at various universities (UDSM, ARU 2009-2012). Planned approx SEK 25 million for research on integrated natural resources management and renewable energy.
Belgium	Technical Support to "Rungwe Environmental Science Observatory Network" (RESON) project through Belgium Universities in cooperation with the French Embas, sy.
CIDA	Water Resources Project – Climate Change Module (reducing vulnerability), USD 2 million a year – shared between four countries in the region.
World Bank	Development of a Policy towards Sustainable Charcoal; Woodfuel Action Plan (financed under TFCMP) and Forest Carbon Partnership Facility, US\$150,000~US\$1 million, mainly TA. Tanzania is not yet participant, but application is submitted.
UNDP/World Bank	Sustainable Management of the Miombo Woodland Resources of Western Tanzania (GEF Project, which includes a adaptations to Climate Change component), ~US\$7.5 million, is yet to be approved.

So far, the funding available has mainly been provided in the form of short-term projects. Although the DPGE has intensified its discussion on climate change issues, there seems to be room for further information exchange and coordination between the implementing entities, and activities do not appear to deliberately match the priorities of the NAPA. Coordination with projects and programmes in the fields of disaster management and

food security seems currently not to be considered by the DPGE. This is despite obvious similarities in substance. For instance, it appears surprising that the WFP, which is deeply involved in vulnerability assessment in relation to food security, has been left out of the “One UN” programme, which deals with climate change. Several projects overlap, e.g. in supporting CDM and capacity development. There seems to be major overlaps between the “One UN” Pilot programme and Danida’s support for the VPO with regard to climate change and implementation of the EMA. Both programmes are building capacity in DOE, sectors and LGA’s, yet none of them refer to each other. Lately IUCN/FINNIDA has as part of a regional programme initiated 5 studies, which have a substantial overlap to the present report.

The intensity of information exchange on climate issues has increased. Nevertheless, information exchange between the development partners on planned and ongoing activities needs further development, as does the exchange of information with DOE. There is a risk that development partner funded projects will duplicate each other and miss opportunities to create synergy.

This has created a need for moving forward in a coordinated manner, ensuring that the activities of the development partners will address the priority needs of Tanzania and be integrated into a wider national framework, while ensuring more joint interventions. The development partners could consider requiring an explicit clause in their various preparation and project documents, describing activities funded by other donors and how coordination is ensured.

The development partners seem to apply fairly arbitrary criteria to define what qualifies as a “climate project”. Some tend to go by the origin of the funding sources, while others focus on the purpose of the activity.

Many of the on-going activities within the sectors and SWAps are already addressing climate change without explicitly describing themselves as climate projects. Sector work is taking place in areas such as soil improvement, watershed management, development of drought resistant crops, more efficient charcoal production and use etc. Several major forest programmes funded by Danida and the World Bank are not labelled as climate change activities. This is also the case of major World Bank- and Sida-funded activities within renewable energy. Conversely, other projects of a similar nature are indeed labelled as climate change projects.

Given the growing funding for climate change activities, it can be expected that an increasing part of these sector programmes will be labelled as addressing climate change in the future. An effort is needed to ensure that such activities are implemented within the sectors. And the development partners and VPO must decide which of these projects they wish to coordinate within the ESW.

4.3 Main activities of the NGO sector

It is not an easy task to get an overview of the main NGO activities related to climate change, since many NGOs regard climate change as an area to be mainstreamed into

existing projects, programmes and development strategies. Due to this approach, it has been decided to illustrate the vast range of NGO projects, which directly or indirectly address climate change. (Annex 3). With the exception of a few small organisations working specifically within the area of climate change, those included in the table are some of the major NGOs in Tanzania: Care TZ, IUCN, WWF, TaTEDO, Ceest, Oxfam, Tanzania Forest Conservation group, Africare, CarbonTanzania, Wildlife Conservation Society of Tanzania and the Environmental Protection Management Services (EPMS). These NGOs either receive most of their funding from sister organizations, development partners, private sector sponsors or headquarters, whereas national public funding of NGO activities is almost non-existent (see Annex 3 for a brief description of the NGOs).

The strategies of the NGO sector pursue a pro-poor adaptation agenda emphasising sustainable livelihoods, measures to address social injustice, capacity building, fighting corruption, awareness-raising, knowledge-sharing and vulnerability assessments. Most of the programmes addressing the impacts of climate change through poverty eradication efforts concern water management, agricultural practices, energy services and management of natural resources.

It has become evident during the fieldwork that the NAPA has not become an integrated tool in the work with civil society, and has not fed into existing NGO programmes and strategies. This underlines a greater need for coordination and information sharing with government institutions, which was repeatedly expressed by the NGO sector.

4.4 Main activities of research institutions

Tanzania's universities and other research institutions have initiated several research programmes and joint undertakings in the field of climate change. The universities have several well-qualified research institutes. For instance, Dar es Salaam University has two appointees to the IPCC's scientific panels.

Research is being conducted on climate-change-related activities by several of the national research institutions. This covers specific climate change research on forecasting and remote sensing technology, as well as sector-specific research in agriculture, forest conservation and energy efficiency. However, disaster management and food security also draw some attention.

National funding of research activities is limited, which is why international partners often fund research in Tanzania. However, for instance the College of Engineering and Technology at the University of Dar es Salaam is carrying out mainly nationally funded research on greenhouse gas inventory, impact studies and CDM. It performs some of the key assessments of sources/sinks as regards greenhouse gasses.

Table 3: Selected Development Partner Funded research programs.

Programme title	Partners	Funding	Comments
Enhancing African adaptation to climate change	Regional programme/IDRC in cooperation with Dar	DFID: USD 26 million in total for	Focus on action research, capacity development and scholarships.

	es Salaam and Sokoine Universities	regional programme for 2006-08.	
Climate research programme	Ardhi, Dar es Salaam, Sokoine Universities Tanzania Meteorological Agency.	Norway: App. USD 14.5 million for 5 years	Under planning expected to start in 2009
Climate Volatility and the Poor in Southern and Eastern Africa	The World Bank: University of Copenhagen in cooperation with Economic and Social Research Foundation in Tanzania.	World Bank USD 360,000 in total for 2008-10	Links local, regional and global CC models and applies results for land-use and economic modelling to Tanzania.
Regional coordination office	Stockholm Environment Institute in cooperation with Institute for Resource Assessment, Dar es Salaam University.	Core staff Shall generate own resources.	The office should support research and policy development within bio resources, environment and development
Environment for Development Initiative	University of Dar es Salaam Dr. Looking Gothenburg University	SIDA/SAREC	Capacity building in environmental economics
Strengthen research capacity for poverty reduction and sustainable development	University of Dar es Salaam	SIDA/SAREC Framework programme 2009-18	Broad support including climate change. Can support scholarships, regional and international cooperation and application of research. Has link to COSTECH.
Impact of climate change on water resources and agriculture – and adaptation strategies in Vietnam and Tanzania	Geological Survey of Denmark, Department of Geography and Geology, University of Copenhagen, Danish Meteorological Institute. Institute of Resource Assessment and Faculty of Engineering, University of Dar es Salaam and TMA.	Denmark Programme is still being planned and has yet to be approved. Tentative budget app. USD 2 million	Focus is on building research capacity and research alliances. Will include work to downscale climate models, hydrological modelling and analysis of drivers of adaptation
Link between disaster management and climate change	School of Environmental Sciences, Ardhi university with TMA, Red Cross and Department for disaster management	Not approved, but proposals requested by EU	
CZM, climate change and HIV/AIDS – adaptation strategies	Dep. of Geomatics, Ardhi University	Budget TZH 2.3 million, SIDA/SAREC	

Climate change influence on human settlements in Mtwara and Iriringa	Dep. of Urban and Regional Planning, Ardhi University		
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There are most probably several other externally funded research programmes underway in addition to those presented in table 3.

The funds available for research are fairly substantial compared to the funding currently available for concrete development projects. Several of the identified programmes cooperate with the same institutions and address some of the same topics.

In addition to research at universities, several studies and analyses are being carried out in Tanzania or internationally, and tools are being developed across a wide range of fields of relevance to Tanzania. Much of this is available at websites, but stakeholders do not always have easy Internet access.

In interviews with the institutions, it soon transpired that coordination and exchange of experiences among the research institutions is fairly limited. Furthermore, there seems to be no systematic cooperation with government institutions, and therefore no systematic link between research activities and national priorities. Dissemination and application of research results to users is not very efficient. There is a widespread perception among researchers that their work is unknown by government institutions. Furthermore, it was clear that the international partners were only aware of their own programmes. Although they are very related, there seems to be no link between “climate change” research and research into disaster management and food security. It is striking that the main coordination seems to take place within individual donor-funded research programmes. This applies, for instance, to the DFID/IDRC-funded programme and the Norwegian-funded forest research, while no information exchange or dialogue seems to occur between these two major programmes.

Several of the researchers pointed to the importance of a more systematic exchange of research results among the universities, and a more intense dialogue with users, as the key to efficient use of research results. .

Due to its coordinating mandate for national research institutions, COSTECH represents one option for addressing some of these deficiencies. SIDA is currently supporting COSTECH, and one focus area of this cooperation is coordination and dissemination of research. It would, however, be necessary to conduct an analysis of the formal role and capacity of COSTECH.

In addition to their research, the universities also perform important educational roles, and many programmes include scholarships. At Ardhi University, there is Disaster Management Training Centre (DMTC). The Prime Minister’s Office initiated the centre in 2002 with support from USAID. The centre is focussed on disaster management, but could be an entrance point for training in preventive measures as well.

It is recommended:

- That development partners, as part of their support for research, ensure a high priority to the dialogue between research institutions, as well as to dissemination and application of research results by user groups.
- That development partners include, as part of their programmes, funding for research networks to exchange research results between the universities. This could be incorporated into the new Norwegian REDD programme in support of research in the form of contributions towards administrative needs, workshops, newsletters etc. within one of the participant institutions.
- That development partners support information exchange between universities and other knowledge centres, that core national research priorities be identified, and that research results be disseminated to government institutions and user groups in the field. It could be considered to involve COSTECH in this in close coordination with DOE and NEMC.
- That efforts be made within all DP-supported research programmes to establish links and synergy between “climate change” research and research focused on disaster management and food security.

5. National Institutional Context

5.1 Overview

The Environmental Management Act (EMA) establishes the legal basis for the GoT's climate change activities. The EMA assigns responsibility for ensuring that international conventions on environment are implemented to the VPO. With specific regard to climate change, paragraph 75 of EMA provides VPO with the following authority:

The Minister shall, in consultation with relevant sector Ministries:

- (a) Take measures to address climate change, particularly the impacts of climate change and adaptation measures.
- (b) Issue guidelines periodically to Ministries and any other institutions in order to address climate change and its impact as a result of global warming.
- (c) Require Ministries and independent Government departments to put in place strategies and action plans to deal with climate change and to advise schools and higher learning institutions to include matters relating to climate change in their curriculum.
- (d) Review and approve any measures undertaken to address climate change by any institution, firm, sector or individuals be it foreign or local, including those related to the use of land, water, forest or any ecosystems within the United Republic to sequester greenhouse gases.
- (e) Project national positions at global level on how to deal with the problem of climate change in the context of the United Nations Framework Convention on Climate Change, and its related Protocol(s).

The Minister of Environment therefore has the central role in coordinating the national response to climate change, but ministries and other institutions are required to develop strategies and action plans to address climate change within their own remits.

The following table sets out the functions of the various institutions as regards climate change response in Tanzania, and the actions expected of each.

Function	Organisations Responsible	Actions Required
Policy leadership, coordination, and monitoring	Division of Environment	Developing policy, guidance and action plans Monitoring policy implementation

National development planning	Ministry of Planning, Economy and Empowerment	Integrating environment into planning processes, including Mkukuta Allocating budgets and budget spending codes to climate change Preparing to integrate climate change support from DPs in General Budget Support system, PAF, joint annual reviews etc Considering economic instruments to promote and facilitate climate change adaptation and mitigation measures
Response planning	Division of Environment, VPO Disaster Response Unit, PMO Food Security Agency, MoAC	Preparing early warning systems and emergency response plans
Sectoral planning	Ministry of Energy and Minerals Ministry of Natural Resources and Tourism Ministry of Water Ministry of Agriculture Food Security and Cooperatives Ministry of Industry Ministry of Wildlife, etc	Integrating environment into policy and planning processes. Preparing sectoral climate change response plans Raising awareness of managers Training technical officers Tracking the issue and keep up-to-date on funding opportunities
Industrial production	Private companies Industrial Confederation of Tanzania Tanzania Chamber of Commerce Ministry of Industry	Identifying cleaner production methods to reduce climate change effects Identifying technology transfer opportunities Researching and disseminating best available technologies with regard to climate change
Area development planning	PMO RALG Ministry of Lands, Housing and Human Settlement Development Land Commission Provincial authorities District authorities	Considering climate change in land use planning and regional and local development plans
Actions at community level	Village authorities NGOs	Raising awareness of low carbon options for livelihood improvement Implementing adaptation measures where climate related effects are evident
Technical information provision	TMA NEMC; DOE, Ministry of Water, MoAC, MoH National Bureau of Statistics	Collecting, managing and analysing data on climate and environmental resources Making information related to climate change variability or effects on environmental resources available to stakeholders
Identification of research needs plus promotion and coordination of research	Ministry of Science Technology and Higher Education COSTECH TMA NEMC	Identifying research needs in the area of climate change Registering and tracking research activities Identifying and recruiting funders of research, and directing them to suitable Tanzanian partner institutions Providing dialogue forums for researchers
Undertaking research	Universities (UDES, IRA, Sokoine, ARDHI) Research institutes (MoAC, TAFORI, TAFIRI, Forest Research Institute) Marine Science Institute NGOs	Researching adaptation measures suitable for the Tanzanian context Surveying, measuring and assessing climate variability and its effects Filling gaps in knowledge required for policy strategy and planning Conducting pilot studies and demonstrations
Awareness raising and Education	Ministry of Education Ministry of Science Technology and Higher Education	Inserting climate change into curricula Preparing and conducting national public awareness raising campaigns

	VPO Sector ministries NGOs	Preparing and conducting awareness raising for senior government and local authority (provincial and district) decision makers Preparing and conducting vocational training in climate change issues for responsible sector and district officers (i.e. at present, Environment Officers)
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5.2 *Institutional roles and responsibilities*

The current activities and capacities of the main institutional actors to carry out their functions with regard to climate change are briefly described below.

Vice President's Office

The overall responsibility for ensuring the implementation of all environmental policies, laws and rules belongs to the Vice President's Office. The Minister of State for Environment works under the Vice President and has overall responsibility for matters relating to environmental-management legislation and policy. According to EMA, a National Environmental Advisory Committee (NEAC) should advise the minister. Its mandate has been formulated and members have been nominated from the relevant institutions, but it has yet to become operational. Two entities have been established to deal with climate change: a National Climate Change Steering Committee, and a corresponding Technical Committee, which can be perceived as sub-committees of the NEAC. While the first is reserved for government institutions, the technical committee also encompasses research institutions, NGOs, private sector stakeholders etc. So far, meetings have not been convened.

The two core institutions responsible for environmental management report to the minister: the Division of Environment (DoE) is responsible for policy matters, and the National Environmental Management Council (NEMC) is the technical entity responsible for enforcement and monitoring.

DoE is the focal point and Designated National Authority under the United Nations Framework Convention on Climate Change (UNFCCC). It has established a Climate Change unit currently comprising five part-time staff members under the Deputy Director in charge of the EIA Section. According to the Deputy Director, additional staff is being contracted. This unit is the main executor of the VPO's responsibilities, as outlined in the EMA

In addition, DoE is responsible for publication of the national State of the Environment Report, the current edition (2007) of which summarises the status of climate change in Tanzania, reports what is known about the effects, sets out the national policy, and reports on actions undertaken. DoE also assists in training and awareness raising of sector and district environmental staff – an obvious mechanism for the broadcast of climate change capacity.

NEMC is not directly involved in the coordination of climate change. The Environment Management Act provides the Minister of Environment with responsibility for coordination of climate activities as described at page 34.

Tanzania Meteorological Agency

Tanzania Meteorological Agency (TMA) is a semi-autonomous agency under the Ministry of Infrastructure. It is required to generate some of its income by selling its services, including access to its historic data. It has suffered from reduced access to investment funds since it acquired agency status, and has difficulty maintaining its current network, let alone acquiring new equipment. It is the national focal point for the Intergovernmental Panel on Climate Change (IPCC), and participates in the yearly meeting. TMA has nominated two members of IPCC taskforces.¹ Domestically, it gathers climate data from its own network, which is supplemented by weather stations maintained by the Ministry of Agriculture and Food Security (MoAFS) and by the Ministry of Water and Irrigation (MoWI), as well as by a large number of private bodies that record some parameters (mostly rainfall) on a voluntary basis. TMA calculate that they require at least 100 climatological stations. They have a sufficient number of rainfall stations (2,000 are needed), when all are operating and reporting, but their network has large gaps, especially in the south and west of Tanzania. TMA has limited capacity in the use of regional models for preparing climate change scenarios at the local level. TMA seem to have substantial management problem for instance it is not able to supply results of 10 days weather forecast to farmers within a 10 day time limit, and it has major problems with financial sustainability. There is only limited cooperation between universities and TMA so far.

Sector ministries and institutions

Sector ministries generally have made limited progress towards integrating Climate Change into their planning procedures (as required by EMA and UNFCCC). Most have now established Environment Sections, and these constitute one potential entry point for DoE-led support of advice and guidance on climate change. The most important ministries in terms of responding to climate change include the following:

Ministry of Finance, Poverty Reduction Department: Responsible for the monitoring of and follow-up to the Mkukuta. Is key ministry for mainstreaming CC in national strategies, such as Mkukuta, and in national budgeting processes, including the use of economic instruments. The team had planned to meet with representatives of the ministry during the second visit to Tanzania, but due to the parliamentary session, it was not possible to meet the Ministry staff. A review of the current MKUKUTA and the preparation of a new national plan will be initiated in February 2009, and is expected to be finalised in first half of 2010. In February/March, a road-map for this work will be presented together with a concept note and guidelines for individual sectors. A first draft of the new MKUKUTA is expected in late 2009.

¹ Current Tanzania IPCC expert members are Mr. Martin Lukando and Dr. Emmanuel Mpeta, together with Prof. Pius Yanda and Prof. J.H.Katima from university of Dar es Salaam

Disaster Management Coordination Unit, Prime Minister's Office. This unit is primarily focussed on disaster preparedness and management, and has so far done less in relation to prevention and on the links between disaster and climate change. The team had planned to follow up closely with this unit during the second visit, but due to the Parliaments session it was not possible to meet the ministry itself.

The Prime Minister's Office heads the Tanzania Disaster Relief Committee (TANDREC). It is composed of PSs from several central ministries. TANDREC is responsible for disaster management and food security.

In collaboration with the Ministry of Agriculture and Food Security (the Food Security Division), the PMO has formed what is known as the Food Security Information Team (FSIT), whose mandate is to undertake food security vulnerability assessments. Several government institutions, regional and local authorities, international partners, such as WFP, UNICEF and FAO, as well as NGOs are included in the team, which prepares a yearly vulnerability assessment.

Ministry of Agriculture Food Security and Cooperatives: Although oversight of the agricultural sector is divided amongst several ministries (Ministry of Livestock Development and Fisheries, Ministry of Water and Irrigation), sector planning is well coordinated through an Integrated Agricultural Sector Programme. MoAC plays an important part by providing comprehensive, reliable and accessible (through the National Bureau of Statistics) information needed to detect and develop responses to climate change, particularly about crop production and yields. It also provides data through its climate stations operated jointly with TMA, as mentioned above, and the Food Security Agency. Also, its remit, together with that of Ministry of Livestock Development, covers the issues most affected by climate variability (drought, overgrazing of rangelands, conflicts between pastoralists and crop producers). In addition, the ministry supervises 20 agricultural research institutes that can investigate sensitivity of crops to climate variability and suggest suitable substitutes where necessary. The Ministry of Agriculture is a key member of TANDREC and FSIT through its Food Security Division.

Ministry of Energy and Minerals: The Ministry of Energy and Minerals (MEM) is mandated to ensure sustainable, reliable, adequate and environmentally friendly supplies of energy at the least cost to the economy and the consumers. Although the national energy policy, issued in 1993, does not specifically address climate change, it does require the ministry to strive to increase energy efficiency and conservation. The ministry has several initiatives aimed at increasing the use of renewable energy, including solar, geothermal, wind and mini-hydro generation. The target is 3–5% but the barrier until now has been cost. Power is generated by TANESCO, an independent company under the ministry. A recent initiative has been the introduction of a Standardized Power Purchase Agreement to simplify the way in which small electricity producers can sell their power through the grid. This will allow easier access to markets for power produced as a way of mitigating climate change. It has to be mentioned that 92% of energy supply still comes from fuel wood and charcoal.

Ministry of Natural Resources and Tourism: This includes the Department of Forestry and Beekeeping (DFB), which is responsible for the national forestry programme. Climate change has not been a focus of the department, and they acknowledge that awareness and technical knowledge is limited. Climate change is not mentioned in the latest Forest Act of 2002. Nor is it a focus of the National Forestry Programme 2001 to 2010. This programme is currently being revised, as part of the new Forest and Beekeeping (sector programme) 2009-11, funded by Finland. The National Forest Policy is under revision with funding from GTZ. According to the National Forest Programme (2001) Tanzania possess about 33.5 million hectares (ha) of natural forest. Much of this is known to be heavily degraded, due to pressure for fuel wood, charcoal and construction materials. The SoER estimates that, despite substantial tree planting efforts, there is a net national deforestation rate of about 67,000 ha annually. DFB is undertaking a National Ecosystem Inventory, with support from Finland, which will produce a database of forest and woodlands.

Ministry of Water and Irrigation: The institution under this ministry most directly concerned with climate change is the Department of Water Resources (DWR). The department acknowledges that it is in the early stages of learning about climate change. Its major contributions are delivered through its regional offices located in each major river/lake basin (there are nine river/lake basins in Tanzania of which five are trans-boundary). These have data collection networks that can record the flows of rivers at various points together with climate data. TMA reports that the climate stations have been allowed to fall into disuse. Similarly, a hydrological yearbook that recorded the discharge of the main river systems has ceased to be published. The Water Resource Department informs that it has 80 meteorological stations, of which only 40 are working. Rainfall data should be reported to TMA. However, in the new Water Sector Development Programme 2006-25, funding is allocated to rehabilitate and expand the hydrological, hydro-geological and hydro-meteorological network. DWR notes that conflicts over the allocation of water are becoming more frequent and it is looking forward to the formation of a cross-sectoral National Water Board, which will be set up to implement the new National Water Development Programme covering the period up to 2025.

Ministry of Health and Social Welfare: Holds systematic data on, for instance, malaria, cholera and nutrition, but is not part of wider assessments of the link between these diseases and climate change. There are however emerging discussions of these linkages within the ministry.

The National Land Use Planning Commission: The Commission coordinates land use in Tanzania. An important task is to build capacity for land use planning at district level and support the preparation of land use plans. The commission is currently preparing a national Land Use Plan for 2008-28. According to the Director for Research, the plan proposes to convert 400,000 ha of forest into arable land.

National Bureau of Statistics, NBS

NBS is a semiautonomous agency, which collects social and economic statistics. It conducts a census every 10 years, the latest was in 2002. The next is planned for 2012. It will be digitized and include spatial data. NBS cooperates with the Division of Surveys and Mapping in the Ministry of Lands as regards base maps and GIS. Has carried out an agricultural survey in 2003 at the regional level, and is planning for a district survey. In 2004, NBS established a Department for Environmental Statistics, which prepared an environmental statistical publication. It is under discussion with DFID and IRA to prepare an environmental/poverty map. The DoE and NEMC should be the champions of this. NBS is implementing a major transformation of the national statistical system with support from the World Bank.

Research organisations

The Ministry of Science, Technology and Higher Education coordinates scientific research in Tanzania through a semiautonomous body – the Commission for Science and Technology (COSTECH). COSTECH facilitates sectoral research and development advisory committees (DAC) that meet twice a year. It also registers and issues permits to foreign researchers who embark on research assignments in Tanzania. Climate change falls under the Natural Resources Committee. In theory, each member of the committee informs COSTECH of all new research to be undertaken and reports progress at the regular meetings. COSTECH should therefore be in a position to guide research, ensuring that gaps are filled and that different initiatives are aware of each other. This is not the case, however, for several reasons:

- Membership of DACs is voluntary, not all research institutions join and those that do may not always send appropriate representation to meetings.
- Some foreign researchers evade registration by entering into agreements with local universities who may not inform COSTECH.
- COSTECH itself does not analyse or disseminate the information it receives.

Currently, SIDA/SAREC and COSTECH are discussing the content of a cooperation agreement, which could include research coordination and dissemination of research results.

The research organizations, which are engaged in climate change projects include the following major players:

University of Dar es Salaam:

The Institute of Resource Assessment: It does basic and applied research on climate change issues, and offers doctoral and post-doctoral research fellowships on climate change related topics (under a DFID-funded programme). Major ongoing climate change related research includes:

- Modelling crop production under various climate scenarios
- Impact of climate change on agricultural systems
- Impact of climate change on rangeland production

- Impacts of climate variability on food production (in collaboration with the Department of Food Security)

College of Engineering and Technology: It does research within greenhouse gas inventories, CDM and impacts. Has been involved in source/sink assessments since 1994. It conducts research involving windmills, landfill gasses, carbon cycle in bio fuels and use of CDM in sugar as well as pulp and paper industries. Is a member of the national CDM committee, but has not yet been invited to meetings

Ardhi University:

School of Environmental Science. Conducts training and research in disaster management. In cooperation with the PMO, it has established the Disaster Management Training Centre. In 2002, it prepared a national vulnerability assessment. In May 2006, it published the study “Community initiatives in managing urbanisation and risk accumulation processes: lessons from Dar es Salaam”. The school is currently following up the findings with the affected municipalities and communities.

Department of Geomatics, Department of Urban and Regional Planning, and Department of Environmental Engineering. These three departments all carry out some research within adaptation and mitigation. They are involved in cooperation with NASA and Purdue University on measurement of sea level rise, as well as in regional cooperation around Lake Victoria.

Sokoine University of Agriculture: The university focuses on research and development in soil and water management, food security and household income for small-scale farmers. It has recently appointed a Team Leader dedicated to climate change. Much of its research agenda (watershed management, rain water harvesting, agricultural water-use reduction, agro-forestry) has now become eligible for funding under the heading of climate change. An ongoing study specific to climate change is an historical climatological study. This will analyse 50 years of climate data collected by TMA.

Natural Resources Research Institutions: The government has established three institutes with an overall mandate of providing scientific information and advice to government on matters relating to the sustainable management of natural resources. These include Tanzania Fisheries Research Institute (TAFIRI), Tanzania Forestry Research Institute (TAFORI), and Tanzania Wildlife Research Institute (TAWIRI).

MOAC Research Institutes: There are at least 14 institutes under the MOAC that conduct research into agricultural or livestock issues (14 are listed in COSTECH’s list of research institutions, MOAC sources cite “around 20”). Originally, most were focused on single crops (e.g. one each for coffee, bananas, coconuts, sugarcane etc.), but they have recently increased their focus to encompass agricultural biotechnology and farming systems research. Their funds and research directions are decided centrally by the Directorate of Research and Training. Current research includes much that would fall into the category of climate change adaptation, such as studies of crop resistance to climate

variability and the potential for introduction of new crop varieties with greater resistance to drought.

Economic and Social Research Foundation, (ESRF). This is one of several independent non-profit institutions for research and policy analysis. It focuses on issues such as growth and development, globalisation, governance and social services, and quality of life. Recently, it has been involved in climate change in cooperation with University of Copenhagen.

NGOs

Several national NGO are active in climate change related issues. TATeDO are doing research and advisory in sustainable energy with projects for improvement of charcoal production and cook stoves. CEEST works with climate analysis and policy, and is currently preparing the Second National Communication. The Environmental Protection and Management Service is building capacity for adaptation to CDM, and is involved in South-South collaboration.

Furthermore, several international NGOs are active in Tanzania. Their remits include poverty alleviation either directly (CARE, Oxfam, Africare) or indirectly through attention to environment and natural resources (WWF, IUCN). Through their frequent cooperation with national NGOs, they have the ability to work at the local level and to communicate directly with communities. Their attitudes towards climate change have much in common, and may be summarised as: a) concern that the effects will increase poverty and undo much of the recent development work; b) building their own capacity to understand the consequences of climate change and to act as interlocutor between implementers of projects and affected communities; and c) being willing to undertake climate change pilot projects and studies, partly to build capacity and partly to take advantage of the funds to advance their advocacy and basic development agendas.

5.3 Capacities to undertake required actions

General needs

The table at page 35-36 lists the actions required of the main institutions to create and maintain a coordinated and effective national response to climate change. Few, if any, of the institutions are yet completely fulfilling their allotted roles. This study has not attempted a detailed capacity assessment of any of the institutions but some general difficulties that they face are acknowledged by almost all of them. These include:

- The need for greater awareness of decision-makers and planners of climate change policy and issues. Although most sectors deal with climate changes, no systematic assessment has been made of the consequences of the latest climate development for the sectors etc. Furthermore, not much attention has been paid to the consequences of CC for national poverty eradication, growth and development strategies.
- Few systematic links between activities related to food security, disaster management and climate change issues.

- The need for technical training in the relationships between sectoral activities and climate change issues.
- The need for mechanisms for institutions to receive and respond to information on climate change and to integrate concerns into their operations.

Such needs can be met without large capital investment, significant recruitment or reassignment of staff in the short term.

Within DOE and TMA, the two national focal points for UNFCCC and IPCC, more short terms support will be needed along with coordination of funding already provided for the division.

- DOE is in need of more staff, in-service training, coordination tools, and support for policy development and coordination. It could be considered to outsource activities, including aspects of coordination, information and training of partners.
- TMA is in need of funds to take part in international and regional discussions and networking, conduct in-service training, renovate and extend climate stations, digitize and analyse historic data, analyse the need for upgrading climate modelling capacity within TMA, or whether it should be part of regional cooperation, implement system for dissemination of information, and convene technical coordination meetings. Finally, TMA needs support to strengthen its management structures, meet its organisational targets and enhance its performance, e.g. in relation to the dissemination of weather reports to users.

6. Existing coordination mechanisms

Addressing climate change could ultimately mean to integrate mitigation and adaptation considerations into all aspects of development activities. It encompasses, for instance, promoting low-carbon technologies, carrying out data collection and research, building resilience in local communities to variations in climate conditions, mitigating climate change through reforestation and soil conservation, adapting crops and cultivation technologies, as well as adjusting to and taking advantage of developments in global markets. The most effective manner of increasing the capacity for adaptation is to further strengthen efforts in favour of economic and social development, including poverty alleviation.

In the coordination of climate issues, it must also be kept in mind that climate change and variations are nothing new and are already being addressed in Tanzania, funded through government and development budgets. Many activities to mitigate and adapt to climate change form part of sector plans, and are coordinated within responsible ministries and with their respective DPs in accordance with the JAST.

Mechanisms are in place to ensure coordination of cooperation between the GoT and development partners as regards activities at the national, local and sector level. These mechanisms all address various aspects of climate change. Accordingly, the main challenge for climate change coordination is not to establish new organizational set-ups for this purpose, but to consider how existing structures can be reinforced to meet the increasingly pressing challenges of climate change and variability.

6.1 The Joint Assistance Strategy for Tanzania (JAST)

The JAST is Tanzania's national strategy for development co-operation between the GoT and its development partners. This and other documents chart the course for coordination.

Within the JAST, the Performance Assessment Framework provides indicators to be assessed during the Joint Annual Reviews of general budget support.

The cooperation is organised in several cluster-working groups, which cover various sectors and thematic areas. Within most sectors and thematic areas, cooperation mechanisms have been set up and/or are being developed. For instance, the Forest and Beekeeping Division of the Ministry of Natural Resources and Tourism convenes four formal meetings a year with their development partners in the Forest and Beekeeping Steering Committee. The cooperation is based on a ten-year strategy, the three-year Medium Term Strategy Plan, and an annual plan and budget, the MTEF discussed during the annual meeting. According to the Division, a SWAP and basket fund for support for forest management are under discussion.

PMO-RALG has an extensive set-up for coordination of support for decentralization as part of the devolution process. The GoT has a National Steering Committee, and – for the

cooperation with development partners – a Technical Steering Committee. Funding allocation is based on objective criteria. Joint annual reviews are conducted on the basis of independent external reviews of progress towards agreed indicators. Within the energy sector, joint annual reviews are also carried out. Other sectors, such as health, agriculture and water, have similar arrangements.

6.2 Development partners – GoT coordination of environmental support

Cooperation between the GoT and development partners in the area of environment is channelled through the Environmental Working Group (EWG) headed by the VPO. EWG holds 5-6 meetings a year, and deals with a wide array of environmental issues. There are currently no joint programmes, basket funding or joint annual reviews within the environmental sector. Support for DOE is provided through separate agreements for each DP. At present, there is no specific mechanism for coordination of climate change activities between the GoT and development partners.

The GoT has defined two separate national entities tasked with dealing with climate change. One is the National Climate Change Steering Committee, which includes most government agencies; the other is its corresponding Technical Committee, which also encompasses most stakeholders outside the government. Terms of Reference have been prepared for these entities by the VPO, and a list of members has been drawn up. However, at the time of the team's missions, both bodies had yet to hold their first meeting. Some development partners have expressed the view that EWG has a very broad agenda, leaving insufficient space for systematic discussion of climate change. Therefore, it is considered more efficient to concentrate climate change coordination within a group specifically dedicated to this purpose. The proposal is that the VPO consider inviting the development partners to participate in the Climate Change Technical Committee in an arrangement similar to that seen in PMO-RALG in relation to decentralization.

6.3 Development Partner Group on Environment: DPG-E.

The DPG-E meets regularly. Recently, climate change has been made a priority issue for the group. When climate change is on the agenda, additional DPs participate in the meetings.

DPG-E functions mainly as a forum for information exchange, and for coordination of views in relation to cooperation with the VPO. To some degree, the participants also seek to coordinate their support for the DOE. The chair and the vice chair of DPG-E represent the group in discussions with the VPO on issues of common interest. Representatives from the group participate in the government-led Environmental Working Group (EWG). The DPG-E covers all aspects of the environment, which is already straining the resources of the group. In its current form, it is unlikely to be a functioning forum for coordination of climate change activities, unless it can be assisted with an academic secretary who could help digest climate change issues.

Although a key partner of the DPG-E is the VPO, the group cooperates with several other government agencies, independent research institutions and NGOs. This is important to

keep in mind when discussing cooperation and coordination mechanisms, as well as in determining who the partners are and at what level co-ordination should take place.

In relation to policy development, coordination and facilitation of CC activities and CDM, the VPO is the key partner institution. However, in relation to forest activities, this role pertains to the Ministry of Natural Resources. As regards urban environment, it is the Prime Minister's Office and the LGAs. In the area of meteorological services, it is TMA. For research, it is the universities, and as regards civil society, the partners are the NGOs.

All these partners are independent institutions with their own mandate. Harmonisation and implementation of their CC activities will be discussed separately in view of their policies and plans. As mentioned earlier, a SWAP for forest issues is under consideration, and as regards urban environment, PMO-RALG has defined a framework called UDEM as a sector window within the decentralization by devolution policy.

The VPO, however, has an important role to play in ensuring the overall policy framework, coordinating and catalysing mainstreaming activities. VPO-DOE could be invited to take part in relevant DPG-E meetings.

6.4 Research entities and NGOs

In the field of research, the current coordination is rather weak. A few initiatives have been taken by COSTECH, but in general there is no systematic mechanism to ensure exchange between researchers and to make research results available to policymakers, administrators and practitioners.

NGOs conduct some coordination², but fairly limited systematic exchange with the GoT and other stakeholders. Some of the coordination identified is: **IDGE, Informal Discussion Group of Environment** with the aim of facilitating communication between the government institutions, NGOs and academic institutions broadly within environmental issues. IUCN is hosting the group, which is planned to be revitalised after two years of inactivity. **TNRF, Tanzania Natural Resources Forum** is a national natural resource advocacy and informational network of over 1,300 individuals and NGOs providing space to share information on NRM issues. It is a very active network, and currently the only national functioning NGO network on climate change related issues. **The National Civil Society Forum on Climate Change** is a new forum organised by Intercooperation Tanzania, Ceest, EPMS and Oxfam as a network explicitly addressing the theme of climate change for civil society organisations. It is still in the making and funding for the administration is still to be identified. **East African Katoomba Group** is an international network representing a broad range of stakeholders, including NGOs, individual groups and institutions, and high-level government institutions. It aims to exchange knowledge and best practices, while conducting advocacy for international policies. It is a strong and very active network.

² Annex 4 for detailed information

7. Main CC funding sources

The funding landscape for climate change is undergoing rapid development. It is currently fairly complex, and financing is channelled through an increasing number of mechanisms, such as global and regional funds, international NGOs, research networks, large foundations, global and regional funds managed through development partners' headquarters and partly through development partners' country missions. Furthermore, more market-based mechanisms are likely to emerge in the future.

Table 4 provides an overview of some of the major funding mechanisms currently under development. Given the changing funding landscape, the figures should only be taken as a good indication of the current trend in funding. Most of the funds are approved for 3-4 years, and a clear picture of the longer-term funding of climate activities cannot be expected until a new international agreement on climate change is in place. This is currently scheduled for the COP 15 in Copenhagen in late 2009.

Table 4. Global multilateral support for climate change activities³

Source of funding	Budget	Contributors	Comment
Climate Investment Fund, CIF World Bank	USD 6.1 billion pledged.		Technology Forests Adaptation
Forest Carbon Partnership Fund (FCPF) World Bank	Target USD 300 million		Support for REDD.
Global Climate Change Alliance ⁴ EU	EUR 10 million for 2008. EUR 25 million per year for 2009/10. Plan: 2 billion/year from 2010. 5-10 billion/year from 2020.	EU and member states. Initial support from Sweden	Considers budget support and sector-wide approaches Covers most CC areas.
Adaptation Fund GEF/WB	Plan for 3-500 mi. US\$ by 2012.	Secretariat in GEF.	
Pilot project for climate resilience	Aims at USD 3-500 million for 5-10 countries ⁵	DFID	Mainstreaming of climate risks and resilience

³ Figures could change, as mechanisms are in development. Should be taken as an indication of funding levels.

⁴ Commission staff working document, Brussels, 15.7.2008 SEC (2008) 2319.

⁵ It is not clear whether this fund will be integrated into the CIF

World Bank			
GEF	Approximately 990 mi. US\$ for 2006-10.	GEF core fund	Mainly for mitigation.
GEF special funds: 1. Least Developed Country Fund 2. Special Climate Change Fund 3. Strategic Priority Piloting and Operational Approach to adaptation	1. Budget USD 172.8 million. 2. Pledged USD 90.8 million. 3. Budget USD 50 million		1. Funding for preparation and implementation of NAPAs. 2. Complementary funds for concrete climate activities 3. Pilot and demonstration project in area of adaptation

There seems to be some detectable trends in global funding:

- The number of funding mechanisms is currently increasing, and several of them are covering the same areas.
- Funding through UNFCCC-based mechanisms, such as GEF, seems to have been weakened, whereas WB, EU and larger bilateral funds (table 4) appear to increase.
- The funding is predominantly directed towards three areas: 1) low carbon technologies; 2) reduction of emissions from deforestation, and 3) adaptation.
- The bulk of funding will be provided through mechanisms, which are managed outside the recipient countries and which are not part of DPs' country programmes.
- It is still unclear how flexible these mechanisms will be and how many specific requirements they will include. It is under discussion how some of these funds can take a much more programmatic approach. In this context, it is also unclear how these funds will relate to the principles of the Paris Declaration.
- Apart from the Adaptation Fund and the GEF funds, so far there appears to be limited involvement of developing countries in the design of these funding mechanisms.

It must also be mentioned that it has yet to be seen how much of these funds will be directed towards countries such as China, India, Brazil and Malaysia, and how much will be available for Sub-Saharan Africa.

This emerging funding landscape poses yet another major challenge for country-based coordination of climate change activities, and it will take a variety of efforts from the GoT and its development partners to align this emerging climate funding to national policies, priorities and administrative systems. It should be a key priority for DPs to assist the GoT in keeping track of and influencing these new funding mechanisms, while they are still under development.

The funding pattern for climate change has many similarities with those observed for HIV/AIDS. A recent joint external evaluation, "The Health Sector in Tanzania, 1999-2006" concluded: "The large increase in external funding for HIV/AIDS sometimes distorts priorities and draws staff away from, for example, maternal and child health care". Further external off-budget support now exceeds external on-budget support in the health sector.

In addition to the multilateral funding mechanisms, substantial bilateral funds are emerging. Some of the larger sources of finance are included in table 5. Some of these funds are still under development, and it generally remains unclear how they will interact with multilateral funds, whether they will be implemented as part of country programmes or separate programmes, and how they will be integrated into national policies. There seems to be a major challenge in securing coordination between these initiatives and multilateral funding.

Table 5. Selected larger bilateral initiatives⁶:

Country	Budget	Duration	Comment
Japan Cool Earth Partnership	USD 10 billion over 5 years	2008-12	Adaptation, clean energy, and mitigation
UK- ETF-IW	Estimated USD 1.593 billion	2008-12	Forest, clean technology, adaptation
Norway Rainforest Initiative	App. USD 560 million	2008-12	Conservation of rainforest, development of forest-based carbon management.
Spanish Millennium Development Goal Fund	Est. USD 143 million	2008-11	Env. management, capacity to access finance, adaptive capacity
German International Climate Initiative	Estimated USD 184 million per year		Sust. energy, adaptation, private investment, support for post 2012.
Australian Global Initiative on Forest and Climate (GIFC)	Expected USD 190 million		Forest initiatives

In addition to the large funds mentioned in table 4 and 5, there is funding managed by bilateral donors' headquarters as global and regional programmes, various research initiatives, international NGO funding, larger foundations, market-based mechanisms, etc.

Finally, it has to be mentioned that – outside this complex web of climate funding mechanisms – most donors are allocating substantial funding within their existing programmes for many of the same purposes, albeit under different headings. Grants for renewable energy, forest management, sustainable agriculture, water supply etc. are substantial. How this is to be coordinated with the new climate funding is not very clear.

From this complex and developing funding landscape, three important tasks seem to surface for the development partners' support for the GoT as regards coordination of CC activities.

- To establish a strong national strategy for climate change activities to guide funding.

⁶ The national funds mentioned could contribute to the global funding mechanisms mentioned above

- To keep track of and influence the funding sources emerging and managed outside Tanzania.
- To understand the procedures for access to these funds.

8. Main conclusion and recommendations

Tanzania is in many ways well positioned to address the present and future challenges of climate change. In particular, the timing of the preparation of the next Mkukuta and the expanded NAPA coincides very well with the international negotiation of a new international agreement on climate change and related funding mechanisms.

- A new MKUKUTA will be prepared for approval in the first half of 2010. The preparation process will be initiated in February/March 2009. This provides a good opportunity to integrate climate change issues into Tanzania's future growth and poverty reduction strategy.
- Tanzania has a NAPA with recommendations for short-term actions, and the VPO is planning a more comprehensive NAPA or national plan for the longer term.
- The overall legal framework is in place, including definition of the VPO's responsibilities.
- A national coordination mechanism has been defined.
- A capable core of researchers is in place at universities, and the NGO community is upgrading skills on climate change.
- Tanzania is a favoured country of cooperation among the development partners.

8.1 Conclusions

Climate change in Tanzania is real, in particular in relation to temperature increase. However there is a huge degree of uncertainty, when it comes to knowledge about specific changes and impacts, as well as the relative weight of global warming compared to other changes with climate implications, e.g. in local land use.

The response to climate change is bound to remain, for a long time, an exercise in the management of uncertainty. Improved and more comprehensive vulnerability assessments and building of resilience in local communities could be important first steps towards securing adaptation.

Climate change is a rapidly emerging issue with a rapidly developing understanding of the problem and its solutions, with intense international negotiations and with an expanding funding framework. This calls for national institutions and their development partners to be flexible in order to adjust policies, priorities, institutional frameworks and cooperation structures to adapt to new knowledge and take advantage of new opportunities.

To meet the climate challenge there is at a global level a serious need for developed countries to provide substantial additional funds to countries like Tanzania, who suffers from developed countries unsustainable use of energy resources. Still at the national and local policy and implementation level climate change should not be considered an add-on

to be addressed through separate projects alone, but need to be integrated and/or mainstreamed into all activities of society. Addressing climate change is about system and technology choices, management practices, improved knowledge, and eventually about budget priorities at all levels. Interventions and coordination regarding climate change in Tanzania should address at least five issues, as expressed in these recommendations:

1. Support and coordinate with the National Designated Authority, VPO, to strengthen its national policymaking and coordinating role, pushing mainstreaming and implementing pilot and demonstration activities. Ensure synergy and coordination with National Disaster Management UNIT, Division of Food Security and Tanzania Meteorological Agency.
2. Assist programmatic and sector efforts, LGAs, Ministry of Finance and others in mainstreaming climate change into national(MKUKUTA) and sector plans, activities and budgets, while ensuring coordination at these levels.
3. Support the preparation of an expanded NAPA or National Climate Action Plan, and the activities needed to secure its participatory preparation and implementation. All initiatives in this regards should be harmonised.
4. Ensure efficient information exchange at all levels, i.e. among the DPs, between DPs and national institutions and among national institutions. This concerns sharing of research activities and results, distributing weather data to user groups and other institutions, organisations and individuals working with disaster management, food security and climate change etc.
5. Align global and regional climate funding to national priorities and plans with the aim of using national system in accordance with the Paris Declaration.

The team has drawn the following specific conclusions:

Climate information:

1. In TMA and other institutions, Tanzania has some basic systems in place to measure the climate situation. However, there is a worrying decline in the number and capacity of monitoring stations maintained by TMA, Water Resource Department and other institutions. Much information is not used, and the capacity and information to substantiate better weather forecasting and climate modelling is limited. There is an urgent need to upgrade weather and other monitoring stations in a viable manner, to computerise existing data, and to assess the feasibility of further development of forecasting and modelling capacities in a regional context.
2. Tanzania has not prepared a comprehensive vulnerability assessment that links knowledge of climate change to socioeconomic data. However in relation to disaster management and food security, the World Food Programme and Ardhi University have performed at least two national vulnerability assessments. There seem to be limited use of these assessments by VPO and its partners, although many of the elements are highly relevant to climate interventions. As a consequence, Tanzania has no up-to-date knowledge of the location of the population groups, sectors and geographic areas that are

most vulnerable to climate change.

3. TMA is the national focal point for IPCC, and has two scientific experts from universities involved in IPCC working groups. Nevertheless, TMA does not ensure coordination and systematic exchange of knowledge between TMA, NEMC, universities, sector research institutions and other knowledge centres, such as CEEST and ESRF

Policy and institutional context:

4. Tanzania has prepared a NAPA to address short-term needs. The NAPA includes a good description of the main problems, a set of key priorities and selected project briefs. However, as clearly stated in the NAPA, it was not intended to address issues related to monitoring and forecasting of climate change and its impacts, research, capacity development, information exchange, awareness-raising and mainstreaming. The development of a more comprehensive national plan and mainstreaming of climate issues in the new MKUKUTA could provide important guidance to national stakeholders and potential donors.
5. There is a need for greater awareness among decision-makers and planners of climate change policy and issues. Although most sectors deal with climate changes, no systematic assessment has been made of the consequences of the latest climate development for the sectors etc. Furthermore, not much attention has been paid to the consequences of CC for national poverty eradication, growth and development strategies. Although many of the basic problems are similar, there are few systematic links between activities related to food security, disaster management and climate change. This applies both to relations between government institutions and between research centres. However, TMA cooperates closely with the Department for Food Security, and less so with VPO/DOE.
6. There is a need for technical training in the links between sectoral activities and climate change issues
7. DOE is in need of more staff, in-service training, coordination tools, needs a national climate plan and coordination. It could be considered to outsource aspects of coordination, information and training of partners.
8. TMA is in need of funds to take part in international and regional discussions and networking, conduct in-service training, renovate and extend climate stations, digitize and analyse historic data, analyse the need for upgrading climate modelling capacity (considering regional cooperation as an alternative to in-house capacity-building), implement system for dissemination of information, and convene technical coordination meetings.

Coordination and funding:

9. Tanzania has drawn up a NAPA and is preparing a Second National Communication. Furthermore, a National Steering Committee and Technical Committee for Climate Change have been established. Even so, most sector institutions, universities and NGOs have called for intensifying dialogue and coordination of policies and activities.

Furthermore, several sector institutions have requested support for awareness-raising and capacity development.

10. At the country level in Tanzania, some donors, such as SIDA, the Netherlands and Finland, are currently focusing on mainstreaming, and have no earmarked climate funding, whereas others, like NORAD, are preparing major forest programmes with the declared objective of combating climate change. These CC programmes often have specific reporting requirements. The “One UN” programme is advancing internal coordination among the UN organizations, in addition to seeking cooperation with government institutions and other development partners. UN coordination of CC activities is still being developed. Efforts should be made to ensure closer coordination between the “One UN” programme and bi- and multilateral programmes to avoid duplication of efforts.
11. There is a need for more systematic exchange of information and dialogue within the DPG-E, and for seeking more joint interventions. As a first step, the DPG-E should clarify what it needs to coordinate in its cooperation with the VPO, and what should be coordinated by other entities e.g. sector institutions and LGAs. A similar clarification is needed among Tanzanian institutions.
12. Substantial funds are allocated to activities addressing climate change within the sectors, and these are coordinated by the designated coordination mechanism. However, such activities are not necessarily labelled as pertaining to climate change, and may have just been part of sector strategies and programmes. Climate change has yet to be mainstreamed in national, local and sector policies and programmes in a more systematic manner.
13. As climate change rises to the top of the international development agenda, many development activities will be labelled as pertaining to this issue, as is already seen in the case of, for example, NORAD’s REDD programme.
14. What will be the implications for coordination? Should responsibility be shifted to the VPO and DPE-G, or should these activities rather be coordinated through existing mechanisms in the current fashion? How should the sectors and VPO relate to each other? And how should DPG-E members cooperate with their DP colleagues working with sectors, LGAs or more general issues? It is proposed to build future coordination on existing systems within the framework of the JAST.
15. The funding landscape for climate change is emerging, but remains unclear. Apparently, a major part of the funding will take the shape of initiatives guided by global and regional bodies, as well as by DP headquarters, while the main funding mechanisms will be placed outside the UNFCCC/GEF system. Much funding already seems to be directed towards technology transfers and forest management in pursuit of mitigation, while adaptation, despite being a priority, seems to receive somewhat less financing. National programmes managed by country missions appear to be small in comparison.

16. Coordination of climate change activities must have a focus different from that of country-based programmes. Substantial efforts should be made to influence these global programmes to ensure their alignment to national policies and priorities, and to push for mainstreaming of climate change in sectors and national policies, such as Mkukuta. Co-financing with nationally executed programmes could be considered as one option.

Research entities and NGOs:

17. Universities are building a substantial research portfolio and engage in considerable international cooperation. However, cooperation between the various research programmes is virtually absent. Moreover, there are no national priorities to guide even core parts of the research.
18. Much generated information is not disseminated to or used by policymakers, administrators and user groups. No functioning mechanism exists for the dissemination of climate change knowledge. It is within the mandate of COSTECH to perform this task. However, it has thus far been unable to comply with this responsibility. The ongoing SIDA-supported restructuring of COSTECH may pave the way for the commission performing this role again.
19. Tanzanian NGOs do implement climate-related activities, such as the development of more energy-efficient stoves, but they have yet to conduct a substantial number of operations explicitly aimed at confronting climate change. Most NGOs consider climate change to be an issue for mainstreaming, and they are currently building capacity to deal with this.

8.2 Recommendations

Policy, strategy and mainstreaming

1. The development partners could jointly support the GoT's efforts to prepare a new expanded NAPA, including assessment of adaptation costs, and to actively involve a wide range of national stakeholders. The first step towards better coordination could be cooperation around the support for an expanded NAPA and harmonization of the support for the VPO.
2. It could be considered to pilot mainstreaming in selected sectors, such as agriculture, water and infrastructure.
3. The development partners and VPO should ensure that institutional support for the VPO, and assistance channelled through the VPO, is well coordinated, and preferably provided within a single programme.

Coordination

4. In general, the development partners should seek coordination and harmonization of activities. Information should be circulated at an early stage of the preparation of new activities, and harmonization of support activities should be pursued.
5. Existing coordination within the sectors, in relation to the MKUKUTA and general budget support and decentralisation, should continue to handle activities within the mandate of the various entities, and should actively support the mainstreaming of CC issues.
6. An independent DP Group for Climate Change could be established as a subgroup under the DPG-E⁷, or CC could be dealt with as part of the DPG-E's remit. In order to strengthen the work on CC, it is proposed that the DP group contract a half-/full-time academic secretary to assist it.⁸ VPO-DOE could be invited to meetings when relevant.
7. Monthly meetings should be held with the GoT under the auspices of the Environmental Working Group in order to discuss climate change. Alternatively, if so agreed with the GoT, the DPs could participate in the CC Technical Committee. DPs should provide support as needed to enable the coordination.
8. A dialogue process – similar to what is currently taking place in most sectors and in accordance with JAST – should be established for climate change activities. This should include joint annual reviews of activities based on external reviews.
9. An agreement could be made by members of the EWG setting out how coordination should take place, including mechanisms for the exchange of information, meeting frequency, agenda, joint annual reviews etc.
10. The VPO and DPG-E should agree on which activities they intend to address and at what level. On this basis, and in view of the findings of this report and other partners, an activity matrix comparing priority intervention areas with ongoing DP-funded programmes should be prepared. The matrix could function as a tool for coordination and as guidance for new funding.
11. Efforts should be made to pull NGOs and research institutions into closer cooperation.

⁷ As climate change activities shall be closely coordinated with other environmental activities, in particular support for the VPO, it will be important not to establish a separate and detached group.

⁸ This person could also support the environmental part of the group's mandate. Some obvious areas of work would be to update information on climate activities in Tanzania, funding needs and options, and to follow up on mainstreaming, and joint support packages.

Research, monitoring and information sharing:

12. It should be considered to provide more systematic institutional support for TMA in close coordination with the Finnish funded regional programme aimed at analysing the capacity of South African meteorological agencies.
13. The development partners should work actively to support coordination of research activities, and consider, as part of existing or planned programmes, to provide support for information exchange between universities. This could be done, for instance, as part of Norway's support for national research. This assistance could be provided as funding to a small unit in one of the research institutions, for newsletters, workshops, operations etc.
14. The development partners should support the dissemination of research results to policymakers and practitioners, and a dialogue between researchers, policymakers, administrators and users groups on core research priorities.
15. It should be further assessed whether COSTECH should play a role in relation to research coordination and in making results available. Within the framework of current SIDA cooperation with COSTECH, it should be considered to provide support for COSTECH to perform this function.
16. The development partners should jointly finance a core support programme.

Main elements of the support programme could be:

Support for an expanded NAPA/National Climate Action Plan, NCAP.

Mainstreaming.

- Mainstreaming of climate issues in the MKUKUTA
- Pilot mainstreaming, initially in water and agriculture sector.
- Capacity development in sectors, LGAs etc.
- Cost analysis/mini-stern of adaptation and mitigation.
- Support for implementation of existing NAPA. Implementation should be done through the sectors financed either by additional climate funds or by sector funds.

Research, information and coordination

- Funding the set-up of a platform for information exchange and coordination with research centres, as well as for dissemination of research results to various user groups, including the establishment of a feedback mechanism. COSTECH might perform this role
- Strengthening NGO interaction/coordination and involvement in policy dialogue.

- Local NGO fund for testing out adaptation solutions, traditional methods of weather forecasting and their potential uses within the TMA, vulnerability assessments, local government actions, dissemination and policymaking.
- Academic secretary contracted to support the DPGE.

Harmonize and increase as needed support for VPO?

The core programme may take different forms. A joint basket fund could be established, or funding might come from individual donors engaging in full information sharing and coordination. There could also be a mixture of the two.

The programme could be presented and agreed at a high-level roundtable discussing future cooperation around climate change in Tanzania.

More detailed suggestions are included in the attached proposal.

Annex 1: Terms of reference

DRAFT TERMS OF REFERENCE FOR FORMULATION OF DONOR PROGRAM FOR STRENGTHENING COORDINATION OF CLIMATE CHANGE ACTIVITIES IN TANZANIA

Context

Adverse impacts of climate change are now evident in many parts of the world. In Tanzania there are already impacts of climate change such as in the pattern of rainfall and temperature, which threaten to undo decades of progress in poverty reduction, water supply, food production, health and education. The main manifestations include:

- power cuts (due to reduced flow in hydropower plants) as a result of recurrent and extreme drought;
- incidence of malaria in areas where it was not previously prevalent due to increased temperatures;
- intrusion of salt water into water wells along the coast due to sea level rise;
- Reduced agricultural productivity as a result of changing rainfall patterns;
- Submergence of some small islands like Maziwe in Pangani and Fungu la Nyani in Rufiji;
- Recurrent droughts and floods in many parts of the country.

The extent and severity of all of these will only increase with time if the impacts of climate change match current predictions. In response, the Government of Tanzania has adopted a National Adaptation Programme of Action (NAPA) (2007) to help identify and implement “immediate and urgent climate change adaptation activities that most effectively reduce the risks that a changing climate poses to sustainable development in a short term implementation”. The Vice President’s Office has the overall responsibility for climate change coordination in Tanzania, but other agencies and authorities could implement the priorities in the NAPA.

With the release of the “National Adaptation Plan of Action” (2007), the question of how to move forward in a coordinated manner to address climate adaptation and mitigation in Tanzania has emerged as a central issue both for the donors and the Government of Tanzania (GoT).

In addition substantial amounts of funds are now being made available by donors to focus on climate change issues, but often with individual donor priorities of which may not all match the current NAPA.

The Government through various processes such as NAPA, National Capacity Self Assessment (NCSA), Initial National Communication (INC) and various sectoral policies has identified priority areas for support from different sources. Coordination is pertinent to avoid these policies and programs resulting in missed opportunities for cooperation, and in development assistance failing to achieve sound climate change adaptation and mitigation.

To ensure a focused, relevant and coordinated approach to climate change in Tanzania the Government of Tanzania and the Development Partner Group for Environment have decided to develop an overall program for coordination of climate change adaptation and mitigation.

Taking a starting point in the NAPA, the CC Programme for Donors will be developed sufficiently broad to address: i) needs for better information upon which decisions can be made, ii) current relevant priorities and identification of new relevant priorities within selected sectors, iii) system for updating, and iv) development of specific work plans and identification of internal and external funds.

Objectives

The objective of the assignment will be to ensure:

The Vice President's Office is able to coordinate current and future externally funded activities related to Climate Change (adaptation and mitigation) and develop a system for updating the programme.

Outputs

The following overall outputs will be delivered:

1. **Inception note** describing in details the approach, an initial stakeholder consultation workshop that defines climate adaptation and mitigation and provides a kick-start to information gathering. The inception report should also provide an overall meeting schedule for the assignment.
2. **Stocktaking report;** including i) Overview of existing documents, activities and proposals related to climate change (include, multi- and bilateral funded projects, NGOs, research projects, private funding/funds); ii) Identification of key institutions, MDA's, NGOs' and person including contact details and brief description of relevance for climate change; iii) Summary of main issues and priorities identified in national plans, strategies, studies and donor papers relevant for climate change as well as current priorities and identification of new priorities within selected sectors; iv) Overview of the current state and need for information between selected sector ministries and relevant key institutions and stakeholders for an integrated response to Climate Change, as well as overview of the current state and need for better dissemination between the government and the public. v) Overview of the current state and need of response strategies and vulnerability/hazard mappings. vi) Identification of potential funding: a. Direct funding ("CC project"), b. Indirect funding (within sector budgets), c. Research, d. NGO's, including multi and bilateral, private and large funds (e.g. Clinton, Ford, Gates etc). vii) Define the broader areas of priorities to be included in the framework.

3. **Government led Roundtable discussion (2 days)**, with relevant key-stakeholders from Vice Presidents Office; relevant MDA's, including Tanzania Meteorological Agency; development partners; and non-state actors, to discuss the findings of the Stocktaking report and to point directions for development of a program for coordination of donor support to climate change activities in Tanzania.

4. **Programme to strengthen coordination of donor supported climate change in Tanzania**, including: i) Updated matrix of donors and the main climate change focus; ii) Identified needs for better information upon which decisions can be made, including development of draft communication and response strategies needed for an integrated response to Climate Change; iii) current relevant priorities and identification of new relevant priorities within selected sectors to be implemented, including vulnerability/hazard mappings (where possible with budget and timeframe of implementation); iv) identification of existing sector specific work plans for implementation and related internal and external funds; v) Development of a draft dialogue strategy between the government and the donors, including a system for updating of the programme. .

A point of departure for the work of the consultant will be the priorities of the NAPA and a note on climate issues prepared by the donor group.

Method of Work

The assignment will be divided into two missions to Tanzania: 1) To undertake an initial stakeholder consultation workshop, and develop the Background Report; and 2) To finalize and consult the Program with the Vice President's Office (VPO) and the DPG-E.

The consultants will on a daily basis report to the Permanent Secretary of the VPO and on overall progress to the DPG-E.

The assignment should take starting point in the NAPA, the note on climate adaptation prepared by the DPG-E and any other relevant information that may be obtained before the first mission. Based on this the consultant will prepare a short inception note well in advance of arriving in Tanzania for the VPO to arrange meetings etc. prior to the team's arrival. The inception note should include considerations for how best to approach answers to the following key issues:

Current state of knowledge regarding shorter scale and longer-term climate change impacts in selected sectors (e.g. agriculture, water management, energy security, human health, etc.)

Climate information needs for decision-makers in these sectors

Policies and/or projects currently being developed and/or implemented that address climate change adaptation and mitigation, including the proposed joint programme by the UN system

Information gaps currently not being addressed, including communication and response strategies to Climate Change.

Climate mitigation activities that also have an adaptation pay-off to be used for fund adaptation activities

The inception note will be submitted at least two weeks prior to the mission and shall include a specific approach to an initial stakeholder consultation workshop. The inception report with approach will be discussed with the VPO and the DPG-E upon the team's arrival in Tanzania.

During the first mission to Tanzania, the team will, guided by the inception note and outcome of the initial stakeholder workshop and discussions with VPO and DPG-E, meet and consult with key persons, MDA's and donors and will continue to collect relevant information necessary to develop the Stocktaking report and bring this into a first draft version.

The draft Stocktaking report should be presented in a Roundtable discussion with relevant stakeholders and hosted by the VPO. The outcome of this Roundtable discussion should be to identify any needs for additional information and to form the first input to a program for coordinated donor support to climate change activities in Tanzania.

The Roundtable discussion should take place within the vicinity of Dar es Salaam at the end of the first mission.

Day 1 would be the presentation of and feed back to the draft stocktaking report.

Day 2 would be facilitated sessions on climate adaptation and mitigation issues that will assist in forming the program for coordinated donor support to climate change activities in Tanzania.

The Final Stocktaking report will be completed in the home office of the consultant based on the outcome of the Roundtable and form the basis for a first draft program to be developed prior to the second mission.

The first draft program will be presented in a one day Roundtable at the start of the second mission, also taking place in the vicinity of Dar es Salaam. The outcome of this Roundtable will be used to refine and finalize the program in a draft final version before it is presented to the VPO and DPG-E.

Timing

The assignment should be commenced in Tanzania in September/October 2008. The first mission will have a length of three weeks. At the end of the first mission the first Roundtable discussion will take place. The Draft Final Stocktaking report will be submitted no later than two weeks after the first Roundtable discussion.

A first draft Programme will be submitted by mid November, two weeks prior to the second mission to Tanzania. The Second mission to Tanzania will be undertaken in November 2008 and will have a length of two weeks. This mission will start with a Roundtable discussion on the draft programme. A final report of the Programme will be submitted no later than two weeks after the second mission to Tanzania is completed.

The team

Team leader (International), specialized in environment and development cooperation and donor coordination, have specific recent Tanzania experience, and possess a good overall knowledge of climate change adaptation and mitigation mechanisms.

International Climate change specialist with strong scientific knowledge in climate adaptation and mitigation that also involve developing countries.

Financial and institutional specialist with substantial international knowledge for design of development assistance programs and donor coordination.

Two national consultants with good knowledge and contacts to Tanzanian MDA's, Research Institutions and NGO's; in addition, it calls for one with knowledge on adaptation and one with knowledge on CDM.

Annex 2: Meetings and person met

Second visit 26th January –6 February 2009

Monday January 26, 2009		
Date/time	Institution	Contacts/Direction
7:15am	CARE	Thabit Masoud, Sector Coordinator, Natural resources and environment, mailto:thabit.masoud@co.care.org +255 0777 416 861 +255 22 266 8061
8:30am	DPG-E	<p>Royal Danish Embassy: Lars Mikkell Johannessen, Counsellor for environment larjoh@um.dk</p> <p>Jema Ngwale Programme officer jemngw@um.dk +255 (22) 211 3887</p> <p>Dfid: Climate and environment adviser Praveen Wignarajah +44 (0) 7824307358 p-wignarajah@dfid.gov.uk</p> <p>Adrian Stone Growth Policy Adviser DFID Tanzania Dar es Salaam +255 (0)22 2110141 (office) +255 (0)754 240899 (mob) mailto:A-Stone@dfid.gov.uk</p> <p>FINNIDA. Counsellor(forest) Timo Vihola +255 (0) 754 400 046 timo.vihola@formin.fi</p>

11:00am	TMA, Tanzania Meteorological Agency	<p>Ag. Director General Mr. Tibajuka +255 22 2460706-8 mailto:tibajukap@meteo.go.tz</p> <p>Dir. Of Research and environment mr. Lukando +255 22 2460 706-8 Mobile 0784 645 331 mlukando@meteo.go.tz mlukando@hotmail.com</p> <p>Dir. Of Bussiness. Mr. Mkvesi +255 784 645339 mailto:rmkvesi@meteo.go.tz</p> <p>Financial management officer mr. Kidimwa Shabani +255 713 470704 kidimwa@yahoo.com</p> <p>Ag. Manager HR administration mr. Alewy M. Hamad +255 784 414470 alawymha@yahoo.co.uk</p> <p>Manager Applied meteorology mr. Mike Mboya mailto:Mike_ymboya@yahoo.com</p> <p>Ag. Director Forecasting service Mr. Matitu +255 784 674 576 mrmatitu@meteo.go.tz http://www.meteo.go.tz</p>
11:00am	WWF	<p>Dr. Herman Mwageni Tel: +255 22 277 5346 Cell: +255 0784 326 360 mailto:hmwageni@wwftz.org http://www.panda.org</p>
Tuesday January 27, 2009		
Time	Institution	Contact Information

8:30am	Water	Mr. Mihayo +255 0754-494697
10:00am	Carbon Tanzania	Marc Baker Arusha +255 0784 448 761 mailto:marc@carbontanzania.com http://www.carbontanzania.com
10:00am	Min of Agriculture	Director of Policy and Planning Mr. Achayo +255 713 273434 Dr. Ningu Julius. Principal Agr. Officer. +255 786 733 904, jkningu@yahoo.com Ag. ADCMEW-MAFC mr. Ombaeli Lemiveli +255 756 880834 lemveli@yahoo.com Ag. DNFS Karimm Mtambo +255 754 296527 mailto:Kmtambo04@yahoo.com
12:00am	IUCN	Jessica Campese mailto:jesscampese@gmail.com +255 0764 889 998
1:00pm	Ardhi University	Ag. DUP Dr. E.J. Liwa Ardhi Univ. Survey area +255 784 303056 liwa@aru.ac.tz
2:00pm	TaTEDO, Tanzania traditional energy development and environment organization	Gisela A. Ngoo Manager Energy Environment Initiative Dept. Sinza off Shekilango Road Tel: +255 22 270 0438 mailto:gisngoo@yahoo.co.uk , mailto:energy@tatedo.org www.tatedo.org

3pm	IRA, Institute of Resource Assessment University of Dar es Salam	Prof. Pius Z. Yanda Institute of Resource Assessment pyanda@gmail.com +255 754 265580 www.ira.udsm.ac.tz
Wednesday January 28, 2009		
Time	Institution	Contact Information
7:30am	DFID	Praveen Wignarajah, Climate and Environment Adviser +44 (0) 20 7023 0306 mailto:p-wignarajah@dfid.gov.uk Adrian Stone Growth Policy Adviser DFID Tanzania Dar es Salaam +255 (0)22 2110141 (office) +255 (0)754 240899 (mob) A-stone@dfid.gov.uk
9:30am	TMA, Tanzania Meteorological Agency	Forecasting Service Ag. Dir. Forecasting Division Mohamed R. Matitu mailto:mrmatitu@yahoo.com Dr. Hamza A. Kabelwa NWP section. nkabelwa@hotmail.com Peter Mbonganile NWP section pmbonganile@yahoo.com
11:00am	TFCG, Tanzania Forest Conservation Group	Senior Technical Advisor Nike Doggart +255 22 266 9007 ndoggart@tfcg.or.tz www.tfcg.org
12:00am	Mama Misitu Campaign TNRF	Niklas xxx Field Coordinator for Mama Misitu Campaign www.mama-misitu.net

12:00am	TANESCO Water Resource	Manager research and environment. Mr. Katyega +255 783 558599 maneno.katyega@tanesco.co.tz Stanislaus Kizzy, senior hydrologist Stanislaus.kizzy@tanesco.co.tz +255 0784-310340
2pm	DPG-E	Royal Danish Embassy
Thursday January 29, 2009		
Time	Institution	Contact information
10:00am	Division of Environment, VPO	Director General Mr. Erick Mugurusi
12:00am	TNRF, Tanzania Natural Resource Forum	Cassian Sianga, Senior Forest Programme Officer +255 756 960 496 E-mail: c.sianga@tnrf.org www.tnrf.org
1530 pm	Danish Embassy	Counsellor (infrastructure) Tony Baek, Danish Embassy +255 22 211 3887 tonbak@um.dk www.ambdaressalaam.um.dk Margoth Nielsen, Cowi Consult Env. Adviser, Danish funded Road Programme.
Friday January 30, 2009		
Institution	Institution	Contact information
8:00am	World Food Programme	Programme officer Juvenal Kisanga +255 0787 720 001 juvenal.kisanga@wfp.org

10:00	Oxfam	Marc Wegerif mwegerif@oxfam.org.uk +255 764 921 896 http://www.pacja.org/index.php
11:00am	UNEP	Mateo
12:30am	Embassy of Norway	Counsellor Ivar Jørgensen Environment/Climate Change +255 22 211 3366 ivar.jorgensen@mfa.no
2:00pm	Ministry of Agriculture and Food Security	Assistant director, Crop research Dr. M,A.M. Msabaha +255 (0) 754 487604 mmmsabaha@yahoo.co.uk
Monday February 2, 2009		
Time	Institution	Contact information
	IFAD	Country officer – TZ Mwatima A. Juma +255 22 2113070-73 m.juma@ifad.org mwatimajuma@yahoo.com
10am	DoE	Assistant director, EIA Richard Muyungi +255 (0)22 2113983 vpodoe@intafrica.com Tanzania37@hotmail.com
	SIDA	First secretary, higher education and research Maria Teresa Bejanero +255 22 2196500 maria-teresa.bejarano@foreign.ministry.se

	World Bank	<p>Sr. Natural Resource mgmt. Specialist Christian Peters +255 22 2163200</p> <p>cpeter@worldbank.org www.worldbank.org/tz</p> <p>Programme Coordinator Africa region Herbert K. Acquay +1 202 473 1043</p> <p>hacquay@worldbank.org www.worldbank.org</p>
Tuesday February 3, 2009		
Time	Institution	Contact information
	IFPRI	James Thurlow J.THURLOW@CGIAR.ORG
11.00 – 12.00	Coordinator of the SUALDAC	Dr Constantine Shayo, DoE,
2.30 – 3.30	MoW, Environmental Coordination Unit	Joseph Kubena,
2-4.30pm	DPG-E and NGO meeting	Embassy of Denmark
2 pm	Division of Environment, DOE	Assistant director Mr. Muyungi
5:00	WWF	George Jambiya Tel: +255 22 277 5346 Cell: +255 075477 1058 mailto:gjambiya@wwftz.org http://www.panda.org

Wednesday February 4, 2009		
Time	Institution	Contact information
8:00 am	World Food Programme	Programme officer Juvenal Kisanga
9:00 am	UNDP	P.O. PRSP Amon Manyama
10:30 am	ARDHI University	Prof. Kissanga
9:00am	Environment Protection and Management Services	Euster Kibona Tel: +255 754 577475 mailto:eusterkibona@yahoo.com http://www.epmstanzania.org
10:30am	Africare	Sekai Mapanda Chikowero Country Representative +255 22 266 7257 mailto:schikowero@africare.org
12:00am	Wildlife Conservation Society of Tanzania	Lota Melamari CEO/Coordinator +255 22 211 2518 mailto:melamarilota@yahoo.co.uk
15:00	IUCN	Alfei Daniel Country Coordinator +255 22 2669 084 http://www.iucn.org
Thursday February 5, 2009		
Time	Institution	Contact information
10:00am	Clinton Foundation	Dr. Yahay Ipuge Country Director +255 22 212 4885 +255 754 000 476 mailto:yipuge@clintonfoundation.org

	Ardhi University	Dean school of environmental science Dr. G.R.Kassenga 073599181 kassenga@aru.ac.tz Lecturer school of env. Science S.E.Mbuligwe smbuligwe@aru.ac.tz
Friday February 6, 2009		
Time	Institution	Contact information
10:30am	DPG-E	WB office debriefing
Saturday	February 7, 2009	
10:00 am	ARI	Prof. Pius Yanda



First visit meetings and persons met October 27 to November 18, 2008

Date	Time	Organization	Person	Contact data
28/10	08:30-09:30	Centre for Energy Environment Science and Technology CEEST	Dir. Hubert Meena	+255 22 2667569 hemeena@yahoo.com Kaunda Drive No 17 P.O. Box 76301
	10:00-11:30	Division of Environment, DoE, in the Vice president's office	Richard Muyungi	0754542832 Luthuli Street
	12:00-12:30	Tanzanian Commission for Science and Technology, COSTECH	- Director General, Dr. Hassan Mshinda - Mr. George Shemdoe, Senior research officer - Matteo Rafael, Director of Research	0754-879877, Ali Hassan Mwinyi Rd, Kijitonyama
	02:00-03:00	Institute of Resource Assessment, IRA	Prof. Pius Yanda, Director of IRA	Univ. of Dar
29/10				
	09:15-10:15	Tanzania Meteorological Agency, TMA	TMA Scientific team including: - Director General, Mr. P. Tibaijuka +255 22 2460706-8, tibaijukap@meteo.go.tz - Dr. Chang'a, 0784-597066, changato@hotmail.com - Director Lukando, +255 22 2460 706/8, Mobile: 0784 645 331 - Manager of Environment and Research, Emmanuel Mpita, empita@meteo.go.tz Manager Int. Reg. Cooperation, Augustine Kanemba, akanemba@yahoo.com	Ubungo Plaza Morogoro Rd P.O. Box 3056
	01:00-01:30	Norwegian Embassy	Ivar Jørgensen, Counsellor, Environment/Climate Change	+255 22 211 3366 Norwegian Embassy

			Mob: +255 (0) 782 777 023	Mirambo Street P.O. Box 2646
	02:00-02:30	Embassy of Finland	Timo Vihola, Counsellor, 0714-400046, timo.vihola@formin.fi	+255 22 2196 565 Ohio St
	03:00-04:00	Forestry and Beekeeping Division (FBD)	- Ag. Director Gladness Mkamba (2126844, gmkamba@yahoo.com) - Aloys Tango, Assistant Director, Forest Development +255 22 212 6844, aloystango@yahoo.com - Christognus Hauie, Senior Forest Officer hanleca@yahoo.com	+225 22 211 1062 Mpingo House, Nyere Road P.O. Box 426
0/10	08:00-08:30	Danish Embassy	Marko Nokkala, Economist	0786-691351
	09:00-10:00	University of Dar es Salaam, UDSM, School of Engineering	Prof. J. H. Y Katima, Deputy Principal, 0754- 265864, dparc@udsm.ac.tz	+255 22 2410024 Univ. of Dar es Salaam P.O. Box 35131
	11:00-12:00	EU	Petra Larsson: tel: +255 22 211 7473-6 fax: +255 22 211 3277 Petra.Larsson@ec.europa.eu	Ohio Street/Garden Ave
	2:00-2:30	National Land Use Planning Commission	Julius Shilungushela, Hydrologist/Tutor at Rwegarulila Water Institute, 0713-115960 or 0787-585854	shilungushela_j@yahoo.co Tancot House, Sokoine Drive
	3:00-4:00 Cancelled at last minute and postpones until later	National Environmental Management Council, NEMC	Director of Research and Planning Ruzika Muheto, Ph:2134603	rmuheto@hotmail.com Tancot House, Sokoine Dr.
31/10	9:00-10:00 Cancelled at last minute	Wildlife Division	Director of Wildlife	Ivory Room
	11:00-12:00	Ministry of Natural Resources and	Director of Policy and Planning and planning	Samora Ave

	Cancelled at last minute	Tourism, Policy and Planning Dept.	team	
	12:15-12:45 Cancelled at last minute	PMORALG –Natural Resources	Rehema Tibanyenda, Natural Resources (PMORALG-HQ, Dodoma) 0754-281025	
	2:00-3:00 Cancelled at last minute	Disaster Unit	Director, Mr. Shaabani, 2117266	Magogoni
03/11	9:00-10:00	Ministry of Energy and Minerals	- Mr. Mwiwaha, Assistant Commissioner, renewable energy - Mr. Silinge, Environmental Coordinator	+255 22 2119158 0754-464036 mwiwaha@mem.go.tz Samora Av P.O. Box 2000
	11:00-12:00	National Land Use Planning Commission	Director General, Gerald Mango	0753-115960, 0784-471964 Tancot House, Sokoine Dr
	12:30-1:00	Tanzania traditional energy development and environment organization TATeDO	- Gissela Ngowo, Manager of Energy Environment Initiative Dept. (0784-424969, 270 0438) - Shima Sago, project staff, energy and environment - Mary Swah, Staff, energy and environment	energy@tatedo.org Sinza off Shekilango Road
	2:00-2:30	Mikocheni Agricultural Research Institute (MARI)	Mr. N. A. Temu Ag. Director Phone: 0754-498934 lchu@mari.org	Tancot House Sokoine Drive
	3:00-4:00	National Environment Management Council, NEMC	Director General, B.T Baya, +255 22 2134603 Director of Research and Planning Ruzika Muheto, Phone:2134603, rmuheto@hotmail.com	Sokoine Drive Tancot House, 3rd floor
04/11	8:00-8:30	UNDP/UNEP	- UNEP Country Representative - Gemma Aliti, 0754-757018	Off-Kinondoni Rd First street Opposite Stanbic Bank
	9:00-10:00 Cancelled at last minute	US Agency for International Development USAID	Juniper Neill, Team leader, Natural resources Mgmt/Economic growth; jneill@usaid.gov	+255 22 266 8490 686 Old Bagamoyo Rd, Msasani P.O. Box 9130

	and postponed until next day		Asukile Kajuni, Senior environmental management specialist; akajuni@usaid.gov	
	11:00-12:00 Postponed	Danish Embassy	Consultancy reference group of donors	Embassy of Denmark
	12:30- 1:00 Cancelled	National CSO Forum on Climate Change	Vera Mugittu, country representative Ph: 2700671 vera@muvek.co.tz	Tanzania@intercooperation.ch Kiko Ave. No. 277 Mikocheni
	2:00-3:00	Ministry of Livestock Development and Fisheries	Mr. Victor Mwita, ass. Director, 0754-204847, 2861701	Temeke Veterinary
	3:30-4:30	Ministry of Water and Irrigation	As. Director of Water Resource, Kongola ph:0755-661427	lrek52@yahoo.com Ubungo opposite TANESCO
	4:00-4:30	Care Tanzania	Thabit Masoud, Sector coordinator, Natural resources and environment	thabit.masoud@co.care.org 0777416861 +255 22 266 8061 Kinondoni Rd P.O. Box 10242
	5:00-5:30	World Bank	Christian Peter, Sr. Natural Resources Mgmt. Specialist, Sustainable Development, East Africa	cpeter@worldbank.org +255 22 21 63 287 50 Mirambo Street
05/11	9:00-9:30	US Agency for International Development USAID	Juniper Neill, Team leader, Natural resources Mgmt/Economic growth; jneill@usaid.gov Asukile Kajuni, Senior environmental management specialist; akajuni@usaid.gov	+255 22 266 8490 686 Old Bagamoyo Rd, Msasani P.O. Box 9130
05/11	9:00-9:30	Ministry of Livestock and Fisheries Dev.	- Ac. DPP, Mr. Desdery Rwezaula 2861901 desderyrwezaula@yahoo.com - Amenje Muakibuga, Head of Environmental Unit	Temeke, veterinary complex
	10:00-10:45	Ministry of Energy and Minerals	As. Commisionor Electricity, Bwakea phone: 0784-611075	Samora Ave.

			bwakea@mem.go.tz (cancelled, so we met:) - Mr. Rugabera, 0713 330090 - Mr. Kihwele, Principal Forest Officer	
	10:30-11:30	WWF	- Dr. Herman Mwageni, Country Representative, 0713-326360 - Dr. George Jambiya gjambiya@wwftz.org	Plot 350 Regent's Estate Mikocheni P.O. Box 63117
	11:00-12:00	FAO	Mrs. Louise Setshwaelo, FAO Rep. in Tanzania	+255 22 211 3070 FAO-TZ@fao.org Tetex Bldg, Pamba House
	2:15-3:00	Norwegian Embassy	Ivar Jørgensen, Counsellor, Environment/Climate Change	+255 22 211 3366 Norwegian Embassy Mirambo Street P.O. Box 2646
	2:30-3:00	Ministry of Health (Environmental Health Protection)	Mr. Msambasi, Health officer	Contact through Amur 0784-734275 amri2001tz@yahoo.com
6/11	One day to Morogoro			
	10:00-10:30 Cancelled	Tanzania Forestry research Institute, TAFORI	Director General, Dr. Nshubemuki	0755-370907 tafori@morogoro.net
	11:00-12:00	Faculty of Forest and Nature Conservation, Sokoine University, SUA	Dean Gillah, Associate Professor.	pgillah@suanet.ac.tz 0713-298810/0784-6298810 P.O. Box 3009 Morogoro
	12:15-1:45	Sokoine University of Agriculture, SUA	Prof. Matovelo, Director of Research and Post Graduate Studies	+255 23 2604388/2603511 +255 744 546130 matovelo@suanet.ac.tz
	1:45-2:30 Cancelled	Morogoro Municipal Council	Municipal Director	
	2:00-3:00	Morogoro District Council	- Morogoro District Executive Director, Eden Munisi - William Jasseda, Ac. District Agricultural	

			and Livestock Development Officer, DALDO - Mailango Ande, District. Land, NR and Environmental officer	
	3:30-4:00	PASS	Andrew Temu,	0754-281797
07/11	9:45-10:30	Ministry of Health and Social Welfare	Dr. Njau (GBS coordinators) Phone: 0765- 486745 mkerebe@yahoo.co.uk Marlene Krag Petersen, JPO. Marlene@HSPSTZ.org	
	9:45-10:30 Cancelled at the last minute and postponed until 14/11	Ministry of Natural Resources and Tourism	DPP, Mr. Rugaganya Ph: 0786-573354	
	10:00-10:30 Cancelled at the last minute and postponed until 11/11	National Bureau of Statistics	Ahmed M. Makbel, Manager, Statistical Methods, Standards and Coordination	+255 22 2122722/3 P.O Box 796
	11:00-12:00	Donor reference Group	DPG-E chair and co-chairs and interested DPs Timo Vihola, counsellor, Embassy of Finland (+255 22 2196 565) Ivar Jørgensen, counsellor, Embassy of Norway	Embassy of Denmark
	11:00 Cancelled at the last minute and postponed until 12/11	World Bank	Ralph Karhammar, Sr. Energy specialist, +255 22 2163 200 rkarhammar@worldbank.org	50 Mirambo Street, 5th floor P.O. Box 2054
	1:15-2:00	Institute of Resource Assessment	Prof. Pius Yanda, Director of IRA	Univ. of Dar pyanda@gmail.com

				+255 754 265580
	2:00-3:00	Ministry of Agriculture, Food Security and Cooperation	<p>- Director for Policy and Planning, Mr. Emmanuel M. Achayo: +255 22 2862074</p> <p>- Ag. Director Food Security, Mr. Mngodo, Phone: 2865950</p> <p>jtjmgodo@yahoo.com</p> <p>dnfs@kilimo.go.tz</p> <p>Ag. Director Environmental Unit, Ms. Shakwaanande Natai. Phone: 0754-893346</p> <p>shakwaa@yahoo.co.uk</p>	<p>Temeke Kilimo Complex</p> <p>P.O. Box 9192</p>

	4:00-5:00	PMO RALG offices	Acting Director, Sector Coordination at PMORALG, Mrs Kwiluhya	
10/11	8:15-8:45	IUCN	Country Director, Issa Abdulrahman issa@iucn.or.tz	+255754-570234 IUCN Tanzania Office Box 13573
	9:30-9:20	Embassy of Sweden	- Mr. Göran Haag, First Secretary, Programme officer Energy - Marie Teresa Bejarano, Research programme officer	+255 22 2196 546 Mirambo Street P.O. Box 9274
	10:00-12:00	DoE	Richard Muyungi 0754542832	Luthuli Street
	11:30-12:00	Tanzania Chamber of Commerce and Agriculture	- Isaac Dallushi, Vice President, Agriculture, Isaacdallushi@yahoo.com , 0713-613434 Adam A. Zuku, Senior Chamber Development Officer, adzuku@gmail.com 0784-527750	
	1:30-2:30	The Finnish Embassy Lead donor on decentralization	Ms. Iina Soina, Programme officer	Mirambo Street P.O. Box 2455
	2:00-4:00	NGO meeting	- WWF, George Jambiya gjambiya@wwftz.org - CARE-Tz, Thabit S. Masoud thabit.masoud@co.care.org	World Bank Offices 50 Mirambo Street

			- IUCN, Jessica Campese jesscampese@gmail.com (OXFAM, Inter-cooperation CSO Forum on CC, TFCG and TaTEDO had confirmed but did not turn up)	
11/11	10:00-11:00 Cancelled and postponed until 14/11	National Bureau of Statistics	Ahmed M. Makbel, Manager, Statistical Methods, Standards and Coordination	+255 22 2122722/3 makbel@nbs.go.tz P.O Box 796
	11:00-12:00	Ministry of Finance	Assist. Commissioner of Policy and Planning, Mr. Bedason Shallanda	+255 22 2110331 0744 692448 bshallanda@mof.go.tz P.O. Box 9111
	2:00-3:00	Ministry of Energy and Minerals	Eng. Rugabera Ph: 0713-330090 Theodore Silinge, Principal Forest Officer, silinge@mem.go.tz Eng. Mwiava, assistant commissioner, renewable energy, mwiava@mem.go.tz	+255 22 211 9158 Samora Avenue Former Tanesco H/Q P.O. Box 2000
12/11	2:00 – 3:00	World Bank	Ralph Karhammar, Sr. Energy specialist, +255 22 2163 200 rkarhammar@worldbank.org	50 Mirambo Street, 5th floor P.O. Box 2054
	2:00-4:00	Workshop for the Inventory of Green House Gases Emissions under the 2nd National Communication	Hosted by Ceest and chaired by - Dr. Luduvick Manege, Director of Tanzania Industrial Research and Development Organisation, TIRDO - Director of Research and Planning Ruzika Muheto, Phone:2134603, rmuheto@hotmail.com	Protea Hotel
	4:00-5:00	R. Netherlands Embassy	Pieter Dorst, Head of Dev Cooperation,	+255 22 2110 000

			Pieter.dorst@minbuza.nl	Umoja House, Mirambo and Garden Ave. P.O. Box 9534
13/11	8:30-9:30	Embassy of France	Raymond Lataste, Attaché de Coopération Scientifique et Universitaire	raymond.lataste@diplomatie.gouv.fr +255 762 741 125 P.O Box 2349 Dar es Salaam
	9:00-10:00	Department for International Development, DFID	Adrian Stone Adrian Stone Growth Policy Adviser DFID Tanzania Dar es Salaam +255 (0)22 2110141 (office) +255 (0)754 240899 (mob) Praveen Wignarajah, Climate and Environment Adviser +44 (0) 20 7023 0306 p-wignarajah@dfid.gov.uk	5th floor Umoja House
	9:30-10:30	Oxfam	Marc Muegerif Economic Justice Campaign Coordinator	+255 764 921896
	10:00-12:00	DP meeting		
	12:00-13:00	UNDP	Gertrude Lyatuu, Deputy Resident Representative	gertrude.lyatuu@undp.org +255 22 266 8749
	14:00-16:00	Tanzania Meteorological Agency, TMA	- Director Lukando, +255 22 2460 706/8, Mobile: 0784 645 331 - Manager of Environment and Research, Emmanuel Mpita, empita@meteo.go.tz - Mr. F. F. Tilya, Meteorologist	Ubungo Plaza Morogoro Rd P.O. Box 3056
14/11	8:00 – 9:00	Ministry of Natural Resources and Tourism	DPP, Mr. Rugaganya	Samora Av. Clock Tower Bldg, Office of Director of Forestry
	10:00-11:00	National Bureau of Statistics	Ahmed M. Makbel, Manager, Statistical Methods, Standards and Coordination (former Director of Department of Environmental Statistics)	+255 22 2122722/3 makbel@nbs.go.tz P.O Box 796

	11:30-13:00	DFID	Praveen Wignarajah, Climate and Environment Adviser	+44 (0) 20 7023 0306 p-wignarajah@dfid.gov.uk
	3:00 – 4:00	Tanzanian Commission for Science and Technology, COSTECH	Director of Research Coordination and Promotion, Dr. Rose Rita Kingamkono	+255 22 2700752, rkingamkono@costech.or.tz Ali Hassan Mwinyi Road P.O. Box 4302
	14:45	Norwegian Embassy	Ivar Jørgensen, Counsellor, Environment/Climate Change	+255 22 211 3366 Norwegian Embassy Mirambo Street P.O. Box 2646
15/11	13.00	Division of Environment, DoE, in the Vice president's office	As. Director, Richard Muyungi	0754542832 Luthuli Street
17/11	10:00-11:00	Debriefing DPEG		
	2:00 – 3:00 Cancelled	Ministry of Planning	Director of Poverty Reduction, Coordinator CWG-2, Anna Mwashu Ph: 2124108	
	3:00	Debriefing PS	VPO	
18/11	7.30	Stockholm Environment Institute, SEI Regional office in ARI	Anders Arvidson	Anders.arvidson@sei.se www.sei.se
	14:00-17:00	DFID/IDRC workshop		
Others		Clinton Foundation	Molly Bartlett, mhbartlett@clintonfoundation.org Dr. Yahya Ipuge, yipuge@clintonfoundation.org	+255 22 212 4885/4886 Skyway Building, 3rd floor Ohio and Sokoine Drive P.O. Box 77277

Annex 3: NGO projects with relevance for climate change

Africare Contact: Sekai Mapanda Chikowero Country Representative +255 22 266 7257 Ada Estate, Plot 116, Galu Street, P.O. Box 63187 schikowero@africare.org www.africare.org				
Current project activities related to CC	Budget and duration	Funding source	National coordination	Main elements
Ugalla Community landscape Conservation	1,900,000 USD	USAID	CSOs, TaTEDO	Biodiversity conserved in targeted landscapes through livelihood driven approaches. (Tabora and Rukwa regions)
Natural Resource Management Programme	1998-2009			The project will be redesigned this year for the next phase, including specific climate change components such as adaptation for farmers through introduction of alternative crops and other income generating activities.
Carbon Tanzania Contact: Marc Baker Coordinator +255 0784 448 761 P.O. Box 425 Arusha marc@carbontanzania.com www.carbontanzania.com				
Current project activities related to CC	Budget and duration	Funding source	National coordination	Main elements

Arkaria Community-based Forest Management & Carbon Trading Initiative	Private buyers Long term duration	All start up work has been funded by Ecological Initiatives Ltd, Tanzania. In addition to that, there have been contributions to the project from individuals and Tour operators, both in Tanzania and the U.K.	Village Council, Arkaria	<p>This project aims to enable the community of Arkaria village, in northern Tanzania, to access the voluntary carbon credit market and, in partnership with Carbon Tanzania, to create and sell carbon credits based on community-based forest conservation and management.</p> <p>This project is working with the local community to create carbon offset credits by protecting and restoring the natural montane forest, habitat which the community also relies on for water supplies, firewood, traditional medicines, and other products.</p>
<p>Care Tanzania Contact: Thabit Masoud, Sector Coordinator, Natural Resources and Environment, thabit.masoud@co.care.org +255 0777 416 861 +255 22 266 8061 Kinondoni Rd P.O. Box 10242</p>				
Current project activities related to CC	Budget and duration	Funding source	National coordination	Main elements
<p>Equitable Payment for Watershed Services: Phase I, Making the Business Case</p> <p>Global programme (Guatemala, Peru, Tanzania and Indonesia)</p>	<p>1,3 million Euro for Tanzania</p> <p>4,1 million Euro total for the global programme</p> <p>2008-2011</p>	<p>Danida is financing Tanzania, while the Dutch Government is financing the other three countries.</p> <p>Buyers of ecosystem services: Coca Cola</p>	<p>Internal coordination: National EPWS, PREM, WWF TPO, Care Tz, IIED</p> <p>External coordination:</p>	<p>The Payment for Watershed Services (PWS) project aims to ensure a sustainable flow of watershed services to beneficiaries of these services into the future through the establishment of equitable payment mechanisms for watershed services in the selected watersheds/catchment areas in Uluguru and East Usambara in Tanzania.</p> <p>The project will work with the upstream and downstream stakeholders to ensure substantial benefits to the poor and to ensure that resources are applied to the</p>

	<i>Ongoing</i>	Tanzania Water Company DAWASCO	DAWASCO, Coca cola, Trust fund, Forest and Beekeeping Division, Water department, Communities	priorities and needs of the poor and that local values, knowledge and practices are incorporated into NRM practices, as well as ensure that women and marginalized groups directly participate in, and benefit, from the PWS mechanism.
Energy efficiency	<i>Feasibility stage</i> 2009-2015	CARE Austria	The final design is to be elaborated by TerraCarbon and Climate focus	- Selling carbon credits - 50.000-100.000 stove types that are fuel efficient
Hillside Conservation Agriculture	1,7 mill USD Feb 2009-Jan 2013	Howard Buffet Fund	District Adm. Morogoro, SUA, MVIWATA	Sustain and support the livelihoods of 4,400 households involving 20,000 underserved men, women and children in the South Uluguru Mountains of Morogoro. The project will enhance farmer's adoption of sustainable conservation agriculture practices and development of appropriate gender-sensitive support systems and infrastructure development. The project will introduce culturally and environmentally appropriate conservation agriculture practices, through establishment of farmer field schools and center for sustainable living, foster adoption of participatory technology development process; promote participatory variety selection scheme; develop village savings and loan scheme as well as mainstreaming gender in all interventions.
COP 15	2009	CARE Denmark	TFCG implementing partner and CARE Tanzania is coordinating partner	Bringing the voice of local civil society organizations into the COP 15.
CEEST Foundation Contact: Hubert Meena, Director Tel: +255 22 266 7569				

hemeena@yahoo.com Kaunda Drive No 17 P.O. Box 76301 www.ceest.co.tz				
Current project activities related to CC	Budget and duration	Funding source	National coordination	Main elements
Netherlands Climate Change Assistance Programme (NCAP) in Tanzania	Euros 180,000 2005 - 2007	Government of the Netherlands / ETC	CEEST, TaTEDO, EnviroCare, VPO	Production of technical adaptation policy options based upon the vulnerabilities and adaptive capacities of local communities.
Second National Communication to the UNFCCC	USD 405,000 2006 - 2009	GEF/UNEP	CEEST, VPO	Prepare climate change scenarios for Tanzania Prepare GHG inventory Prepare GHG mitigation Undertake V & A studies Compile the final SNC report
Capacity Development for CDM (CD4CDM)	USD 49,000 2007 - 2008	UNEP Risoe	CEEST, EPMS, VPO	- Assist local project developers to prepare PIN - Provide technical backstopping local CDM investors - Awareness raising and capacity building - Conduct workshops for focused groups
Climate Change Technology Needs Assessment	USD 100,000 2004 - 2005	GEF/UNEP	CEEST, VPO	Identify adaptation and mitigation technologies in various sectors of the economy Prepare and publish final TNA project report
CDM Capacity Building Programme for Tanzania, Kenya and Uganda	2008 – 2009 Ongoing	STEM/Swedish Gov	CEEST, Cornland International, MEM	Provide learning by doing to local CDM project developers Assist the local project developers to prepare PDD
Project Catalyst on Adaptation Working Group	2008 – 2009 Ongoing	ClimateWorks	CEEST, MCKenzie International	- To facilitate on good agreement in Copenhagen COP15 IN 2009
Environment Protection and Management Services Contact: Euster Kibona Nkrumah, Lida building, room 128 Tel: +255 754 577475 eusterkibona@yahoo.com				

www.epmstanzania.org				
Current project activities related to CC	Budget and duration	Funding source	National coordination	Main elements
Capacity strengthening in Least Developed Countries on Adaptation to climate change (CLACC)	15,000 GBP (5,000 for each activity) 2005-2008	International Institute for Environment and Development, IIED	1. Institute for malaria 2. Local and national NGOs 3. City Council of Dar es Salaam	1. Awareness of climate change in the health sector of Tanzania: Malaria in Highlands (2005-2006). 2. Establishment of climate change resource center and NGO forum for climate change issues (2006-2007). 3. Climate change vulnerability assessment of the city of Dar es Salaam to feed into the City Council Strategy (2007-2008).
Enabling Poor Communities in Africa, Asia, Latin America to adapt to impacts of climate change under South-South-North Initiative.	1. phase: 15,000 Euro (seed funds) 2. phase: 60,000 Euro 2006-2009	The Dutch government	Local NGO: FAAPECO	1. phase: (2006-2007) Development of 3 PINs on adaptation Identification of hot spots Feasibility study on vulnerable areas 2. phase: (2007-2009) Full development of project on enhancing adaptive capacity of coastal community by shifting of shallow water wells affected by inundation of sea water.
Capacity building in CDM	80,000 USD (1. and 2. phase) 2007-2008 (1. phase) 2009-? (2. phase)	UNEP/Risoe	DOE, Project developers	The 1. phase included identification of stakeholders within the CDM business and development of PIN and awareness raising and capacity building. 3 national and 3 mini workshops have been conducted with a broad range of sectors. The 2. phase will include development of PDDs.
Community based adaptation to climate change in Africa (Regional in 8 countries)	100,000 Canadian \$ 2008-2011	IDRC	Pastoral communities	Testing methodology initiated by the South-South-North Initiative to develop adaptation projects. Tanga was selected as pilot area based on vulnerability mapping of geographical areas in Tanzania.

Scouting on Potential CDM Facilitator Candidates in Tanzania	4,000 USD 2008	Swedish Energy Agency through SSN Africa	-	Identification of candidates to train and estimation of CDM projects within water and pollution.
IUCN Contact: Issa Abdulrahman Country Director, issa@iucn.or.tz +255754-570234 IUCN Tanzania Office Box 13573 www.iucn.org				
Current project activities related to CC	Budget and duration	Funding source	National coordination	Main elements
Climate Change and development Project Regional project including Mozambique and Zambia.	2 million Euro for the 3 countries Tanzania 1/3 2008-2010 <i>Ongoing</i>	Ministry of Foreign affairs of Finland	DOE, NEMC, Inst. of Resource Assessment, Sokoine University, TMA, TNRf forest group, Min. of Agriculture, Ministry of Energy, Rufiji District auth., Pangani water basin office,	Tanzania sites: Pangani River basin and Rufiji District. - Ensure climate change related policies and strategies lead to adaptation activities that emphasize the role of forest and water resources in supporting people's livelihood and associated farming systems through: Policy support capacity building Supporting vulnerability assessment and implementation of adaptation measures Promoting policy and practice of adaptation measures
Integrated Water Management - Pangani River Basin	4,750,000 USD 2003-2010	IUCN HQ: 22% EU: 60% UNDP/GEF: 13% Gov of Tanzania 300.000 USD	SNV World, Pangani water basin office, Pangani water board, DOE, NEMC, Ministry of Water and Irrigation,	Capacity building The climate change component entails vulnerability assessments and adaptation measures.

			Pamoja Trust	
Livelihood and Landscapes (LLS) – Rufiji District	142,000 Euro 2009-2010	Government of Switzerland	District council, Rufiji district authority, Ministry of Forest and Beekeeping, TFCG	LLS is a global initiative that examines the rights and access of the rural poor to forest products in the context of the entire landscape in which people and forests interact.
OXFAM Contact: Marc Wegerif +255 764 921 896 Mikocheni B Kiko Street Plot 270 P.O. Box 10962 mwegerif@oxfam.org.uk www.oxfam.org				
Current project activities related to CC	Budget and duration	Funding source	National coordination	Main elements
Pan African Climate Justice Alliance	2008- long term	Private donors DIFD Dutch Government	TANGO, Agricultural Non-state Actors Forum, Civil Society organizations Membership stands at 102 organizations spread across 37 African countries.	The alliance is a continental coalition of civil society organizations in the African continent, brought together by common agenda of promoting and advocating for climate-related and equity-based development that considers climate change as a key driver of sustainable development. - Advocacy on climate change in global negotiations - Polluters pay principle - Creation of forum on climate change for small organizations - Public awareness
Tanzania Forest Conservation Group Contact: Nike Doggart				

Senior Technical Advisor
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 P.O. Box 23410
 +255 22 266 9007
 ndoggart@tfcg.or.tz
 www.tfcg.org

Current project activities related to CC	Budget and duration	Funding source	National coordination	Main elements
Pilot REDD projects	5 million USD 5 year period Planning phase	Norwegian Embassy	Recoftc	<ul style="list-style-type: none"> • Capacity building for selling carbon emission reductions from the communities • Reduction of deforestation • Awareness raising at community level
Participation in Póznán COP 14	2008	CARE Denmark	CARE Tanzania	Preparation for the international negotiations.
COP 15	2009	CARE Denmark	CARE Tanzania	Preparation for the international negotiations. Bringing the voice of local civil society organizations into the COP 15.

TaTEDO
Contact: Gisela A. Ngoo
 Manager
 Energy Environment Initiative Dept.
 Tel: +255 22 270 0438
 E-mail: gisngoo@yahoo.co.uk,

Sinza off Shekilango Road energy@tatedo.org www.tatedo.org				
Current project activities related to CC	Budget and duration	Funding source	National coordination	Main elements
Up-scaling access to integrated modern energy services for poverty reduction	2,5 million Euro 2008-2012	EU and HIVOS (Dutch NGO)	VPO	Up-scaling of number of people using modern energy services and supporting development of small enterprises in rural areas
Integrated modern energy services for sustainable development and poverty reduction (Phase II)	2,9 million US\$ 2007-2009	Norwegian Embassy	9 districts, local NGOs and CBOs, Faith based organizations, Villager govt., private sector, NMNRT, VPO, MEM, Ministry of Agriculture and Food Security, NEMC	Contribute to sustainable development and poverty reduction by enhancing access to modern energy technologies and services for consumptive and productive needs in households, SMEs and social service centres: - solar - wood fuel - biofuel - tree planting
Integrated sustainable energy services for poverty reduction and environmental conservation programme (ISES-PRECP Phase II)	800,000 Euro 2006-2009	EU and HIVOS	Districts, local NGOs and CBOs, Faith based organizations, Villager govt., private sector, NMNRT, VPO, MEM,	Increase income of the rural and urban population through reduced costs and increased efficiency for woodfuels utilization and production by adoption of efficient woodfuels stoves, ovens and charcoal production kilns.

			Ministry of Agriculture and Food Security, NEMC	
Households efficient stone or brick made woodstoves in Rombo and Hi districts	200,000 US\$ 2008- long term	HIVOS	Districts, local NGOs and CBOs, Faith based organizations, Villager govt., private sector, NMNRT, VPO, MEM, Ministry of Agriculture and Food Security, NEMC	Improvement of thermal performance of the wood fuels stoves in rural areas through replacing the tree stone fire places by efficient fuel wood stoves. In 2009, 6000 stoves were installed. Pilot villages have entered the voluntary carbon market calculating emissions from use of efficient firewood stoves.
Fredskorpset Exchange project	2000- no ending date	Fredskorpset		Exchange of staff with Norway and Brazil. TaTEDO has received 3 staff during the years and are now preparing their 3rd Tanzanian colleague to leave for Brazil.
Enabling access to sustainable energy (EASE)	Contract based 2000-	ETC and DGIS	VPO, MEM, Ministry of Agriculture and Food Security, NEMC	

<p>Wildlife Conservation Society of Tanzania Contact: Lota Melamari CEO/Coordinator Garden Av. Plot 39 P.O.Box 70919 +255 22 211 2518 melamarilota@yahoo.co.uk www.wcst.or.tz</p>				
Current project activities related to CC	Budget and duration	Funding source	National coordination	Main elements
Monitoring protected areas	100,000 USD 50,000 GPD 2006-2008	Darwin Initiative	Birdlife International, Cambridge University	Computer simulation model using birds as indicators for implications of climate change.
<p>WWF Contact: Dr. Herman Mwageni Country Representative Tel: +255 22 277 5346 Cell: +255 0784 326 360 Plot 350, Regent Estate Mikocheni P.O. Box 63117 e-mail: hmwageni@wwftz.org www.panda.org</p>				
Current project activities related to CC	Budget and duration	Funding source	National coordination	Main elements
East Usambara Forest landscape Restoration Project	2005-2010: 615,000 Euro (First phase: 1991-2005)	Executing agency: WWF TPO, WWF Finland, WWF International	Department of Forestry and Beekeeping, Tanzania Forest Conservation Group,	Testing of approaches being advocated for improved forest conservation: Community based forest management Joint forest management Land-use planning

	<i>Ongoing</i>		District Councils of Muheza and Mkinga	Fire management
Conservation and Management of the Udzungwa Mountains	8,813,935 NOK 800,000 SEK 70,000 USD 30,311,000 Tanzanian shillings (Started in 1991) Fourth phase: 2006-2008+ <i>Ongoing</i>	The Norwegian government WWF Norway WWF Sweden CEPF EAMCEF Executing agency: WWF TPO in collaboration with TANAPA, District councils and local communities	The government, local authorities, NGOs, CBOs, the private sector and researchers	To ensure long-term sustainability and health of forest and freshwater ecosystems through: Strengthening TANAPA Reducing pressure on and improve utilization of forests, water and land resources Restoring connectivity for fragmented forest patches Improving community conservation Establishing locally based ecological research and monitoring
Rufiji-Mafia-Kilwa Seascape Programme	Annual funding of 350,000 GBP from WWF UK 2005-2010 + <i>Ongoing</i>	WWF UK JSDF The Norwegian government GEF WWF Switzerland Executing agency: WWF Tanzania Programme Office	VPO, NEMC, Fisheries Division of Ministry of Natural Resources & Tourism, Kilwa, Rufiji & Mafia Districts, Mafia Island Marine Park, Mangrove Management Project	The seascape programme is specifically aimed at improving socio-economic well-being of coastal communities in the Rufiji, Mafia and Kilwa districts of Tanzania through sustainable, participatory and equitable use and protection of marine and coastal natural resources
Valuing the Arc programme: Putting value on the Eastern Ark mountain ecology	2,000,000 USD 2007-2011	Leverhume Foundation (UK-based) WWF Science Unit USA	Natural Capital Project, Cambridge University, University of East	Map ecosystem services from the Eastern Arc Mountain and award an economic value to each economic system to inform stakeholder decision making - as a pilot for feasibility of payments for environmental services

	<i>Ongoing</i>	Implementing agency: WWF Tanzania Programme Office	Anglia, University of Leeds, University of York, Cranfield University, Sokoine University of Agriculture, University of Dar es Salaam	
Africa and Madagascar Programme - Meeting the Challenge	150,000 US\$/year 2004-2009 <i>Ongoing</i>	Annual funding from WWF UK with additional funding from TPO	Civil society organizations, VPO, Ministries, departments and agencies, Care International, TPO	Meet the MKUKUTA targets and support the various Ministries and departments in meeting the MKUKUTA targets.
Reforestation in Uzungwe National Park	1 million USD/3 years 2006-2009	WWF Norway The Norwegian government	Implementing agency: WWF Tanzania	Reforestation in Uzungwe National Park
Equitable Payment for Watershed Services: Phase I, Making the Business Case Global programme (Guatemala, Peru, Tanzania and Indonesia)	1,3 million Euro for Tanzania 4,1 million Euro total for the global programme 2008-2011 <i>Ongoing</i>	Danida is financing Tanzania, while the Dutch Government is financing the other three countries. Buyers of ecosystem services: Coca Cola Tanzania Water Company DAWASCO	<i>Internal coordination:</i> National EPWS, PREM, WWF TPO, Care Tz, IIED <i>External coordination:</i> DAWASCO, Coca cola, Trust fund, Forest and	The Payment for Watershed Services (PWS) project aims to ensure a sustainable flow of watershed services to beneficiaries of these services into the future through the establishment of equitable payment mechanisms for watershed services in the selected watersheds/catchment areas in Uluguru and East Usambara in Tanzania. The project will work with the upstream and downstream stakeholders to ensure substantial benefits to the poor and to ensure that resources are applied to the priorities and needs of the poor and that local values, knowledge and practices are incorporated into NRM practices, as well as ensure that women and

			Beekeeping Division, Water department, Communities	marginalized groups directly participate in, and benefit, from the PWS mechanism.
Ruaha River Fresh Water Programme	800,000 US\$/year 2001-2009 (Starting new phase in 2009) <i>Ongoing</i>	WWF UK EU	Implementing agency: WWF Tanzania District councils and Adm. of Water	The goal of this project is to achieve year-round flow in the Great Ruaha River by 2010 by using the "integrated river basin management" approach. (Adaptation options in a severely depleted catchment)
Matumbi/Kichi Hills Forest Landscape Restoration project	1,005,668 USD 2005-2010 <i>Ongoing</i>	WWF UK WWF Switzerland GEF Critical Ecosystem partnership Fund	WWF Tanzania, Department of Forestry and Beekeeping, Kilwa and Rufiji District Councils	Improve forest conservation, resource use, governance, community's access and livelihoods.
Coastal East Africa Network Initiative	2009-long term	WWF UK WWF Norway WWF Sweden WWF Denmark WWF International	In process of identifying new partners, but TCFG will be a partner.	Workplan is still to be submitted, but will entail climate change component. Geographical concentration in coastal East Africa from Kenya to Mozambique. WWF is going through global restructuring and 70% of WWF Tanzania's budget will be placed within this programme.

Annex 4: Description of NGOs

National NGO Networks:

Three national NGO networks related to climate change issues are currently operating or in the process of being constituted; 1) TNRF, Tanzania Natural Resource Forum, 2) IDGE, The Informal Discussion Group on the Environment, and 3) The National Civil Society Forum on Climate Change. The first one is well functioning and has a broad member base at national level, whereas the other two are respectively recently being revitalized and launched.

The Tanzania Natural Resource Forum

The Tanzania Natural Resource Forum is a network, which has grown from a small, informal discussion group with a focus on wildlife issues in 2002, to a national natural resource advocacy and informational network of over 1,300 individuals and organisations in 2009. TNRF works for improved natural resource governance by being a demand-driven network of members and partners that helps people to bridge the gap between local natural resource management needs and practices, and national natural resource management priorities, policies, laws and programmes.

TNRF facilitates and supports member-driven ‘Working Groups’ on key policy and practice issues that are of direct use and interest to members. These working groups provide an opportunity for TNRF’s diverse membership to tackle practical policy and practice issues at a range of different levels. Currently TNRF facilitates three working groups – the Tanzania Forestry Working Group, the Pastoralist Livelihoods Task Force and a Wildlife Working Group, which all meet regularly throughout the year.

TNRF has begun to support information sharing on climate change over the last year – particularly in regard to ongoing member initiatives that are piloting community-based Reduced Deforestation and Degradation (REDD). Two round tables were held in 2008 (a third is scheduled for 20th February 2009) at which members and partners share their experiences, and their informational and learning needs with each other.

TNRF is funded by a diverse range of donors, such as international development partners, government and private funding. Representing an established forum with a 11-person secretariat, makes TNRF an appropriate structure for administering the NGO network for climate change, suggested within the proposals of this consultancy.

IDGE, Informal Discussion Group on the Environment

The IDGE is a multi-disciplinary, broad-based discussion group concerned about current and pending national and international environmental and conservation issues. The group will facilitate dialogue to raise the profile of relevant issues between civil society, development partners, and government. The IDGE will continue to share information about specific projects during its meetings, but it will also work through a theme-based discussion programme on key strategic policy matters, such as the Tanzania Assistance Strategy, the PRSP, the National Strategy for Sustainable Development (NSSD) process, local government reform, to understand better the extent to which environmental issues are being mainstreamed in order to reduce poverty. An organising group will co-chair the IDGE and take responsibility for forward planning on a quarterly basis, whereas the meetings will take place at a monthly basis.

The IDGE was established in November 2000, where IUCN served as the secretariat. The group was active from 2000 to 2006 meeting about every 2 months (with wide variations over time), but meetings stopped due to lack of staff capacity and budget. During the last two years IDGE has worked as an e-mailing network with aprox. 45 members.

In late 2008, IUCN took up the challenge of reviving the network, and one meeting was held late October 2008, though with limited participation. Based on recommendations from the meeting, IDGE will, *inter alia*, (1) try to collaborate with TNRF and other forums to maximize synergies in mission and resources, and (2) try to set meetings around other key events/ issues in Tanzania, to avoid creating more time demands on members.

The effort to revitalize IDGE is being undertaken based on voluntary time from an IUCN consultant on top of normal working hours, with commitments of support from a representative of the MRNT Wetlands Unit. IUCN has also initiated discussion with TNRF about possible collaboration, but no details are set. The challenge of IDGE is to revitalize the network and reconfirm the member base. In 2008 IDGE had a small amount of funds within the IUCN Livelihood and Landscape project to support costs of organizing meetings. A similar small amount has been requested for 2009, but no funds are available for personnel support.

National Civil Society Forum on Climate Change

National Civil Society Forum on Climate Change is a new forum organised by Intercooperation Tanzania, Ceest, EPMS and Oxfam as a network explicitly addressing the theme of climate change for civil society organisations. The network was established at the end of 2008 with the aim of ensuring that there is a more effective civil society involvement and influence on climate change issues in Tanzania, by creating a space for information sharing, capacity building, and engaging in discussions with the Government of Tanzania and other stakeholders. An action plan for the group is currently being elaborated and three yearly meetings are estimated to be held, the next in March 2009. It has so far been organised on a voluntary basis, but funding is to be identified, though no plans exist to set up secretariat or formalisation of member base.

NGOs working with climate change projects and programmes:

Africare

A US based private non-profit organisation founded in 1970 to support development work in Africa. Africare has been working in Tanzania since 1984 towards improving the quality of life in Tanzania delivering projects in food security, agriculture, water resource development, environment and natural resource management, health and HIV/AIDS, and emergency and humanitarian aid. (www.africare.org)

Carbontanzania

A non-profit organisation founded in 2007 governed by a small group of professional conservationists and scientists dedicated to channelling funds for offsetting carbon emissions towards the regeneration of critical natural habitats while simultaneously creating economic benefits for local communities. (ww.carbontanzania.com)

CARE Tanzania

CARE Tanzania was established in 1994 with the goal of poverty reduction and improvement of social justice. With the launch of the *Poverty-Climate Change Initiative* in July 2006, CARE International (CI) began adapting its worldwide programming to the climate change realities. Care Tanzania accordingly started planning an appropriate response to climate change, and

positioned them strategically on the issue of climate change, undertaking mitigation, adaptation and advocacy activities. (www.care.org)

Centre for Energy, Environment, Science and Technology (CEEST)

Ceest foundation is an independent research institution from 1992 whose objectives are to undertake research and studies in areas related to energy, environment, science and technology. Ceest is conducting and specializing in Environment, more especially in Climate Change Studies (Impact, Adaptation, GHG Inventory & Mitigation, and CDM), Environment Impact Assessment, Environmental Audits, Environmental Policy and Planning and Environmental Institutions, Energy and Natural Resources Conservation. (www.ceest.co.tz)

Environmental Protection Management Service (EMPS)

EPMS was established in 1997 as a professional environmental firm dedicated to work both at national and international level on issues related to environment and sustainable development. The key areas of expertise include Climate Change, EIA and other professional services as well as activities related to the implementation of the three post Rio Conventions (CBD, UNFCCC and UNCCD), adaptation and mitigation project activities including activities related to identification and implementation of CDM projects and preparation of CDM Project Design Documents (PDDs). (www.epmstanzania.org)

The International Union for Conservation of Nature (IUCN)

The world's largest and oldest global environmental network with more than 1000 governments and NGO members. IUCN's mission is to influence, encourage and assist societies throughout the world to conserve the integrity and diversity of nature and to ensure that any use of natural resources is equitable and ecologically sustainable. As part of the new 2009-2012 programme, IUCN is working to include biodiversity concerns in adaptation and mitigation policies and practise, thereby linking biodiversity and climate change. (www.iucn.org)

OXFAM

Oxfam International is a confederation of 13 organizations working together and with partners and allies around the world directly with communities seeking to influence the powerful to ensure that poor people can improve their lives and livelihoods and have a say in decisions that affect them. OXFAM is represented in Tanzania through their representative office in the country, which is working within the vision of OXFAM Global Climate Change Campaign, aiming at responding to increasing numbers of serious droughts and floods in recent years, helping poor communities to adapt, such as through better flood defences or drought resistant farming techniques. (www.oxfam.org)

Tanzania Forest Conservation Group (TFCG)

The Tanzania Forest Conservation Group is a Tanzanian non-governmental organisation promoting the conservation of the Eastern Arc/Coastal forest biodiversity hotspot. For the last 19 years the Tanzania Forest Conservation Group has worked to provide sustainable solutions to the problems that have driven deforestation in this unique area, and has recently started planning REDD activities and capacity building with regard to the international negotiations.

(<http://www.tfcg.org/>)

Tanzania Traditional Energy Development and Environmental Organization (TaTEDO)

For more than fifteen years, TaTEDO has been engaged in implementing different sustainable modern energy development projects and programmes in Tanzania. The overall objective of TaTEDO is to enable the majority of the population, particularly women, to access sustainable

modern energy technologies and services that contribute poverty reduction, sustainable development, climate change mitigation and adaptation. (www.tatedo.org/)

Wildlife Conservation Society of Tanzania

A national NGO, engaged in advocacy issues towards promotion of sustainable and equitable use of natural resources. WCST is the national partner of Birdlife International. (www.wcstonline.org)

WWF Tanzania

During the last 5 decades, WWF has become one of the world's largest independent conservation organizations. WWF has been actively involved in conservation work in eastern Africa since 1962, beginning with the purchase of land in Nakuru, Kenya. As part of an ongoing global structuring, the geographical concentration will be in coastal East Africa focusing at the coast from Kenya to Mozambique, which will cover 70% of WWF Tanzania's budget. This programme will combine conservation and climate change issues.

Annex 5: Note on Tanzania Meteorological Agency and food security

FINAL REPORT

Joint Donor Climate Change Mission Covering Tanzania Meteorological Agency (TMA) and Food Security Division

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In collaboration with

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Dar es Salaam

Division of Food Security
Ministry of Agriculture and Food Security

ACRONYMS

ACMAD	- African Centre for Meteorological Application and Development
AWS	- Automatic Weather Stations
DMCH	- Drought Monitoring Centre Harare
EAC	- East African Co-operation
FSIT	- Food Security Information Team
FSVA	- Food Security and Vulnerability Assessment
GCM	- Global Circulation Model
GCOS	- Global Climate Observation Systems
GEF	- Global Environment Facility
GHACOF	- Greater Horn of Africa Climate Outlook Forum
GTN-C	- Global Terrestrial Network- Carbon
GTN-E	- Global Terrestrial Network-Ecology
GTN-G	- Global Terrestrial Network – Glaciers
GTN-H	- Global Terrestrial Network- Hydrology
GTN-P	- Global Terrestrial Network- Permafrost
ICAO	- International Civil Aviation Organization
ICPAC	- IGAD Climate Prediction and Applications Centre
IRA	- Institute of Resource Assessment
LGA	- Local Government Authority
MAFS	- Ministry of Agriculture and Food Security
METEOSAT	- Meteorological Satellite
NAPA	- National Adaptation Programme of Action
NCEP	- National Centre of Environment Prediction
NEPAD	-
NFRA	- National Food Reserve Agency
NOAA	- National Oceanic and Atmospheric Administration
PRSMC	- Pretoria Regional Specialized Meteorological Centre
SACCOS	- Saving and Credit Cooperative Society
SADC	- Southern African Development Community
TAA	- Tanzania Airports Authority
TANDREC	- Tanzania Disaster Relief Committee
TCAA	- Tanzania Civil Aviation Authority
UNCCD	- United Nations Convention to Combat Desertification
UNEP	- United Nations Environment Programme
UNFCCC	- United Nation Framework Convention of Climate Change
WMO	- World Meteorological Organization
WWW	- World Weather Watch

1. INTRODUCTION

Weather and climate affects almost every aspect of human activity. The socio-economic well being of most Tanzanians are very sensitive to severe weather and extreme climate events. The country often experiences loss of life and destruction of property as a result of severe weather and extreme climate events such as heavy rains, tropical cyclones resulting in floods and landslides, destruction of road, buildings, bridges and houses, loss of properties and peoples life. Likewise less rainfall result into droughts and a prolong droughts affects agriculture production and hydroelectricity power supply. A large population in rural areas in Tanzania lives below the poverty line since rain-fed agriculture, on which they depend for their livelihood, has become more sensitive to severe weather and extreme climate events that are prevalent. Skilful and timely weather and climate forecasts can help the government and local communities mitigate the negative impacts of severe weather and extreme climate events through proper planning of the anticipated weather or climate events; however these can only be achieved through well organized systematic observation, monitoring and analyzing of weather and climate parameters. Advance weather information and seasonal outlook forecasts given; helps farmers in planning their farming activities, mitigation of water bone disease and national food security. It is important, therefore, that the Meteorological Service be improved so as to be in a position of giving better services not only to agriculture but also to other sectors of the economy.

Climate monitoring, detection, attribution and climate change research and applications require historical observational data from sources that are well distributed across the country. In particular, it is of major importance that data from different locations and times are comparable or can be made comparable. This calls for:

- a) **Homogeneity** of the data time-series relating to observing practices: This ensures data to be inter-comparable over the entire record, especially for data from the same location for different times. Changes in observing practices, including instrumentation can cause problems for climate research and many applications though they may improve operations and other real-time uses. Homogeneity of environment is basic for quality time-series data. It should consider observing practices, instrumentation and the environment in which the measurements are taken. Since observing sites are often established where people are living, the environment has a tendency to change continuously.
- b) **Representativeness** of the environment: Observing sites need to provide the best representation for the climate in the area of concern. Current observing stations are located in habitable areas.

Data management systems that facilitate access, use and interpretation of data and products should be included as essential elements of climate monitoring systems. Tanzania network of stations is integrated into the global weather and climate-observing network under the World Meteorological Organization (WMO) World Weather Watch (WWW) and GCOS programmes.

Tanzania is a signatory to a number of international conventions, protocols and programmes such as the United Nation Framework Convention of Climate Change (UNFCCC) and its Kyoto Protocol, the UN Convention to Combat Desertification (UNCCD) and the Vienna Convention for the Protection of the Ozone Layer and its associated Montreal Protocol that require it to carry out systematic climate monitoring and observations among its obligations. Tanzania is also a member of WMO and its Technical Commissions.

2. TANZANIA METEOROLOGICAL AGENCY (TMA)

TNA has the following vision, mission and main function:

Vision

To stand out as a centre of excellence in accelerating the National Development Vision through provision of world class meteorological services by the year 2015

Mission

To provide quality, reliable and cost effective meteorological services to stakeholders' expectations thereby contributing to the protection of life and property, environment and national poverty eradication goal.

Main functions of TMA

- i) To provide meteorological services for international air navigation at standard and recommended practices of International Civil Aviation Organization (ICAO) and WMO on behalf of the United Republic of Tanzania
- ii) To organize and administer efficient networks of surface and upper air stations necessary to capture accurate records of the weather and climatic conditions of the United Republic of Tanzania;
- iii) To observe, collect, archive and disseminate meteorological and related information for the United Republic of Tanzania;
- iv) To take part in global exchange of meteorological and related data and products for the safety of humankind and to enhance the understanding of the global atmosphere;
- v) To provide weather, climate services and warnings for the safety of life and property to the general public and to various users including aviation, agriculture, marine and food security, water resources, disaster management, health and construction industry;
- vi) To carry out research and training in meteorology and climatology and in other related fields, and cooperate with other institutions where appropriate, for use in socio-economic development planning;
- vii) To participate in the activities of international organizations and programs, in particular the World Meteorological Organization (WMO) e.g. World Weather Watch (WWW), International Civil Aviation Organization (ICAO), Global Climate Observing System (GCOS), the Global Atmospheric Watch (GAW), etc;
- viii) To cooperate with other institutions concerned with issues related to climate variability, climate change and environment;
- ix) To participate in activities dealing with meteorology under Regional Organizations e.g. Southern African Development Community (SADC) and East African Co-operation (EAC);
- x). To publish weather and climatological summaries, bulletins and other interpreted

products, to collect fees and charges for data, products and services rendered; and to carry out any other function as the Minister may direct. Currently TMA is far from being able to fulfill these task e.g. the monitoring network is degrading, the weather forecast are uncertain and not delivered timely to farmers, and TMA is not able to downscale climate models.

2.1. TMA ORGANIZATION

There are four divisions in the Agency comprising of the Forecasting Services, Technical Services, Research and Applied Services and Support Services. The Zanzibar Office is under the Director General's Office. All these are headed by Directors. The organogram provides an overview of the TMA and includes total number of staff in each unit.

Organogram of TMA and the number staff in each section

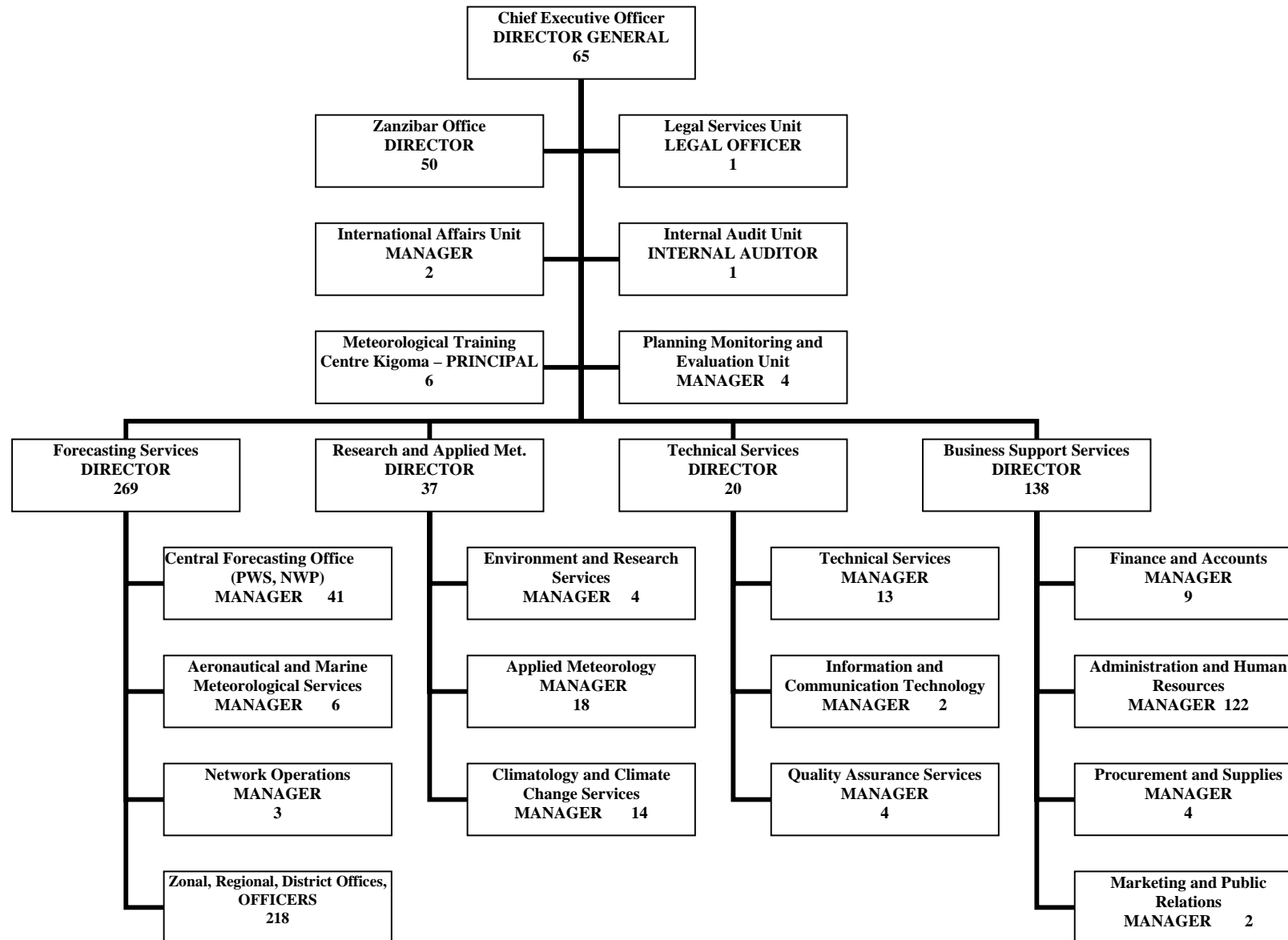


Table 1: TMA STAFF DISTRIBUTION AND THEIR QUALIFICATION**Summary of TMA Staff with their Designations in their respective Stations**

No.	Station	Meteorologists/Degree level	Met. Officers/Diploma level	Met. Assistants/Certificate level	Support Staff	Total
1	Headquarters	36	3	18	58	115
2	Nyerere Int. Airport	3	10	16	8	37
3	Central Forecast Office	15	16	17	8	56
4	Arusha	0	2	12	4	18
5	Babati	0	1	1	0	2
6	Bukoba	0	2	5	0	7
7	Dodoma	0	2	7	4	13
8	Handeni	0	0	3	1	4
9	Iringa	0	1	5	1	7
10	Igeri Agromet	0	0	1	0	1
11	Ilonga Agromet	0	0	1	0	1
12	Kilimanjaro Int. Airport	1	5	12	8	26
13	Kibaha	0	1	3	1	5
14	Kigoma Airport	0	1	5	4	10
15	Kigoma NMTC	2	3	2	13	20
16	Kilwa Masoko	0	0	3	0	3
17	Lyamungu Agromet	0	0	1	0	1
18	Mahenge	0	1	5	2	8
19	Marine Met. Dsm.	0	1	6	0	7
20	Mbeya	1	4	5	4	14
21	Morogoro	1	1	7	4	13
22	Moshi	1	0	3	1	5
23	Mtwara	1	0	6	4	11
24	Musoma	1	1	5	1	8
25	Mwanza	1	5	12	4	22
26	Pemba	0	1	8	2	11
27	Same	0	0	3	4	7

28	Shinyanga	0	1	7	2	10
29	Singida	0	1	4	0	5
30	Songea	0	2	5	3	10
31	Sumbawanga	1	1	6	1	9
32	Tabora	1	2	8	3	14
33	Tanga	1	1	7	1	10
34	Tukuyu	0	0	2	0	2
35	Uyole	0	0	1	0	1
36	Zanzibar	6	7	10	13	36
	Total	72	76	222	159	529
			Technical		370	
			Support		159	
			Total		529	

Note:-

Support Staff at Headquarters includes those with Degree, Diploma, Certificates and professional qualifications in their respective positions.

Table 2: Staff Qualification

	PhD	Masters	Bachelors	Diploma	Certificate	Form VI/V	Others
Meteorology Cadre	5	22	45	76	222		
Engineering	-	-	1	5	2		
Economist	-	-	1				
Human Resource		2	2	-	-	-	
Procurement and Supplies	-	1	2	-	2		
Finance & Accounts		3	2	2	2	-	
ICT		1	2	2	-		
On Training	2	3	32	28	43	10	
Others	-	-	5	1	-	-	
Others/Quantity Surveyor	-	-	1	1	-		

3. TMA BUDGET (2004 – 09)

A greater part of TMA services are rendered to the public and for fulfilling Tanzania's international obligations of meeting international conventions and protocols related to meteorology. The rest of the services are provided on a cost recovery basis to customers receiving TMA services, but these customers are not significant. The main TMA sources of revenue are from;

- a. Government subvention
- b. Aviation revenue
- c. Charges of MET Services, Data & Products
- d. Others (donors and development partners)

Table 3: TMA Sources of Revenue

Government subvention. Account	Aviation revenues	Charges of MET services, data and products	Others
74%	20%	4%	2%

According to TMA, the performance of TMA in the current and past four years shows only a moderate performance as most targets were not fully implemented due to budgetary constraints especially those in need of capital investment. The trend for TMA own revenue collection for the mentioned period is on the average of Tshs.1.5 billions per annum. During the Financial year 2008/09, TMA received funding from donor support to the tune of Tshs. 0.22 billions for climate change activities. The reason for the budget jump from 2005/06 to 2006/07 was due to the fact that the government provided fund for the purchase of new meteorological radar (Table 4). The trend of the requested and actual funds received from the government is as follows;

Table 4: Six years trend of TMA Total budget financing Gap analysis for 2003 – 09

S/N	Year	Requested funds (Billions Tshs.)	Actual funds (Billions Tshs.)	Financing Gap (Billions Tshs.)	Financing Gap (in %)
1	2003/04	3.88	3.34	0.54	14
2	2004/05	5.21	3.80	1.41	27
3	2005/06	5.90	4.63	1.27	22
4	**2006/07	8.80	7.80	1.00	11
5	2007/08	9.00	5.99	3.01	33
6	2008/09	9.90	-	-	-
	Total				

Key: Total budget = GoT-OC + Own Revenue
 Own Revenue = Aviation +Met services+Other Sources
 GoT-PE is not included in total budget
 ** A raise in budget due to radar funds from VPO-Environmental department

Table 5: TMA budget distribution

Running of Meteorological Stations	Investment budget	Staff Welfare	Operational costs
23%	27%	16%	34%

Investment Analysis for Financial Year 2008/09

TMA has a Research and Applied department whereby among others things deals with climate change issues. Contribution of the TMA budget to climate change issues is through investing in research activities, meteorological instruments and equipment and meteorological network expansion and rehabilitation. However, the issues of climate change modelling and research are still at infancy stage, mainly now TMA is doing the capacity development to its technical staff in order to able the institution to engage in climate change activities in the near future.

Table 6: Investment analysis

Met Instruments	Training Domestic	Meteorological Network Expansion and Rehabilitation	Others
36%	31%	22%	11%

Table 7: Six Years Revenue Trends 2003-2009

PLANNED/REQUESTED (Tshs. In billions)							ACTUAL FUNDS (Tshs. In billions)					
S/N	YRS	GoT-OC	GoT-PE	Aviation	Met Service &Data	Other Sources	S/N	GoT-OC	GoT-PE	Aviation	Met Service &Data	Other Sources
1	2003/04	2.35	1.45	1.0	0.01	0.52	1	1.50	1.45	1.77	0.02	0.05
2	2004/05	3.00	1.45	1.85	0.35	0.01	2	2.00	1.10	1.51	0.02	0.33
3	2005/06	4.00	2.08	1.85	0.04	0.01	3	2.50	2.10	1.84	0.02	0.27
4	2006/07	6.85	2.50	1.90	0.03	0.02	4	4.22	2.22	1.28	0.05	0.03
5	2007/08	7.00	3.50	1.95	0.03	0.02	5	3.60	2.50	2.30	0.07	0.02
6	2008/09	7.20	4.60	2.50	0.17	0.03	6	-	-	-	-	-
Total		26.4	15.48	11.05				12.82	16.2			

Key: GoT-OC – Government fund for Other Charges,

GoT-PE – Government fund for Personnel Emolment

Challenges/weaknesses

The major challenge facing the institution is inadequate budget to meet the following investments:-

- expansion of meteorological network
- Training – inadequate budget for capacity development to TMA staff
- meteorological equipment and Instruments,
- Weather radar network,
- Improving communication infrastructure.
- Central forecasting office and Headquarter building

4. EXISTING MONITORING/OBERVATION NETWORKS

The available instrumental meteorological observations in Tanzania measure all common parameters including air temperature, precipitation, air pressure, surface radiation budget, wind speed and direction and water vapour. Since 1982, the number of rainfall stations, has expanded considerably and today there are more than 2056 rainfall stations in the country of which only about 1650 are still open and about 600 are operating. Rainfall is the most extensively measured element because it is considered to be the most crucial meteorological factor in the country. There are about 150 climatological stations in the country mainly with measurements of rainfall and temperature.

TMA does collaborate with other players such as Ministries responsible for water, Agriculture and Food Security, Natural Resources, Infrastructure and Education; and private institutions. The public institutions have stations that measure other elements apart from rainfall, while private institutions such as churches and schools operate most of the single-element rainfall stations. The existing monitoring /observation networks were described as follows;

- **Synoptic Stations**

At present TMA operates meteorological stations at 20 airports, out of which 2 are international airports. However, no modern equipment (weather radar, visibility sensors, present weather sensor, wind profilers etc.) are available, and only one upper-air station provides data once a day. Synoptic stations make 24 hourly observations of various elements: including wind direction and speed, solar radiation, relative humidity of the air, wind run, and cloud type.

The hourly observations are telecommunicated to the National Meteorological Centre daily at prescribed times and monthly records are submitted to the Data Section (DS) of TMA. These include manually filled forms, cards and charts records from automatic instruments, such as sunshine recorder, automatic rain-gauge, thermo-hygrographs and anemographs. Automatic Weather Stations (AWS) have been installed in 7 synoptic stations for improving data availability at the NMC.

Synoptic stations are equipped with telecommunication facilities which include: Radio telephone (single side band), landline leased telephone, cell phones and facsimile machines. With a few exceptions, all synoptic stations are located in airports. Synoptic stations also make observations of upper air winds using pilot balloons that are tracked with theodolites, however, the operational costs for running synoptic stations are very high.

- **Agro-meteorological Stations**

There are 15 agro-meteorological stations that are operated by TMA in collaboration with Ministry of Agriculture and Food Security (MAFS). Agro-meteorological stations make meteorological observations twice daily, at 06.00 hours and at 12.00 hours UTC. Observations made include: daily rainfall, wet bulb and dry bulb temperatures, maximum

and minimum temperatures, hours of bright sunshine, air relative humidity, class-A pan evaporation, soil water, soil temperature and the crop growth and development.

These stations send monthly returns of observations to Data section and Agrometeorological Section of TMA. In addition, rainfall reports are communicated to Agrometeorological Section by phone and on weekly cards to MAFS-Food Security Department. Automatic instrument charts, cards and hand filled forms are sent monthly to the Data section. Office and residential accommodation for station staff is provided by MAFS. TMA provides professional observers and services the meteorological enclosures and instruments. Efforts are being made to improve these stations by providing them with basic equipment and expand the network to 70 stations. The main constraint facing TMA on this is insufficient financial resources, because the price for setting up one station ranges between US\$ 15,000 to US\$ 25,000 depending on the size and observations one want to be observed by the station. Long distances covered in operations of these stations require reliable transport e.g. motorcycles.

- **Climatological stations**

These stations measure the rainfall, temperature, humidity and sunshine. There are about 150 ordinary climatological stations in Tanzania, of these only 60 provide regular and continuous records (**Table 8**). These are operated by various institutions such as Ministry of Water, National Parks, Universities, Sugar plantations etc. TMA has plans to rehabilitate many of these and increase them to more than 200, and the cost for setting up one station ranges between US\$ 15,000 to US\$ 25,000. It is important that all stations adhere to and maintain the required standards.

- **Automatic Weather Stations (AWS)**

There are 14 Automatic Weather Stations (AWS) located at various stations in the country. However, due to the vastness of the country, the actual requirement is about 80 AWS according to the minimum requirements from the WMO standards.

- **Upper-Air Observation Network**

Upper air data has always been necessary in weather forecasting and climate monitoring. Upper air data are also vital input to global circulation and climate models (GCMs). Generally surface movements of weather systems are controlled by upper level systems including horizontal and vertical motions.

TMA used to have four such systems located at Dar es Salaam, Mtwara, Kigoma and Tabora. They have since stopped working due to lack of resources, old age and change of technology. However, Dar es Salaam has since acquired new upper air system under the Global Climate Observing System (GCOS) of WMO and is now operational. There is a need to revive the other three if we are to enhance the quality of forecasting and improve safety regularity and efficiency of aviation. It is planned to operate a radio theodolite station at Tabora. According to the information from TMA, the cost for one set of radio theodolite is estimated to be US\$ 25,000.

- **GCOS Surface Network (GSN) and Upper Air Network (GUAN) Stations**

There are 4 operating GSN stations in Tabora, Dodoma, Dar es Salaam and Songea. GUAN stations are currently not operating but are in the process of being revived. They are located in Kigoma, Dar es Salaam and Mtwara. These stations are important for upper surface and atmospheric observations.

- **Other Observation Stations**

Tanzania is not connected to any of the global programmes for systematic terrestrial observations such as Global Terrestrial Network – Glaciers (GTN-G), Global Terrestrial Network- Permafrost (GTN-P), Global Terrestrial Network-Ecology (GTN-E) Global Terrestrial Network- Hydrology (GTN-H), Global Terrestrial Network- Carbon (FLUXNET) and other networks which monitor land-use, land cover, land-use change and forestry, fire distribution, CO₂ flux, and snow and ice extent. These observations would be appropriate for Tanzania since the phenomena to be observed do exist in the country, e.g. glaciers and permafrost on Mount Kilimanjaro, wild fires and/or loss of land cover and forestry. Such observations would provide information and data essential for implementation of Multilateral and Regional Environmental Agreements related to biodiversity and desertification and drought.

- **Remote sensing**

Radars

TMA has been operating in a difficult situation due to lack of necessary remote sensing equipment. There used to be 4 weather radar-observing systems in 1970s, located at Dar es Salaam, Kilimanjaro, Mwanza and Mtwara. However, these have long ceased to function for various reasons including old age and change of technology. Radar observing systems help to detect and track microsystems such as severe storms, tropical cyclones, tornadoes, wind shear etc. Recently the government purchased one new radar, this could enable TMA to provide accurate services and warnings of impending disasters and improvement in nowcasting. According to the TMA the cost for one set of radar is estimated to be US\$ 2.8 million.

Satellite

METEOSAT data are at the Dar es Salaam TMA Central Forecast Office. There is need to have a satellite receiver for polar orbiting satellites to enable TMA to provide better forecasts and rainfall estimates. The METEOSAT which use the satellite technology it is estimated to cost US\$ 0.5 million.

Table 8: TMA station network

Description	Number of stations		
	Current	Operational	Needed total
Surface synoptic stations	26	26	70
AWS	14	5	80
Agromet stations	15	15	35
Ordinary climate stations	150	60	250

Rainfall station	2056	600	2500
Marine weather station (offshore)	-	-	15
Lake weather station (offshore)	-	-	16
Upper air stations	4	1	4
Radiowind	-	0	1
Pilot Balloon	5	-	5
Wind profiler	-	-	
Weather Radar	0	0	7
Lightning	0	0	
GAW	0	0	-
Radiation	8	3	3
Ozone	-	-	1
Bouys	-	-	15
Bouys with meteorological obs.	-	-	15
Tidal with meteorological obs.	-	-	5
Seismic station	-	-	8
Satellite receiving station MSG	1	1	1

4.1 Constraints to systematic monitoring/ observations network in Tanzania

- Inadequate Financial Resources

The main sources of TMA's financing are government budgetary allocations (74%) and revenue from the Tanzania Civil Aviation Authority (TCAA) and the Tanzania Airports Authority (TAA) (12.5%). There are expectations of raising revenue from TCAA and TAA to 25%. Other sources include loans from banks and grants from donors, mainly to support training and equipment. Other potential sources of fund include UNFCCC through GEF, NEPAD and AU.

- Low Network Coverage

The distribution of the network of stations in Tanzania is less than the WMO recommended density of 2.5 degrees of Longitude Square between stations. The distribution of these stations is not even, some parts of the country have a very high concentration of stations and others having very few. This is because distribution of stations is based on the human population. Areas with high density of population distribution have relatively high concentration of stations. There are areas with concentrated activities of agriculture basically in the north eastern and southern highlands and Lake Victoria basin which requires high network coverage of the observation systems.

- Shortage of Essential Meteorological Instruments and Equipment

Many of the instruments and equipment were installed more than 30 years ago thus aged, obsolete and beyond repair due to non-availability of compatible spares. Recording instruments are worse-off than ordinary instruments as they lack charts, ink, pens and spares for unserviceable clock mechanisms. There is no single station with a complete working automatic rain-gauge. Meteorological enclosures for most stations are not of WMO standard form.

- **Poor Telecommunication Facilities**

For real-time data, HF-radios, telephones and dedicated teleprinter lines are used. These unfortunately experience frequent breakdowns. Besides, the operational costs for the present telecommunication system are very high. There is, therefore, a need for modernization through adoption of the most up to date, cost effective and efficient way of receiving and transmitting meteorological data and information within the country and internationally through the GTS.

- **Replacement of analog telecommunication system with digital system**

The current telecommunication system though has 3 automatic links, one for Dar es Salaam and Nairobi, it is outdated, fragile and subject to frequent failure resulting in unacceptable breaks in transfer of data and products. There is need to switch from analog to digital system.

- **Lack of Maintenance, Calibration and Inspection**

TMA has shortage of technical workforce to service its instruments and equipment. In addition, it lacks modern maintenance and repair workshop to service meteorological instruments and equipment. Instrument calibration laboratory is also lacking.

Corrective and preventive maintenance is a key in ensuring quality meteorological data. It is important to enhance regular preventive maintenance. Due to the budget constraint, corrective and preventive maintenance are not carried as required.

5. WEATHER / CLIMATE FORECASTS

5.1 Types of weather forecast

There are four types of weather forecast done at TMA, namely;

- Daily weather forecasts
- 10 days forecasts
- Monthly forecasts
- Seasonal forecasts using physical-statistical methods

Weaknesses

- The 10 days weather forecast does not reach the end users (the general public including farmers) on time. It takes 5 days to produce the forecast and another 5 days or more to distribute it through post mail. Timely distribution is only possible to about 50 recipients through emails

5.2.Cooperation with Global and Regional Institutions

Tanzania like any other developing country is prone to extreme climate events such as droughts and floods, as well as to climate change impacts. These extreme events have severe negative impacts on key socio-economic sectors in the country and other countries in the sub-region. In view of this Tanzania through TMA is cooperating with various regional and international organizations in monitoring the extreme events and climate

change.

In 1989, twenty four countries in Eastern and Southern Africa established a Drought Monitoring Centre with its headquarters in Nairobi (the DMCN) and a sub centre in Harare (Drought Monitoring Centre Harare – DMCH) in response to the devastating weather related disasters. In October 2003, the Heads of State and Governments of the Intergovernmental Authority on Development (IGAD) held their 10th Summit in Kampala, Uganda, where DMCN was adopted as a specialized IGAD institution. The name of the institution was at the same time changed to IGAD Climate Prediction and Applications Centre (ICPAC) in order to better reflect all its mandates, mission and objectives within the IGAD system.

The ICPAC is responsible for seven member countries namely: Djibouti, Eritrea, Ethiopia, Kenya, Somalia, Sudan and Uganda as well as Burundi, Rwanda and Tanzania, while DMCH is responsible for all SADC member states.

Both centres, ICPAC and DMCH were formulated with the vision of becoming the viable regional centres of excellence in climate prediction and applications for climate risk management, environmental management, and sustainable development. Tanzania because of its location and climate it belong to both centres.

TMA cooperate with ICPAC and SADC-Drought Monitoring Centre (DMC) in following areas;

- Development of Regional Climate forecasting on seasonal time scale.
- Expert attachment program
- Capacity building and training
- Greater Horn of Africa Climate Outlook Forum (GHACOF)
- Data exchange

TMA also cooperates with other regional and international organizations and institutions which include the following;

- Pretoria Regional Specialized Meteorological Centre (RSMC) - Severe Weather Forecasting and capacity building
- Re-Union RSMC on tropical cyclone matters
- National Oceanic and Atmospheric Application (NOAA) and National Centre of Environment Prediction (NCEP): Cooperation on expert attachment program through African Desk.
- TMA and NCEP (NOAA) are cooperating through data and product exchange. Generally the cooperation is in three areas (training, operations and research).
- African Centre for Meteorological Application and Development (ACMAD) - Development of Climate forecasting on seasonal time scale, expert attachment program, capacity building, training and data exchange
- WMO – All meteorological and related issues
- ICAO - Aviation
- UNEP - Environment
- ISDR – Disaster management
- Agricultural and hydrological Institutions - Data collections and exchange including rainfall and soil moisture

5.3 Early Warning System

Tanzania is affected by frequent weather related natural disasters, the main ones being droughts, floods, severe storms, tornadoes, strong winds, and tropical cyclones. These cause big losses of human life and livestock, property destruction and damage of roads and rail systems. The droughts in 1983, 1987, 1993, 2003 and 2005 were the worst having affected millions of people. Earthquakes happen and they have caused death of several people. The Indian Ocean tsunami in 2004 caused the death of 10 people while unknown number went missing. Epidemics occurs frequently affecting thousands of people. Losses caused by the above disasters could be minimized by accurately monitoring and forecasting these extreme events, and issuing timely warnings and advisories so that mitigation and contingency measures are taken. Relief operations also require weather information.

TMA operates on 24/7/365 basis. It is responsible for weather monitoring, data analysis, prediction of extreme or adverse weather events likely to endanger life and property and issue of corresponding warnings. TMA is a designated focal point for tsunami, and is responsible for issuing warnings for tsunami. TMA currently receives international tsunami warnings for tele-tsunamis from the Pacific Tsunami Warning Center and from the Japan Meteorological Agency. The messages are received by the meteorologist on duty (analyst) at TMA through Global Telecommunication System of WMO, fax and email.

5.4 Climate Change modeling

TMA is in its infancy stage on issues of Climate Change Modeling, however, has started to develop technical capacity on the same. More than 4 TMA staff have participated in short-term courses on climate change modeling. Another constraint was due to lack of super computers for running GCMs for climate change modeling.

5.5 Possible Areas for Assistance

In order for TMA to perform its duty efficiently, the following are the proposed areas for possible assistance;

a) Capacity Building

- Basic and specialized meteorological training e.g. in Numerical Weather Prediction modeling
- Computers for modelling laboratory

b) Institutional capacity to monitor the weather and climate of Tanzania through

- Increased surface station network (Synoptic and Automatic weather Stations), upper air observing stations
 - Efficient telecommunication system
- c) Satellite Remote sensing capability
 - d) Weather Radar network
 - e) Data Resuce - Digitization and archiving of original old manuscripts
 - f) Training school expansion (class rooms, hostel, library)
 - g) National Meteorological Centre (TMA Headquarters) building

In general a major issue would be to work with development of the institution, management processes, financial sustainability, and development of systems for efficient dissemination of data and setting priorities.

6. THE NATIONAL FOOD SECURITY ISSUES

Food Security issues are dealt with by the National Food Security Division in the Ministry of Agriculture Food Security and Cooperatives. The Division is responsible for formulating and reviewing policies on food security including food aid policy; formulating strategies and programmes on food security; carrying out overall monitoring of food crop sub-sector and liaising with the National Food Reserve Agency (NFRA) and the Disaster Management Department of the Prime Minister's Office on all issues related to food situation in the country.

In addition, the Division is responsible for disseminating post-harvest technologies with a view to reduce post-harvest losses, add value and promote utilization of food crops. The main objective of the Division is to ensure that sustainable food security for all citizens is maintained at all levels and at all times. The division has two sections dealing with Pre and Post Harvest Management Services Section.

The Crop Monitoring and Early Warning Section is responsible for monitoring the country's food crops at all stages from planting through growth to harvesting, food stocks and price movements. The section provides early warning signals and recommends interventions to overcome adverse food situations.

Specifically the activities of the section include preparing preliminary and final food production forecasts, providing early indication of problems of food shortage in the country and advising on proper balancing of food levels across the country. Other activities include provision of reports to Government on position of food levels in the country, to determine levels of food imports and exports and to liaise with the National Food Reserve Agency (NFRA) and the Disaster Management Department in the Prime Minister's Office on all issues related to food situation for appropriate decisions and actions. It also, in collaboration with PMO, other Government Ministries and Institutions UN- organisations (e.g. .FAO, WFP, UNICEF), FEWS NET other NGOs and stakeholder carry out Vulnerability Assessments in areas affected by food shortages in which food insecure population are identified and the necessary interventions including amount of food and seed assistance required by the vulnerable people are determined. The section at

times carries out some specific studies that are geared to suggesting specific actions for a specific food security problem e.g. A study on climate change and its effects on food security was carried out in collaboration with experts from IRA, University of Dar es Salaam.

On the other hand, the Post Harvest Management Services Section is responsible for reviewing and providing guidelines for food crop handling, food crop storage and structures, food crop processing and preservation and food utilization. In addition, the Section is offering advisory services on food crop based nutrition, food quality and standards, building capacity of RS and LGAs on post harvest management and providing technical backstopping services. The aim is to promote post harvest management services with a view to reduce post harvest losses, add value and promote utilization of food crops.

Such activities include among others: training to LGAs on storage, processing and utilisation of food crops particularly, cassava, sorghum, fruits and vegetables; Stakeholders' consultation on available technologies for blending of food crops to collect their views and information that will assist in the preparation of guidelines for blending of food crops (the idea here is that blending of food crops will expand food basket, diversify uses, increase production and farmers' income); training of LGAs as part of capacity building towards the development of DADPs that are geared to improving their household food security and food storage respectively; Technical backstopping on processing technologies and dissemination of post harvest and processing technologies for food crops during various national shows like World Food Day, Nane Nane, Local Government and Ushirika (cooperative) day, etc.

6.1. Food Security Vulnerability Assessment

The Food Security and Vulnerability Assessment (FSVA) is designed to provide data on food security and vulnerability in the country. The general assumptions in conducting these assessments are to provide a baseline data set on food security and vulnerability of the population. The assessment first looks at available secondary data. Then, primary data are collected at household level in order to cover five objectives:

- Who are the food insecure people in Tanzania?
- How many are they?
- Where is the food insecure?
- What are the causes of food security in Tanzania?
- What are the implications for programming and is food aid the best option?

6.2. Stages on Food Security Vulnerability Assessment (Early Warning system) in Tanzania

- Preliminary Food Production Forecast Survey or Final Food Production Survey
- Rapid Vulnerability Assessment (RVA) - The objectives of the RVA are to: 1) ascertain the impact of the food production shortfall including other hazards on food availability, access and utilization among food insecure populations in

affected areas; 2) identify populations likely to experience food insecurity during the period consumption year most vulnerable to food insecurity in the affected areas and 3) determine and recommend appropriate short, medium and long term interventions for those populations.

- Final survey

6.3 Collaborating partners in Food Security Vulnerability Assessment

Under the Prime Ministers Office in collaboration with Ministry of Agriculture and Food Security (Food Security Division) formed a team known as The Food Security Information Team (FSIT), which mandated to undertake Food Security Vulnerability Assessment in collaboration with various partner agencies. The collaborating partners for Food Vulnerability Assessment comprise the following:-

- **Government Ministries and Institutions:** Prime Minister's Office (Disaster Management Department), Ministry of Agriculture Food Security and Cooperatives (National Food Security Division), Ministry of Livestock Development and Fisheries, Vice President's Office (Division of Environment), Tanzania Meteorological Agency, Tanzania Food and Nutrition Centre and Sokoine University of Agriculture,
- **International and Local Organizations (NGOs):** Food and Agriculture Organization (FAO), United Nations Children's Fund (UNICEF), World Food Programme (WFP), Famine and Early Warning Systems Network (FEWS NET), Oxfam, CARITAS, Save the Children and World Vision and
- **Regional and Local Authorities:** Regional Administrative Secretaries (RAS), Regional Agriculture Advisers (RAA), District Executive Directors (DED) and District Agricultural and Livestock Development (DALDO) and their technical staff.

Traditionally the FSIT has been employing assessment methodologies based primarily on food crops production. The methodology employed in RVA involve a more comprehensive food security and nutrition approach adopted from the Integrated Food Security Phase Classification (IPC), which integrates broad livelihood-based indicators such as food supplies and prices, nutrition, access to water, livelihood assets and coping strategies. This is a holistic approach in food insecurity and vulnerability assessment.

6.4. Decision Structure

The Food Security Information Team (FSIT) is chaired by the Disaster Management Department, and the National Food Security Division is the secretary to the team. The final decision on how to implement the suggest interventions on food security assistance is done by the Prime Minister's Office through a Tanzania Disaster Relief Committee (TANRDREC) (A inter-ministerial of Permanent Secretaries) by using the recommendations from the FSIT.

TANDREC - Tanzania Disaster Relief Committee is a committee of Permanent Secretaries of some key Ministries and some co-opted CEO of some institutions as follow;

1. PS - Prime minister's Office - (Chair Person)
- 2.. Director -Disaster Management Department - PMO- (Secretary)
3. PS. Ministry of Finance and Economic Affairs - (Member)
- 4.. PS - Regional and Local Government Administration PMO-RALG -(Member)
5. PS- Ministry of Agriculture Food Security and Cooperatives - (Member)
6. PS - Ministry Infrastructure Development -(Member)
7. PS Ministry of Community Development Gender and Children - (Member)
8. PS Ministry of Health and Social Welfare - (Member)
9. PS- Ministry of Minerals and Energy - (Member)
- 10 PS Ministry of Defense (Member)
11. PS- Ministry of Livestock and Fishery Development - (Member)
- 12 PS- Ministry of Water and Irrigation- (Member)
13. PS – Vice President's Office (Member)
14. CEO- National Food Reserve Agency (NFRA) - (Member)
15. Director - Tanzania Meteorological Agency (TMA) - (member)
16. Commissioner - Fire Control Services (Member)

The list may not be exhaustive but it is constituted depending on the type of disaster at hand. There are also regional and District Disaster Committees at lower levels.

6.5 Strategies for Addressing Negative Effects of Climate Change in Food Insecure Areas in Tanzania

The Government through Ministry of Agriculture and Food Security conducted a study on strategies for addressing negative effects of climate change in food insecure areas of Tanzania in line with the National Adaptation Programme of Action (NAPA). The work is a joint venture with the Institute of Resource Assessment (IRA) of the University of Dar es Salaam and the Division of Environment in the Vice President's Office.

The main objective of this study was to identify and enhance adaptive strategies for addressing negative effects of climate change in areas with recurrent food shortage consistent with the Ministry of Agriculture's goal towards sustainable food security in the country. The specific objectives were:

- i. To establish the perceptions of climate change and its influence to food security in selected agro-ecological zones.
- ii. To assess the impact of climate change on crop production. (Analyze the effects of climate change on various crops in different agro-ecological zones).

- iii. To assess the impact of climate change on food security (Flash back on food security status in Tanzania relating production and requirement overtime in an attempt to establish climate change impact on food security).
- iv. To examine existing adaptive capacities of local communities to climate change and variability in relation to food insecurity.
- v. To predict consequences of climate change on crop production using climate scenarios.
- vi. To propose adaptation strategies in line with study objectives.

6.5.1 Major Conclusions on Food Security Issues

Major socio-economic activities are crop production, livestock keeping followed by petty business and crop trading. In improving food security implies that all sectors are important as a strategy towards diversification. Communities have a clear perception that climate has changed and the change has involved variability in rainfall patterns, temperature patterns, wind velocity, and ground water regimes. There is a general feeling that rainfall amount over the last 20 years has been decreasing while temperatures have increased.

The main indicators of climate change include changing patterns of rainfall seasons in which both March –May (MAM) and October – December rainfall seasons over bimodal areas of Tanzania are decreasing from east to west. Other notable indications include increased frequency of dry spells, shortened rainfall seasons with a likelihood of increased incidences of droughts translating into decreased crop productivity and increased temperatures. Enhanced temperatures due to climate change are likely to trigger both water and air borne diseases including highland malaria, diarrhoea and respiratory infections to human beings and to livestock and crops including mildews.

Generally, it has been observed that there is a general decline in crop productivity in all the areas partly due to climate impact and partly due other factors e.g. shortage of land and other agricultural inputs etc. The main causes of food shortages were noted to be those related to natural factors such as drought, floods, strong winds and excessive rainfall. Crop diseases, crop pests, low soil fertility, lack of labour and weeds were also noted to contribute. Other reasons included: coldness, lack of agricultural inputs, small farm sizes, destructive birds and use of local varieties. Birds such as quelea quelea have been very destructive and lead to serious food shortages.

Multiple adaptation strategies include incorporating indigenous knowledge (IK) which will involve strategies of growing of fast maturing crop varieties, growing of drought tolerant crops, irrigation, mainly involving wetland cultivation and storage facilities of excess food during good seasons. Afforestation and reforestation processes as well as promotion of sustainable livestock keeping to be encouraged countrywide.

It is proposed that the government should provide subsidies on agricultural inputs on seeds, pesticides and fertilizers as the costs are currently too high. An awareness campaign to encourage farmers to use locally available manure and the second strategy is to enhance irrigated farming and avoid the fluctuating climate. Extension services were

reported as inadequate and under capacitated to provide education on better agricultural practices, climate change, and environmental conservation. Support on micro financing was found critical to with the establishment of credit facilities such as SACCOS and non-restrictive agricultural loans from banks.

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- Acting Director General of TMA – Mr. Tibaijuka
- Director of Research and Applied Meteorology – Mr. Martin Lukando
- Director of Business Support Services – Mr. Rashid Mkwesi
- Ag. Director of Forecast Services – Mr. Mohamed Matitu
- Director of Policy and Planning – Ministry of Agriculture and Food Security
- Division of Food Security - Ministry of Agriculture and Food Security
- Director of IRA at the University of Dar es Salaam – Prof. Pius Yanda