# FINAL REPORT

# Climate change and rural livelihoods in Malawi

*Review study report of Norwegian support to FAO and SCC in Malawi, with a note on some regional implications*

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## Acronyms

| | |
|---|---|
| ADP | Malawi Government Agricultural Development Programme |
| ARDEP | Agriculture Research and Development Programme |
| AU | African Union |
| CAADP | Comprehensive Africa Agriculture Development Programme |
| CARD | Centre for Agriculture Research and Development |
| CGIAR | Consultative Group on International Agricultural Research |
| CICERO | Center for International Climate and Environmental Research - Oslo |
| CIDA | Canadian International Development Agency |
| COMESA | Common Market for Eastern and Southern Africa |
| Danida | Danish International Development Assistance |
| DfID | (UK) Department for International Development |
| FANRPAN | Food, Agriculture and Natural Resources Policy Analysis Network |
| FAO | Food and Agriculture Organization of the United Nations |
| GECAFS | Global Environmental Change and Food Systems |
| GoM | Government of Malawi |
| ICRISAT | International Crops Research Institute for the Semi-Arid Tropics |
| IPCC | Intergovernmental Panel on Climate Change |
| NAPA | National Action Plan for the Adaptation to Climate Change (Malawi) |
| NASFAM | National Association of Smallholder Farmers of Malawi |
| NEPAD | New Partnership for Africa's Development |
| SADC | Southern Africa Development Community |
| SCC | Swedish Cooperative Centre |
| UNDP | United Nations Development Programme |
| UNEP | United Nations Environment Programme |
| WB | The World Bank |

# 1.0 Introduction: climate change issues

Since the early 1980s it has become apparent that our Planet may undergo significant climate change. The general opinion is now (IPCC, 2007) that this is indeed taking place, and is significantly a result of human activities. The IPCC report further indicates that the short-term (next few years), medium-term (next few decades) and long-term (centuries) effects are difficult to predict accurately. Rapid changes in weather patterns create added uncertainties to activities that are directly or indirectly affected by the weather. For countries whose economies largely rely on agriculture and other primary rural industries (e.g. Malawi), additional uncertainties in temperature patterns (highs and lows, seasonalities), intensities of received ultraviolet radiation, rainfall patterns (volumes, frequency, intensities, seasonalities) and wind patterns (extremes, seasonalities) compound to challenge the decisions rural people must take in respect to their activities.

However, the various climate models presented by IPCC (IPCC, 2007) for global climate change vary in their predictions for Malawi (and most other countries) and for the Southern African regions. Indeed, there is no way to pretend to be accurate at the larger national scale or even regional level. What they all predict, however, is increased climatic uncertainty, even at national scale. Most models, even at a coarse scale, predict higher temperatures and possibly higher rainfall for Malawi. The current changes in weather patterns in Malawi as observed by the Malawi Meteorological Service and noted by all farmers include higher temperatures, delayed and shorter rainy seasons and increased intensity of rainfall. Scientifically speaking it is too early to be certain that these current patterns reflect trends in possible longer-term climate change.

Decision taking under uncertainty is nothing new to rural people, Malawian farmers and fishermen included. They have developed coping mechanisms that have brought their communities and societies to their present levels. In general, rural communities in low-income countries are risk-averse, i.e. their coping mechanisms favour robust activities that can accommodate significant but known unpredictabilities in weather. Global climate change studies indicate that some countries, including Malawi, may expect increases in weather uncertainties, thus making decision-taking more difficult, and possibly even requiring coping mechanisms that are currently not known to local communities, too expensive to implement even if known, or mechanisms that are currently under development in research environments not easily accessed by poor rural people. However, over the years Malawian agriculture has become specialized, with significant emphasis on maize production for household consumption, and tea and tobacco growing. The maize emphasis has had strong political backing. In general, specialization in agriculture increases vulnerability to vagrancies in weather (and markets) ("all eggs in one basket"), but can also lead to windfalls if conditions remain good.

Climate change may also require shifts in emphasis in already known and practiced coping mechanisms. Ambitions to create further development (e.g. eradication of undernutrition of children, poverty alleviation, stronger income-generating activities) or to ensure sustainable development (maintaining or increasing the total capital, composed of social capital, institutional and nature capital) inherently rely on our ability to take advantage of any positive effects of climate change, and to successfully adapt to apparently negative effects thus minimizing negative impacts.

Malawi's contribution to global emissions of greenhouse gases that are regarded as main drivers of climate change is small and was estimated at 29M tons in 1990, of which 5% was attributed to agriculture (but 68% to land use changes, including deforestation)(GoM, 1997). In a global context and being a largely agricultural country, with small components of livestock ruminants and rice production (known emitters of methane), limited burning of rainforests and crop residues, and small industrial and transport components (all $CO_2$ and $NO_x$-emitters), the global impact of any Malawian efforts to mitigate climate change will probably be small. However, they could not necessarily be discouraged, indeed adaptation practices to climate change may result in mitigation, e.g. reduced burning of crop residues.

But similarly increased reliance on ruminants as a coping mechanism for farmers may cause increased emissions of greenhouse gases. Climate change in Malawi will therefore largely be a function of emissions elsewhere. Malawi's challenge is, as noted above, to attempt to adapt to climate change in Malawi. However, Malawi could join in global mitigation efforts, most likely those related to carbon sequestration, where incentives to increase carbon storage in soils and vegetation in Malawi could facilitate actions at local level and create useful additions to nature capital, in addition to potential financial gains for the participating communities and individuals. The carbon sink in 1990 was estimated at 1.321G t (GOM, 1997). Malawi also has significant terrestrial and aquatic resources of biological diversity that may become relevant in future efforts to minimize the effects of global climate change (GOM, 2006). Such resources constitute valuable components of Nature Capital and could attract outside investments.

Specific efforts are underway in many developing countries to design and implement projects that include elements of mitigation of and adoption to climate change. The UN family certainly considers adaptation issues, e.g. within FAO, UNEP, UNDP, WHO, WMO and The World Bank. Malawi has drafted a National Action Plan for the Adaptation to Climate Change (GOM, 2006a), which, however, has yet to be accepted and implemented. Currently, there is no Norwegian development assistance to Malawi, neither in bilateral nor multilateral contexts, that has specifically targeted climate change activities in its portfolio. However, some components in Norwegian-sponsored projects in Malawi stressing sustainability and livelihoods may incidentally be closely related to components that are often considered as central in projects specifically designed for mitigation of and adaptation to global climate change. (This, incidentally also apply to many – if not most – development activities undertaken in Malawi, whether financed from internal or external sources). However, it is important to note that the most recent draft of the Malawi Government Agricultural Development Programme (GOM, 2007) has scant reference to climate change as a feature to be considered in Malawian agricultural development.

Despite these constraints, the government of Malawi has undertaken several actions and projects in relation to climate change. It signed the United Nations Framework Convention on Climate change (UNFCC) during the United Nations Conference on Environment and Development (UNCED) in 1992. It is also a signatory to the Convention of Biological Diversity CBD) and developed the National Environmental Action Plan in 1994 (GOM, 1994) after recognising the threats caused by climate change especially the adverse impacts of droughts and floods. Several development partners have also supported projects that are promoting rural communities to adapt to climate change.

The Norwegian government has recently emphasized the need to look at development activities through a *climate change lens*. Realizing the impact of climate change on rural livelihoods in Malawi, a review of two relevant projects was commissioned by the Royal Norwegian Embassy, Lilongwe, to (i) to assess the sustainable livelihoods project currently supported by its Embassy in Malawi within the context of climate change and its predicted impact on agricultural development and food security in Malawi and (ii) to assess the potential efficiency benefits to Norway of establishing a Norwegian Strategic Framework for investing in Climate Change response in Southern Africa. To achieve these objectives, the study team visited projects sites in Balaka, Mangochi and Salima, extensively reviewed the literature on several programmes and projects in relation to climate, and organized consultative meetings with relevant stakeholders from government, donor agencies and farmer associations.

This is a report which addressed two objectives. In the first objective are study findings of two sets of Norwegian sponsored projects in Malawi (that were designed as rural livelihood projects with strong emphasis on sustainability) through an 'adaptation to climate change lens', with a further note on any mitigation effects the implemented or planned project interventions may have. In the second objective are suggestions on how a strategic framework for investing in climate change response could give efficiency benefits to Norwegian development assistance, and – we believe - for development in Malawi and other Southern African countries.

## 2.0 Objectives

The study review had two broad objectives each with specific tasks to be achieved. Firstly, the team assessed the sustainable livelihoods projects currently supported by Norway in Malawi within the context of climate change and its predicted impact on agriculture development and food security. Specifically, the study was commissioned to (i) to help FAO and SCC to further define and focus its roles and responsibilities in supporting the mainstreaming of the climate change agenda within a rural livelihoods development thrust (ii) to assess eventual challenges or additional actions that could be undertaken that would represent good practices for adaptation to climate change and in the context of climate change, agriculture and sustainable and management (iii) to develop recommendations as to how, if feasible important linkages to other Norwegian supported projects could be developed in particular ADERP and NASFAM.

Secondly, the review assessed the potential efficiency benefits to Norway of establishing a Norwegian Strategic Framework for investing in climate change response in Southern Africa. Specifically, the study was set to (i) to review the draft UNDP 'climate change risk assessment study report (ii) to review existing work plans of ARDEP, CARD and Miombo Climate Change Research Network (iii) to review the UNDP-UNEP Environmental and poverty linkage assessment and the GECAFS Science plan for Southern Africa (iv) to review the new work programme on development and climate change at CICERO and finally (v) to review FAO-supported initiatives in order to develop the missing spatial datasets that can be used to assess impacts of climate change and various adaptive response options under different climate change scenarios for Malawi and promote local and policy dialogue around the assessed options

## 3.0 Study review methodology and process

The study was conducted from November 15th to 23rd, 2007 and employed mainly qualitative methods to collect data, which ensured maximum participation of the key stakeholders. Qualitative research methods included participatory methods (PRA) involving focus group discussions and key informants at village level and direct observations among others. Formulation of research guidelines was done by the consultants based on initial review of key documents highlighted below and the terms of reference of the study. The study team spent the first day in planning and organizing the whole study involving technical experts from FAO, SCC, ARDEP, UNDP/UNEP, UNDP, Noragric, Bunda College and the Norwegian Embassy. During the meeting a brief background to the study and programmes undertaken was presented by the Norwegian Embassy, FAO and SCC (see appendix 1 for a list of participants).

### *3.1 Project assessment*

To achieve the first objective, the study team together with representatives of the projects selected and visited nine (9) sites in Balaka, Mangochi and Salima districts where Norwegian-funded sustainable livelihood project are being undertaken (see Table 1). The project was assessed against its objectives, activities, work plan and achievements in the light of climate change and current knowledge.

**Table 1. Projects sites visited by the study team**

| *Project* | *District* | *Site* | *EPA* | *Date* |
|---|---|---|---|---|
| *FAO* | Balaka | Kuthambo | Phalula | 15-11-07 |
| | Mangochi | Matungwi | Ntiya | 15-11-07 |
| | Mangochi | Ang'ona Irrigation | Mbwadzulu | 16-11-07 |
| | Mangochi | Nasenga | Nasenga | 16-11-07 |
| *SCC* | Salima | Tembwe | Tembwe | 17-11-07 |
| | | Kalonga | Tembwe | 17-11-07 |
| | | Chimwemwe | Khombedza | 17-11-07 |
| | | Songondileya | Khombedza | 17-11-07 |
| | | Mbuna | Khombedza | 17-11-07 |

In analysis of sustainability, the study team tried to assess how the impact of the project may be sustained after FAO and SCC funding phases out. In particular, the team assessed the projects in relation to several issues covered in Table 2. Secondly, consultations were done with key stakeholders from Ministry of Agriculture, FAO and SCC. Thirdly, village meetings were conducted to get feedback from the community using PRA tools and finally interviews were conducted with key informants within the project sites to complement information from village meetings.

**Table 2. Criteria used to assess FAO and SCC projects**

| *Criteria* | *Factors considered* |
|---|---|
| *Alternatives to agriculture* | More alternatives to agriculture e.g. remittances, fishing, non agricultural businesses, market access |
| *Rural urban migration* | High rural to urban migration |
| *Impact on women* | More than 70% of women participating |
| *Means of communication* | road infrastructure, rail network, phone facilities |
| *Livestock* | Number, types and usage, compatibility with current interventions |
| *Soil and water conservation* | Coverage of best bet technologies |
| *Labour availability* | Gender, qualification, usage |
| *Technologies* | Land management technologies, |
| *Challenges* | Water availability, markets, means of communication |
| *-Capital availability* | Social, economic, nature capital, synergies |
| *Stakeholders* | Number of stakeholders working in the area |
| Others include prone to floods and drought, rainfall pattern, deforestation rate, project design & sustainability, level of community participation and involvement of the youth and other organisations | |

### *3.2 Programme review*

Three programmes supported with funds from the Norwegian government were also reviewed. These were National Association for Smallholder Farmers of Malawi (NASFAM), Agricultural and Research Development Programme (ARDEP) and Centre for Agricultural Research Development (CARD) at Bunda College, University of Malawi. A checklist was used to solicit information of current projects and activities, challenges and constraints faced, area of support and future plans in relation to climate change. The study team also asked the experts the advantages of establishing a regional network on climate change in Southern Africa supported by the Norwegian government. Interviews and experts meetings were held with Programme Directors, Heads of institutions and Line Managers. Relevant documents including annual and strategic work plans for some of the organisations were also were also reviewed to identify thematic areas that can be linked to climate change.

### *3.3 Consultative meetings*

In addition to reviewing the three programmes supported by Norway, consultative meetings were also held with FAO and SCC technical team, staff from Machinga ADD, Opportunity International Bank of Malawi (OIBM), Department of Agricultural Research, Meteorological Department, Ministry of Environmental Affairs, World Bank and ICRISAT. These consultations were conducted to understand some of the activities undertaken by the stakeholders and identify some of the areas that are specifically targeting climate change issues.

### *3.4 Review of key documents*

To achieve the second objective of the study, firstly the team reviewed the following key documents as outlined in the terms of reference:

- Climate Risk Assessment study' (Currently being developed by the UN in Pretoria).
- The UN-UNEP Environment and Poverty Linkages Assessment,
- The GECAFS Science Plan for Southern Africa;
- The existing work plans of ARDEP, CARD and the Miombo Climate Change Research Network;
- The new work programme on Development and Climate Change at CICERO,
- FAO- supported initiatives to develop the missing spatial data sets to be used to assess the impact of climate change and various adaptive response options under different climate change scenarios for Malawi, and promote local and policy dialogues around the assessed options.
- National Adaptation Plan of Action (NAPA) to Climate change.
- Sustainable Land and Water Management and food security Pillars of the ADP.
- FAO Project synopsis document, semi annual reports and special activity reports.

### *3.4 Data and information analysis*

Analysis of findings involved the participation of the core study team. The core team made judgments/conclusions on each objective under study and draw recommendations for future programming focus that can enable the two programmes for future climate change interventions.

### *3.5 Integrated entry, midterm and exit conference with the Norwegian Embassy and key stakeholders.*

There were three main meetings with the Norwegian Embassy during the study. During the entry conference, the consultants and the stakeholders were briefed on the study intent, its objective and the overall importance of the exercise on the Norwegian Embassy. During the second meeting the study team and the stakeholders discussed the study as outlined in the TORs with Norwegian embassy some stakeholders. The Consultant team finally presented the study findings to the key stakeholder and inputs from the stakeholders were incorporated before submission of the final report.

## 4.0 Previous and current work on climate change in Malawi

Several stakeholders have embarked on climate change related programmes since the 1992 Earth Summit. To begin with, the government has developed an inventory on the status of climate related issues at country level (GoM, 1997). It has also produced the Vulnerability Assessment report (GoM, 2002a). There is also a report on research and systems observations Malawi (GoM, 2002b), and an institutional coordination system at country is in place. A climate change risk assessment report was completed in 1990.

A national climate change committee to coordination issues of climate change chaired by the Director of Meteorological services was established in 1990. At country level, the First National Communication Report (GOM, 2002c) and National Adaptation Plan of Action (GoM, 2006a) have detailed specific projects to be implemented. A National biodiversity strategy and action plan was completed in 2006 (GOM, 2006). Some of these projects have been funded by African Development Bank (ADB), and Global Environmental Fund (GEF). The Department of Forestry is also promoting tree planting for as a mitigation measure to climate change *visa- a-vis* carbon sequestration. Other programmes by the government of Malawi include energy-barrier removal to renewable energy, rural electrification and alternative sources of energy.

Several initiatives are being undertaken by the government, NGOs and faith based organisation at local and country level. For example, United Nations Development Programme is supporting the government in the Lower Shire. Ministry of Agriculture is embarking on an adaptation project covering land, water and soil conservation. Centre for Agricultural Research Development (CARD) is conducting research supported by DFID on building disaster resilient communities (BDRC) in partnership with Evangelical Lutheran Development Services. The World Bank is supporting the Malawi Agriculture Sector Development Project where the Bank's Commodity Risk management Group is strengthening risk management strategies. In the group the Bank is working with public and private stakeholders to test multiple strategies for reducing or mitigating risks associated with droughts (or severe flooding).

CARD is currently a node of Global Environmental Change and Food Systems (GECAFS) and Food, Agriculture and Natural Resources Policy Analysis Network (FARNPAN) regional initiatives, that aim to determine strategies to cope with the impacts of global environmental change e.g. climate change on Southern African food systems; to assess environmental and socio-economic consequences of adaptive responses aimed at improving long term food security. Agricultural Research Development Programme (ARDEP) supported by the Norwegian Government is undertaking research and outreach programmes on climate change related issues. Opportunity International Bank of Malawi (OIBM) together with NASFAM have partnered on weather risk insurance programme on tobacco and groundnuts in central region of Malawi. The Food and Agriculture Organization of the United Nations (FAO) is supporting an initiative to build-up missing spatial data that will assist in assessing/evaluation of different climate change related interventions.

Some NGOs such as Action Aid Malawi DFID are supporting climate change adaptation activities in Nsanje and Salima districts. In Nsanje with support from DFID, Action Aid is working with communities on river management. The communities are also planting trees to fortify the river bank and rehabilitate the river catchment. Irrigation is also being undertaken because of floods and water scarce in many parts. Action AID is also carrying out awareness campaigns on disaster risk reduction and early warning systems for floods and droughts and promoting capacity building at district level. River diversion to minimize the impact of flooding on communities is also being promoted in Salima. Some civil societies have also organised several national workshops on climate change to link to disaster preparedness, as well as participated in international conferences to raise the profile of community experiences on climate change impacts and adaptation.

# 5.0 Findings on Norwegian supported projects

In general, both the FAO and SCC projects were designed without serious consideration of climate change issues. Looking at the current situation it can be indicated that despite the knowledge of information by both the technical team and the beneficiaries in changes that are taking place due to weather, simple principles that can be used to adapt to climate change have not been implemented or are overlooked in some cases implemented without proper consideration. Issues of gender, remittances, information access, education, rural-urban migration, youth participation are important and can help the communities in adapting to climate change. Below is a detailed discussion of the issues as identified by the Consultant team.

## *5.1. Environmental and socio-economic background of FAO and SCC project sites*

This section presents results from FAO project (Enhancing Food Security and Developing Sustainable Rural Livelihoods) and SCC projects (Malawi Lake Basin Project) funded by the Norwegian government. In the project sites, (Balaka, Salima and Mangochi) the average household size of 5.5 members, of which 41.2% of the households are female-headed and least 31% of the household heads reported that they had never had any formal education. The average land holding size (0.96 ha) is less than a hectare. Although the study area favours various types of crops such as maize, groundnuts, pigeon peas, cassava, sweet potatoes, etc., the households mainly concentrate on maize whose yields is far below its potential. Small scale irrigation using watering cans, treadle pumps, river diversion and motorized pumps is practiced to a limited extent in the project area.

The major crops grown under irrigation are maize, vegetables and beans while the main types of livestock kept are goats, sheep, cattle, pigs and poultry (although in small numbers). There is not much that has been done on fish farming. Capture fishing is done in parts of the Shire River, Linthipe River and parts of Mangochi. The two main sources of income are crop production (rice, cotton, maize) and livestock production (goats and chickens). Incomes from other source include '*ganyu*' and remittances. The major energy foods available are maize, cassava, rice, millet, irish potatoes, sweet potatoes and sorghum (FAO 2007a). The prevalence of acute malnutrition in the surveyed areas falls above the normal levels of expected malnutrition rates (>3%). Chronic malnutrition was still rampant in children under five years of age. Cross cutting issues include: HIV/AIDS and gender (FAO, 2007b).

Slope gradient are gentle (1 –6 %) in the Balaka and Lakeshore plains, moderate to steep (6.1–50 %) in the Namwera hills. Annual mean maximum temperatures may range between 29 - 35 $^{o}$C while annual mean minimum temperatures range is 18 - 21 $^{o}$C. The area gets approximately 500 to 1000 mm of rainfall[4] per annum on average. Generally the sites are characterized by different types of soils namely, sandy loam in Machinga District, sandy stony soils in Phalula and sand clay in Mangochi and sandy clay loam, sandy loam and silt loam soils in parts of Salima. Deforestation is still rampant in all project sites. These projects which are therefore targeting marginal farmers, women headed households, HIV/AIDS affected households, orphans and the youth mostly living in marginal areas characterised by poor soil, erratic rainfall, rampant deforestation, drought or floods making them highly vulnerable to climate change. Detailed description of specific sites is given in (Table 3).

[4] Detailed climate data was difficult to collect

**Table 3. Environmental and socio economic background information of FAO and SCC project sites**

| *Project* | *Project site* | *Background* |
|---|---|---|
| *FAO* | Kuthambo | Erratic rainfall (<700 mm pa), poor soil (stony sand), dry area, water scarcity, rampant deforestation due to charcoal business. |
| | Matungwi | Moderate rainfall, red soils, major problems hunger & poverty, steep terrain, high erosion, high migration, high dependency on remittances, deforestation of natural forest, many villages participating in the project especially women, tribal community (Yao). |
| | Ang'ona | Dry area, low rainfall (<600mm pa), erratic rainfall, forest fires, flood prone area, main problem hunger, integrated community and livelihoods (fishing and farming), women are more active than men. |
| | Nasenga | Flood prone area, moderate rainfall, rampant deforestation, clay soils, major problems hunger & poverty, flat terrain, high water table. |
| | Tembwe | Good soils, Good forest cover, forest fire, low population density, moderate rainfall, good soils (clay loam), major problem food shortage, women are more active than men. |
| *SCC* | Kalonga | Fertile (alluvial) soils, close to Linthipe river, moderate rainfall |
| | Chimwemwe | Erratic rainfall, good soils, major problems hunger & poverty, relatively flat terrain, water scarcity, rampant deforestation, 100% women group, 5 NGOS working in the area. |
| | Songondileya | Erratic rainfall, good soils, major problems hunger & poverty, relatively flat terrain, water scarcity, rampant deforestation, more women participating, 5 NGOS working in the area. |
| | Mbuna | Erratic rainfall, good soils, major problems hunger & poverty, relatively flat terrain, water scarcity, rampant deforestation, more women participating, 5 NGOS working in the area. |

Based on the socio-economic background described above the FAO and SCC projects set a number of objectives to improve the livelihood of these rural communities living in these marginal areas. The FAO project has three major objectives. Firstly it aims to promote small-scale irrigation water control and watershed management, secondly, to intensify and diversify farm production and lastly to enhance capacity building and institutional development. On the other hand, SCC has two components that aim to improve the livelihood of the rural communities along the lakeshore. The first component is business development, organisation development and democracy. The second component is to promote agriculture, fisheries and community management of natural resources. During field visits, the study team identified a number of issues such as apparent limited of technical expertise and low technology adoption among others in relation to climate change. To achieve these objectives, the two projects are implementing the following interventions: small-scale irrigation, livestock programmes, afforestation, land and water management, crop production as well agricultural input support. Table 4 has a description of site specific interventions undertaken by the two organisations.

### 5.1.1 Small-scale irrigation

Both FAO and SCC projects are promoting small-scale irrigation programmes in Mangochi, Balaka and Salima RDPs. In both projects several investments have already been undertaken including laying of pipes, construction of water canals and irrigation weirs. The project used water from the stream. The project team noted that the project had limited technical capacity among its staff. The Consultant team would have wished to have had more technical expertise available in the SCC project. Techniques such as mulching, use of compost manure, use of cover crops such as legumes are but some of the practices that can be integrated with irrigation but were not covered in the briefing given to the Consultant team. These areas are prone to drought, floods and high temperatures, therefore, protective measures could help to reduce evaporation, moderate soil temperatures, reduce soil run-off and erosion, protect fruits and other contacts from direct contact with soil and minimise weed growth.

In addition, the use of organic materials such as mulch may have enhance soil fertility, structure and other soil properties. For example, the area could promote rice production during the rain season and encourage high value crops during winter. This will allow communities to access both carbohydrates and other essential nutrients. The Consultant team felt that the range of interventions undertaken were unduly focused on engineering aspects of irrigation and less on agronomic aspects that could also help adaptation to climate change.

### 5.1.2 Livestock programmes

Goat and poultry production are the main activities being promoted by both programmes. The current approach to promote semi-intensive goat management is not only ideal for improved performance of the animals, but a proper management of agroforestry trees that are been promoted in these projects. The introduction of an exotic he-goat is also an opportunity to improve both meet and milk production that can offset malnutrition at local level. The study team was pleased with both the housing and feeding regimes promoted in these programmes. We see the potential in these activities as promoting adaptation to climate change, although the original driving forces for the goat schemes may have originated elsewhere.

Feed availability during the dry season might be one of the constraints to be faced by the beneficiaries especially in Balaka and Salima. Preserving feeding materials during rain season could be one of the possible strategies. Both projects could promote growing of pasture and other regimes that can be used as fodder, enhance soil fertility, conserve soil moisture and provide alternative food for the households. These could include Napier grass, agroforestry species, and pigeon peas among others. SCC could promote goat and other animals in Tembwe EPA in particular where the conditions are conducive for livestock management. Beneficiaries could be trained in disease control and basic breeding techniques.

### 5.1.3 Afforestation programmes

Several trees species are being promoted by the project and most of these trees are natural species (e.g. *Faidebia albida*) and some fast growing tree species like *Acacia albida.* However, very few fruit trees including those that can be easily propagated such as paw paws, granadillas and indigenous fruits have not been included. These could be promoted as they are the source of both income and essential nutrient at household level. Most of these tropical fruits can withstand several harsh climatic conditions prevailing in these locations. Other legumes and grass species could also be promoted for conserving soil moisture, animal feeds, pests and disease control. There is need to promote multiple purpose tree species that can give both immediate and long term benefits such as animals feed, human food, soil fertility improvement, soil and water conservation oil and medicine among others.

Proper management of tree seedlings after planting has been identified as the main failure in most afforestation programmes in Malawi. Criteria or mechanisms to promote tree management in the fields could be devised by the technical teams. Provision of incentives for very tree surviving every month for the first year could be considered. Proper management of bush fires and goats could also be considered by the technical teams and the beneficiaries. In some areas especially where natural forests still exist, the project could promote tree regeneration and avoid introducing alien species.

Many sites are promoting 'fashionable' tree species (e.g. *Jetropha*) without proper policy guidance. In this case caution could be taken as to how and where the trees are planted. Proper technical expertise could be provided for the communities and consultation could be encouraged between the technical teams and officials from Ministry of Agriculture, Ministry of Environment, FAO and SCC. This could also be extended to other organisations. There is need to consider introducing specific tree species in relation to climate change. Fast growing, drought resistant and multipurpose species could be encouraged. These species could provide both animal feed and improve soil structure. The approach taken by FAO to investigate the economic value of *Jetropha* in an early phase of the project is a good approach and should be done prior to an extension of the tree planting activities.

### 5.1.4 Land and water management programmes

Land and water management programmes are some of the activities promoted by FAO projects in all the sites (see Table 4). While some new technologies have been introduced such as water holding holes for the trees, stone bunds for checking water speeds could have been replaced or combined with live materials such as vetiver grass. Most of these interventions are normal land husbandry technologies that have been advocated in the country for longer time, are labour intensive and incentives could be introduced to encourage the beneficiaries most of whom are women. Furthermore, incentives could promote or enhance other activities such as afforestation programmes. Land and water management activities are forms of investment and good approaches for retaining soil moisture; these could be undertaken at catchment level where both direct and indirect beneficiaries could be engaged. Introduction of new technologies and utilisation of indigenous knowledge could be included in future programmes. This could involve collaborating with research institutions.

### 5.1.5 Crop production

Maize, which is grown by over 90% of the rural population, is the main crop in all the sites visited. Group discussions revealed that the crop is mainly for own food and less for income. Field visits have revealed that even in areas that are not ideal for the crop, the projects are facing resistance to advocate for other crops. For example in Phalula, parts of Monkey-Bay and Salima where other agricultural forms can be promoted, the beneficiaries are still growing maize. This approach to rural livelihoods is not only a risk in relation to climate change but one of the contributions to high rates of malnutrition. The other problems associated with wholesale maize production are that several labour intensive soil and water management interventions are being promoted to reduce soil loss. This has an impact on women and children who are undertaking the projects without food and incentives.

Promotion of maize crop through subsidies has also exerted pressure on project managers to provide farm inputs that are not budgeted in the projects. In addition, several crops that can be promoted have been largely neglected because of both cultural and technical constraints. Crops that are drought resistant, short duration crops such as legumes, high value crops such as chillies, root and tuber crops are not among the priority crops for the entire projects. In this case, future programmes could promote diversification of programmes that can even be integrated with livestock and other income generating activities. This study recommends that in areas such as Phalula, Monkey-Bay programmes such as bee keeping, pigeon pea production, post harvesting technologies and goat farming are but some of the livelihoods that could be promoted. Soil and water management programmes that are undertaken could continue but for the sake of maize production only. This could also include folder production that can be further processed even for sale.

### 5.1.6 Agricultural inputs, equipment and tools

Selected beneficiaries mainly vulnerable youth, people leaving with HIV/AIDS and female headed households and the aged have been provided with farm inputs by SCC. These include fertiliser and seeds. Some inputs distributed to the communities include goats, broiler chickens, irrigation equipment, tree seeds, polythene tubes, wheel bars and cement. Technical support and expertise has also been provided especially in the irrigation sector. In response, all the communities have provided land, local building materials, labour as part of their contribution. In many clubs, this has been quite encouraging though dominated by women.

## *5.2 Challenges and opportunities in relation to climate change- FAO*

First and foremost, most of these programmes are being undertaken in environmental marginal areas where soils are poor and moisture availability is very low. The areas have been neglected in terms of extension services, communication and availability of other NGOs. Food insecurity is high among most of the communities in these areas. In addition to environmental problems, women are the dominating beneficiaries which might have a social implication when it comes to decision making.

The communities are used to other livelihoods that are both destroying the environment as well as diverting the attention of the new intervention. These include fishing, charcoal and firewood business, rural-urban migration and illiteracy. Detailed interventions, challenges, and potentials for FAO are presented in Table 4.

**Table 4. Interventions, potentials and challenges in relation to climate change of nine Rural Livelihood projects implemented by FAO**

| *Project* | *Project site* | *Project interventions* | *Challenges* | *Potentials* |
|---|---|---|---|---|
| *FAO* | Kuthambo | -Agriculture (Conservation agriculture, goat farming)<br>-Natural resource management (Re-afforestation, soil & water conservation technologies)<br>-Capacity building (social capital, marketing) | -Poor soils<br>-Afforestation vs. goat farming | -Agriculture diversification (drought tolerant crops e.g. millet, tephrosia, folder, horticulture, pawpaw, hybrid mangoes, granadillas, storage of ground nuts, beekeeping, value adding, Food processing and storage)<br>Natural resource management: protection of road, using water collection pits for manure making, planting vertivar on already constructed bunds, rain water harvesting etc) |
| | Matungwi | -Agriculture (goats & chickens, irrigation, conservation farming, input support)<br>-Soil and water conservation (compost, ridge realignment, check dams, gully reclamation, re-afforestation, nurseries.<br>-Business (revolving fund) | -Lack of inputs<br>-Hunger<br>-Lack of materials | -Crop diversification (horticulture e.g. mangoes)<br>-Capacity building in local feed making.<br>-Businesses( e.g. juice extraction, markets linkages)<br>-Conservation incentives in form of bonus |
| | Ang'ona | -Agriculture diversification (irrigation, goats)<br>-Natural resource management (soil & water conservation technologies, nurseries)<br>-Business (revolving fund MK315 000)<br>-Capacity building (women) | -Poor soils<br>-Management of goats and new planted trees.<br>-Technical expertise on irrigation scheme<br>-Dwindling fish catches<br>-Poverty | -Further promotion of agriculture diversification (integrated farming e.g. rice/duck/fish, drought tolerant crops, high value crops, value adding, rain water harvesting, and horticulture).<br>-Business (seed multiplication).<br>-Deep water fishing.<br>-Fine tuning existing natural resource management technologies.<br>-Need for conservation incentives (inputs). |

However, several opportunities were also identified that could allow the communities to adapt to climate change. Communities are aware of several changes taking place because of climate changes and are ready to contribute their labour, land and other resources towards the project. The approach taken by both organisations to promote self help programme is welcome idea.

Some areas have the ideal climate to produce enough food for other sites and generate incomes if business concepts are encouraged. Communication through good roads, mobile phones and other facilities can enhance business in all the areas.

### *5.3 Challenges and opportunities in relation to climate change- SCC*

As alluded earlier, these projects are being implemented in marginal areas characterised by poor soils, erratic rainfall. In addition the projects are implemented in poor communities some of them rely on remittances from relatives, businesses, fishing etc. Table 5 has detailed information on challenges and potentials on SCC.

**Table 5 Interventions, potentials and challenges in relation to climate change of Rural Livelihood projects implemented by SCC**

| *Project site* | *Project interventions* | *Challenges* | *Potentials* |
|---|---|---|---|
| Nasenga | -Agriculture (cow peas)<br>-Re-afforestation | -Knowledge gap<br>-Hunger | -Need for crop diversification, horticulture, irrigation, integrated farming (horticulture, fish) linkages with markets.<br>-Capacity building<br>-Need for conservation incentives. |
| *Kalonga, Chimwemwe, Songondileya, Mbuna sites* | -Agriculture (improved varieties: maize, g/nut. cassava, sweet potato, cowpeas, beans, rice, goat farming, irrigation, goat farming,<br><br>-Natural resource management (re- afforestation, nurseries, soil & water conservation technologies, agroforestry (T.vogelli, T.Tandida, Sesbania sesban), Integrated pest control (NIM, cow dung, cow urine)<br>-Capacity building (leadership skills, group dynamics, integrated farming, savings & credit, marketing, study groups)<br>Vulnerable groups (elderly, HIV &AIDS, orphans)<br><br>-Business: Revolving fund | -Food insecurity.<br>-Water scarcity<br>-Poverty<br>-Lack of incentives (inputs)<br>-Food insecurity.<br>-Dwindling fish catches (Linthipe site)<br>-Poverty<br>-Lack of incentives (inputs) for conservation | -Management of existing forest vs wild fires<br>-Value adding<br>-Using water collection pits for manure making<br>-Planting vetiver on already constructed bunds<br>-Manure making from goat feed residues<br>-Management of existing forest<br>-Forest seed collection.<br>-Bee keeping<br>-Food processing and storage.<br>-Genetic conservation<br>-Horticulture<br>-Agriculture diversification sorghum and millet, value adding.<br>Fine tuning current best bet technologies e.g. compost manure making, vertivar planting, etc.<br>- Bamboo growing |

However there are a number of opportunities observed in the field that the project may wish to tap. There is tremendous social capital especially among women which can be utilised to develop the nature capital. In addition specific project sites may wish to link up and provide locally produced and marketable products which may be difficult in other sites. There project may enhance field visits which may enhance the groups to learn from each other. This could utilise the opportunities in post harvest technologies.

### *5.4 The impact of climate change on livelihoods programmes*

The need to undertake this study is important not only to the Norwegian Embassy, but to the Government of Malawi and other parties engaged in rural livelihoods programmes. During consultations, issue of climate change has so far not been a priority among many stakeholders. The study team has noted that like in many vulnerable areas, all projects are vulnerable to droughts, floods, high temperature, soil infertility, deforestation and soil moisture availability. Climate change will continuously affect these communities.

For example, food supply may be reduced during period of short rains when long duration varieties are promoted. Crop yields could be reduced mainly as a result of erratic rains, floods; droughts and soil infertility. Most of the areas are vulnerable because of high land degradation (soil and forest), extreme geographical events and salinisation. Unpredictable droughts may be the most limiting factor for crop production in the visited areas. Most of the areas have already several water shortage conditions, thus increasing population pressure and competition for water resources will make the effect of successive droughts more severe.

Water availability may be sensitive to climate change and severe water stress conditions will affect crop productivity, particularly that of vegetables and long duration varieties. The combination of elevated temperatures and decreased precipitation can cause reduction of irrigation water availability and increase in evapo-transpiration, leading to severe crop water-stress conditions. Most conditions in Malawi will face the same problem. Salinity was identified as one of the problems in some of the visited areas especially those targeted for irrigation in Mangochi. Excessive soil salinity reduces productivity of many agricultural crops and there is need to undertake intensive soil and water sampling before large investment are initiated.

Based on these field visits, consultative meetings and extensive literature review, there is need for the communities to undertaken activities that will enhance their adaptation to climate change. The communities are faced with many risks from climate change. The risks are apparent in agriculture, fisheries and many other components that constitute the livelihood of rural populations in developing countries (Adger *et al.*, 2003). Despite that these communities have adapted to climate changes in the past, it is important for programme managers and financiers to understand the nature of current and potential shocks at household, community, national and regional scale where natural and human systems are likely to be most vulnerable (IPCC, 2001). While climate change is likely to present some opportunities for some sectors and regions, promoting programmes that will allow rural communities to adapt to these changes will be an ideal policy and livelihood option for Malawi.

In this study, some societies especially those in Balaka and Monkey-Bay are more vulnerable to the risks posed by climate change than societies in Matumbi (Mangochi) and Tembwe (Salima). However, all societies need to enhance their adaptive capacity to face both present and future climate change outside their experienced coping range. While the notion of climate change is now among all development stakeholders, the challenge is to promote adaptive capacity in the context of competing sustainable development objectives.

Community vulnerability in all the areas visited is therefore a socially constructed phenomenon influenced by institutional and economic dynamics that must be understood by the project managers. The vulnerability of these communities to climate change has been discovered to be determined by its exposure, by its physical setting and sensitivity, and by its ability and opportunity to adapt to change. In such conditions, it is difficult to promote similar programmes without considering the above issues. They could decrease sensitivity by avoiding building settlements and infrastructure in high-risk locations, or by strengthening existing systems so that they are less likely to be damaged by unusual events.

The need for adaptation is based on the fact that the potential impacts of climate change on agricultural systems will depend not only on climate per se, but also on the internal dynamics of agricultural systems, including their ability to adapt to the changes (FAO 2001). Success in mitigating climate change depends on how well agricultural systems adapt to the current and future changes. Most technologies being implemented in FAO and SCC projects needs to be revisited by utilizing both indigenous and current information from experts and research institutions. Farmers in marginalized environments where FAO and SCC projects are currently being implemented need tools to adapt the adverse effects of climate change. Potential technologies being developed through research could be considered to adapt to climate changes. Farmers in FAO and SCC project sites are small-holders, have fewer options and must rely heavily on resources available in their farms, within their communities and to limited extent outside their communities (remittances). Thus, technologies that are simple, affordable and accessible must be used to increase the resilience of farms in less developed countries.

## *5.5 Findings from programme reviews*

### 5.5.1 ARDEP

The Agricultural Research Development Programme (ARDEP) is a five year (2005-2010) Research and Development Programme which is being jointly funded by the Government of Malawi and the Royal Kingdom of Norway. The programme is being coordinated by Bunda College, a constituent college of the University of Malawi but managed by national structures. The programme is composed of three major outputs; the first one is aimed at developing and implementing a "Farmer focused Research and Outreach Programme", the second one aimed at implementing a "Mandatory Outreach Activities to Promote Best Practices" and the last one on "Capacity Building of Malawians and Partners in Managing National Research and Outreach Programmes".

ARDEP through the second call for research concept notes for research and outreach programmes (ARDEP, 2007) has priority area that are directly linked to issues for climate changes at both country and regional scale. These include fish farming, technological adoption, irrigation, marketing, post-harvesting technologies, communication and information, livestock and crop research among others. However, these thematic areas are not explicitly presented to target several vulnerable communities. In this case, specific research on climate change including modelling for Malawi could be included. In addition, the programme through Bunda College could take a leading role in coordinating all research and capacity development on climate change at country level.

Together with other research and training institutions such as ICRISAT, ICRAF, Mzuzu University and regional institutions could come up with a working paper to strategise on priority areas on climate change. The programme in collaboration with Norwegian universities in Bergen and Oslo or could also take a leading role in developing short courses on climate change for NGOs, civil servants and other stakeholders. There is need to establish a very strong communication framework at country level that will guide policy makers on climate change issues at this stage. Specifically, ARDEP could target mainstreaming issues of climate change within its strategic framework.

Firstly, the outreach and dissemination theme could consider developing a special awareness and advocacy programme on the impact of climate change on agriculture and rural livelihoods. This could utilise already existing structures available with the NGOs, private and public sectors. In this option, farmer forums and exchange visits could effectively be used to sensitise communities at country and disseminate new technologies that could be developed by research institutions. Collaborating with NASFAM and other farmer association groups could be strengthened on climate change issues.

### 5.5.2 NASFAM

NASFAM current work plan aims at developing and improving the lives of small holder farmers, through rural productivity and innovation (NASFAM, 2007). In terms of climate change, NASFAM is interested in helping farmers to adapt to climate change through promotion of technologies aimed at improving household income and food security and natural resource management. In line with this NASFAM is currently supporting the following interventions: tree planting, weather insurance, promoting environmental friendly pesticides (Methyl bromide phase out), conservation tillage, water harvesting, and small scale irrigation among others.

There are a number of challenges that NASFAM is facing in implementing climate change related interventions. Some challenges include the presence of the hard pan that exists in most fields, water shortage, inadequate knowledge to give proper direction to farmers in climate issues, lack of guidelines on proliferation of hybrid varieties particularly maize that is present in the country, bush fires due to mice hunters, In the future NASFAM plans to continue promoting building of small scale dams which will help to capture the water before it goes to receiving water bodies. However these will require extra finings and could divert them from their core objective of building a business oriented farming community.

Because of the NASFAM size (extension net work, farmer members) on the ground there is expectation that their impact in terms of climate change interventions will be significant. Despite these interventions there is need for more capacity building within NASFAM portfolio to ensure that it is capable to give advice and direction to farmers on climate change issues. The trend of climate change has been towards reduced rainfall, less precipitation, erratic rainfall and rising temperatures. There will be need for a compendium for specific varieties suitable for different agro ecological zones, identification and promotion of local traditional technologies, promotion of multi purpose trees, grafting. Engaging incentives for conservation will help to curb current challenges of bush fires due to mice hunting and management of planted trees from livestock such as goats.

Current government initiatives are working on assumption of availability of efficient extension service. However there is need for efficient extension service in any form. Resolve the current needs such as institutional and capacity building, decentralization and core function analysis. There is need for more investment in agriculture in terms of research and extension to meet the current extension policy which is holistic and demand driven. This role could be built within the NASFAM strategic plans. Such programmes could empower local communities in delivering effective extension messages.

### *5.5.3 CARD*

***Current focus***

CARD, was established in 1994 as a centre of excellence for undertaking high quality and timely policy research in areas of agriculture and rural development, natural resources and environmental management. The centre is also a facility for undertaking cooperative research, consultancy and outreach/training in coordination with University of Malawi, NGOs, faith based organisations and Government in search for innovative policies and strategies geared towards the promotion and transformation of agriculture and rural development in Malawi (CARD, 2006). CARD is the first node of Food, Agriculture and Natural Resources Policy Network (FANRPAN) in Malawi and is a member of Poverty and Environment Network (PEN).

However there was general feeling that there is a need for more to be done on sensitizing policy makers, stakeholders, and local communities on climate change issues. The approach to adaptation to climate change needs to be a holistic way which could be coordinated by an umbrella body. CARD could take the role of addressing policy gaps, reviews and evaluation of climate change interventions. In addition, CARD could also collaborate with ARDEP and NASFAM to come up with capacity development programmes in climate change related areas.

The organisation could also focus its research on climate change mitigation and adaptation by communities. This could be done in collabarotation with other research institutions at country and regional scale. Programmes could focus on agricultural intensification and diversification, small scale irrigation, research on drought tolerant crops etc.

## 6.0 Norwegian strategic Framework on Climate change in Southern Africa

It is widely accepted that models of global phenomena, e.g. global climate change, gain credibility by being undertaken by international entities (e.g. the award of the Nobel Peace Prize in 2007 to IPCC). But it as also often felt that issues involving strong national or regional interests (e.g. climate change in Malawi and/or in the Southern African region) must have significant elements of national and/or regional ownership to ensure local relevance and credibility. The scientific and political debate at national and regional levels cannot proceed satisfactorily without spokespeople well conversant with more local models and their outcomes, and an ability to critically handle the complex issues of climate change.

Whilst it may be possible to engage an external body in the preparation of climate change models for Malawi, and for Southern Africa (and also possible to conceive of models of the highest standards being provided by such external bodies), the practical and political impact of the models and the consequences of the predicted outcomes will be much enhanced by local ownership, in Malawi for national issues, and regional ownership for Southern Africa issues. Engagement of Norwegian development assistance in climate change issues in Malawi and other countries in the Southern African region may be best advised to seek opportunities for local and regional ownership as prerequisites for the involvement. However, this is not simple.

In discussions with senior officials of the Malawian Meteorological Service and the Malawian Department of Environmental Affairs (Ministry of Mines, Natural Resources and Environment) we have been made aware that the GoM does not currently have within its own ranks relevant expertise in advanced climate modelling in and for Malawi. Similarly, the colleges of the University of Malawi (Bunda and Chancellor) have yet to provide graduates in meteorology and climate change studies of the calibre required. However, there seems universal agreement among the relevant Malawian groups that such expertise is much needed now and in the near future, and that a strengthening of the abilities of the University and the Meteorological Service to handle and interpret national and regional climate change models is a pre-condition for serious involvement in the debate and advice on adaptation to climate change in Malawi and the neighbouring countries. In addition, with its 21 manual and 4 automatic weather stations Malawi is currently short of adequate weather data coverage so essential for national climate change models, and for adaptation to climate change (e.g. crop insurance schemes).

Several organizations require upgrading and up scaling of climate change models and their interpretation for their activities in support of Malawian agricultural development and sustainable land management. The World Bank (personal communication D. Rohrbach, F. Sperling, Nov. 2007) foresees a significant investment in climate change capabilities for its activities in support of the GoM and has requested the consideration of Norway for contributions. The World Bank cooperates closely with FAO in its attempts to raise donor interests in support of its activities, which address some parts of the national planning process. Of particular interest are FAO's efforts to ensure that adequate spatial data sets are available for climate change studies.

A central document for Malawi's handling of the National Adaptation Programme of Action (NAPA) issued in 2006 is the interest expressed by UNDP to support its implementation. NAPA has yet to be taken forward by the GoM, and GoM has been soliciting support for it from outside donors. However, individual donors may prefer to address specific parts of NAPA rather than NAPA as a whole, which could undermine the proposed concerted effort. The UNDP proposal reaches much wider, proposing implementation of NAPA in its entirety.

The UNDP proposal (currently an internal document), is closely linked to the UNDP-UNEP Poverty-Environment Initiative (PEI) framework (which is in principle applicable also to Malawi). The UNDP proposal is comprehensive in relation to the NAPA, but assumes the willingness of GoM to adopt NAPA. Until this can be assured there is no national basis for the implementation of the UNDP initiative. The scaling-up proposal of the PEI goes much beyond the NAPA framework, its detailed relevance to Malawi needs to be ascertained and a national implementation plan presented for the GoM and for the donor community.

We must conclude that there are several somewhat competing initiatives both from within and beyond the UN family. This is usual in international development assistance but not necessarily helpful for the GoM. A somewhat similar situation arose initially with the focus on HIV/AIDS in Malawi, leading to the establishment of the National AIDS Commission. It has been suggested to us that a central, coordinating body (not necessarily a commission) would make it much easier for GoM to create the necessary focus on adaptation to climate change, and that such a body would make optimal use of limited expertise available in the GoM to consider the multitude of proposals presented to it. Even if the GoM does not wish at present to forward NAPA, a concerted effort to create a more complete national climate risk model to which national efforts may refer in the future, would be a valuable first contribution from a coordinating body.

At regional level the situation is different. Within the region there are several centres with advanced climate change modelling capability, both at government and university level. Some of these groups are part of or could become associated with the "Food, Agriculture and Natural Resources Policy Analysis Network" (FANRPAN), an originally USAID-sponsored network with several national nodes in the region and with its regional offices in Pretoria, South Africa (For a fuller description see FANRPAN (2007) or visit www.fanrpan.org for its strategy and business plan.). These capabilities do not at present seem to be resident in NEPAD's "Comprehensive Africa Agriculture Development Programme" (CAADP) secretariat, which could, however, draw on networks like FANRPAN, and others.

Outside the region there are other organizations with capabilities and willingness to be engaged in regional studies, notably GECAFS (Global Environmental Change and Food Systems) a British-based international research project with formal research partnership agreements with FAO, WMO and CGIAR) and originating from other global research efforts (IGBP, IHDP and WCRP) (see also www.gecafs.org). GECAFS has itself links to FANRPAN, and a proposed research initiative with FANRPAN. The management of this research initiative seems somewhat unclear at the moment, and may require elucidation to attract sponsors. In particular it may be necessary to ascertain the extent to which regional good expertise would be used and created for the initiative, the contribution and cost of expertise attracted from outside the region, and the actual administration of the initiative.

The Consultative Group on International Agricultural Research (CGIAR) has a number of research centres in the Southern Africa region (and specifically a score of institutes in Malawi, centred on the ICRISAT campus outside Lilongwe). Several of these institutes have specific research programmes related to agricultural adaptation to climate change in the region (see e.g. www.icrisat.org - What ICRISAT Thinks October 2006). They could be used in the processes above.

As evident from the above a number of UN organizations (UNEP, UNDP, FAO, WHO, CGIAR, WB) are now including adaptation to climate change in their strategies, also in support of their regional programmes and projects. Regional organizations (AU, SADC, COMESA) have joined forces to organize NEPAD with its CAADP and its added responsibilities for the WB-initiated TerrAfrica. CAADP has provided a four-pillar framework as a model for national agricultural development in member states. CAADP considers the possibilities of climate change as elements in its four pillar strategy but has as yet to provide a specific framework for climate change guidance to national governments for their national agricultural development programmes. CADDP must be viewed as a 'Think tank' rather than an institution that can undertake comprehensive studies or have implementation capability in the field of climate change.

The number of international initiatives on adaptation to climate change relevant for the Southern Africa region is significant. In order to avoid demarcation disputes it would seem essential that at least the UN-affiliated organizations present a simple and clean interface to the regional bodies, which is probably best represented by CAADP. In this somewhat multifaceted national and regional image of adaptation to climate change we urge Norwegian development assistance to adopt a number of principles for future institutional investments:

1. Investments at national level in Malawi (and presumably other countries in the region) be aimed at building national institutional capacity on climate change models, on mitigation of climate change and – specifically – on adaptation to climate change.

   In the context of Malawi this could involve a significant strengthening of the Malawi Meteorological Service, both in terms of weather stations (preferably automated) and it the retooling of its staff towards more climate modelling, and the recruitment of postgraduate staff (preferably at PhD level) with relevant knowledge.

2. Incentives to relevant colleges of the University of Malawi to develop or to cooperate in the development of post-graduate courses (M.Sc. and Ph.D. levels) in relevant aspects of climate change.

   Whilst this is a longer term process, the inherent capabilities of Malawi to independently confront the climate change challenges must be strengthened. Interim solutions would be to train a smaller number of candidates in relevant institutions of higher learning abroad. The ARDEP research financing and programming functions may also be used to address these issues.

3. Urge the Government of Malawi to forward for political approval its own NAPA 2006 programme as a basis for national and international efforts to assist in the adaptation to climate change in Malawi.

Unless there is comprehensive and agreed national consensus for such efforts it could become counterproductive for individual bilateral and multi-lateral donors to pick-and-choose in a longer menu presented by NAPA. Individual donor agendas could distract the GoM from a comprehensive approach to the issues.

4. Urge that the GoM Agricultural Development Programme (ADP) in its final form adequately considers adaptation to climate change as an integral part of its strategy.

Failure to do so in a country where 80% of the population are directly associated with agriculture, will make it most difficult for donors who wish to consider poverty alleviation and environment together – in particularly in the context of rural development and rural primary industries.

5. Assist institutions and the GoM to find a common platform (secretariat, commission or similar) for national adaptation to climate change issues, to avoid rivalry, improve inter-ministerial communication, and facilitate optimal use of scant relevant human and technical resources.

Such a platform could also serve as a meeting place with international donors and parties willing to support and facilitate Malawi's own efforts.

6. Use its influence, including its monetary contributions, to ensure that initiatives of multi-lateral organizations are coordinated and in line with comprehensive national and regional plans.

The use of the national platform (6 above) and the engagement of recognized regional bodies (e.g. CAADP) could be important tools for such cooperation.

If Norwegian development assistance wishes to involve Norwegian institutions at national Malawian and regional levels in Southern Africa, the following suggestions may prove helpful:

1. CICERO, affiliated with the University of Oslo, has world-class experience in climate modelling and the up-scaling of models to regional and national levels. However, CICERO has so far been little involved in development issues. A meeting with CICERO as part of this mission has indicated that CICERO would welcome an invitation both to contribute in joint work with Malawian colleagues on the development of national climate changes models for Malawi and training of relevant Malawian staff in the use of such models, and to become involved in regional efforts for up-scaling at regional level, with other institutions (e.g. CAADP and FANRPAN). CICERO also has much expertise in carbon sequestration issues and carbon trading. This may be relevant for Malawian conditions.

2. The Meteorological Office, headquartered in Oslo, has much relevant weather station experience relevant to the needs for retooling the Malawian Meteorological Service.

3. The Norwegian University of Life Sciences has significant knowledge in curriculum development on agriculture and adaptation to climate change and could assist University of Malawi to strengthen its post-graduate training. Specifically the established relationship between Noragric and Bunda College could be a vehicle for such cooperation.

4. Norwegian universities in Bergen and Oslo have traditionally had strong (world-class) departments in the meteorological sciences and could be encouraged to accept Malawian students at Ph.D. level for long-term Norwegian investments in human resources in the field.

# 7.0 Conclusion and recommendations

The Review Team has related to two Norwegian-sponsored sustainable livelihood projects in Malawi (undertaken by FAO and SCC), and also noted activities conducted by NASFAM, CARD and ARDEP. Our general impression is that since adaptation to climate change was not a design feature of any of the projects or undertakings, the relevance of the activities to adaptation to climate change is incidental. Clearly many activities aimed at better land management, more robust agricultural production systems, and community awareness and participation may also be important ingredients of projects specifically designed with climate change in mind. However, some production-oriented interventions, e.g. higher production rates from long duration maize or specialized maize production at the expense of subsidiary crops (sorghum, millet, legumes, vegetables) may render the farming systems significantly more vulnerable to adverse weather assumed to become increasing associated with climate change. Detailed recommendations are presented in Table 6.

**Table 6 Summary of recommendations on Norwegian funded projects**

| Name of project | Recommendations |
|---|---|
| FAO and SCC projects | -There is need to fine tune the current soil and water conservation technologies to improve their efficiency.<br>-There is need for diversification (specifically for vegetables and fruits) to address high malnutrition levels prevalent in the project sites.<br>-There is need to improve current food processing technologies, value adding and access to markets.<br>- Collaboration with other NGOs, government staff and other key stakeholders working in the area could be enhances<br>-The projects could introduce deliberate incentives that will promote environmental conservation and household income. CARD and ARDEP can assist in designing these incentives.<br>-The social capital could be used to promote environmental capital. These could be done in consultation with other institutions.<br>-External factors such as remittances, government policies, activities of other in NGOs and engagement of government extension services could be integrated to enhance adaptation to climate change.<br>-Introduction of new technologies or programmes could be site specific based on physiographic and socio-economic conditions. |
| ARDEP | - Integrate climate change policy issues in their programmes<br>- Through their information sharing and promotion of technology, they could establish a grouping of experts on climate change at country level<br>- Human capacity could be improved through short courses at Bunda and other colleges<br>- Guidelines could be developed within the farmer focused research and outreach programme on climate change<br>- Take a leading role in approaching the government on climate change issues<br>- ARDEP could be able to source new technologies and try them in the field in relation to climate change<br>- The capacity of its technical team could be developed in relation to climate change through external and internal courses<br>- Development of business plans could consider issues of climate change to meet key result areas 1 [KAR1) |
| NASFAM | - Through KAR2, NASFAM could promote on-farm research and consult at all stages with research institutions to generate new concepts and technologies in relation to climate change.<br>- The capacity of farmers associated could be developed through technical information on climate change, without neglecting indigenous knowledge [KAR3]<br>- In KAR 5, NASFAM could introduce few programmes that are not directly linked to agriculture and climate, such as post harvesting technologies, value adding. |
| CARD | - CARD could take a role in addressing policy gaps reviews and evaluation of climate change intervention<br>- Could work with ARDEP and NASFAM on capacity development in the agricultural sector on climate change<br>- CARD with ARDEP could provide technical backstopping to the Norwegian supported programmes |
| Regional Network on Climate Change | - There is need to consider developing the existing capacity in relation to climate change issues at country<br>- Immediate support could be given to the National Committee on climate change and the Department of Environmental Affairs<br>- The Norwegian government could facilitate the establishment of a functional secretariat on climate change<br>- The embassy could facilitate awareness programmes through CARD, ARDEP and NASFAM among the stakeholders |

Diversification into small livestock production can – if properly managed – offer increased food security. The projects reviewed seem to have considerable more understanding of the potential strengths of diversification than major government agricultural support programmes, yet often fall outside current subsidy schemes covering fertilizer and seed distribution. Nutrition is closely associated with livelihoods. The observed under-nutrition and malnutrition of children in the project areas is very worrisome and – unfortunately – not directly addressed in the government emphasis on increased maize production. In that sense the projects may offer increased food security for children in the longer run. We note that in many of the project areas the predominance of female-led households indicates that male family members are working elsewhere. Remittances will therefore very likely be important elements of household incomes. The Review Team has had insufficient time to consider the impact of remittances on existing and developing farming systems. We are surprised, however, that this most important feature does not seem to have been considered in project documents.

The review team appreciate that this feature may be specific to certain parts of Malawi. Remittances do constitute an important strategy to lessen the impact of vulnerable farming systems, and thus in conditions of climate change. Therefore we suggest that Malawi's expertise in climate change issues must be significantly strengthened at national level, and not become overly dependent on outside expertise. A number of suggestions on how to support national Malawian institutions toward this end are offered. An early implementation of Malawi's NAPA can give guidance to priority settings.

The Team raises some concern as to whether the multitude of initiatives forwarded by institutions within and beyond the UN system to the Malawian government, and often driven by donor perspectives, may lead to fragmentation of efforts. It urges these organizations to coordinate their efforts so that national aspirations, e.g. those contained in Malawi's NAPA, can be fulfilled. On regional cooperation on climate change in Southern Africa the Review Team urges the Norwegian development authorities to make use of regional networks, supplemented by outside expertise, to develop a strong platform on climate change issues. Finally, on specific Norwegian – Malawian bilateral cooperation issues, the Review Team has listed a number of Norwegian institutions that may assist in capacity building in specified Malawian institutions.

Finally, in the medium to longer term, rain-fed farming systems will remain vital for future food security, but investment in them will have to be greatly increased. Such increased investment by risk-averse farmers and stakeholders will only take place through a better quantification of climate risk that enables the identification, promotion and implementation of investment innovations that have a high probability of success in the context of variable climates. Climate change is likely to make rain-fed agriculture even more risk prone in the rain-fed systems in the country and farming systems will need to adapt to these changes.

However the exact nature of these changes still remains uncertain. The livelihood resilience and adaptive capacity of impoverished and marginalized rural communities must first be improved in the context of current climate variability if they are to have any hope of adapting to future climate change. Climate driven tools are available that allow the development of integrated climate risk management strategies which will facilitate targeted investment innovations. At country level, there is need to collaborate and establish an effective grouping involving development partners, farmer association, research institutions and government departments. This is where the Norwegian embassy could play a funding role for improved rural livelihoods.

## 8.0 References


ADGER, W. N., HUQ, S., BROWN, K., CONWAY, D. & HULME, M. (2003) Adaptation to climate change in the developing world. *Progress in Development Studies,* 3, 179-195.

ARDEP (2007) Second call for concept notes for research – outreach project proposals for the ARDEP Competitive Grant System, Bunda College, Lilongwe, Malawi.

CARD (2006) CARD Strategic annual plans 2007-2008, Bunda College, Lilongwe, Malawi

GOM (2007) *Malawi Agricultural Development Programme* (ADP). Ministry of Agriculture and Food Security, Lilongwe, Malawi

GOM (2006) *National biodiversity strategic and action plan*, Ministry of Energy, Mines and Natural Resources, Lilongwe, Malawi

GOM (2006a) *National adaptation plan of action under the United Nations Framework Convention of Climate Change (UNFCCC)*. Lilongwe, Malawi, Government of Malawi, Ministry of Mines, Natural Resources and Environment.

GoM (2005). *Malawi's National Adaptation Programmes of Action (NAPA)*. Lilongwe. Environmental Affairs Department. Ministry of Natural Resources and Environmental Affairs.

GoM (2002a). *Vulnerability Assessment Report*. Lilongwe. Environmental Affairs Department. Ministry of Natural Resources and Environmental Affairs.

GoM (2002b). *Research and systems observations for Malawi Report*. Lilongwe. Environmental Affairs Department. Ministry of Natural Resources and Environmental Affairs.

GoM (2002c). *Initial National Communication under the United Nations framework Convention on Climate Change*. Environmental Affairs Department. Ministry of Natural Resources and Environmental Affairs.

GoM (1999). *State of Environment Report 1998*. Chapter 9: Climate change and air quality, pp. 29-32. Department of Environmental Affairs, Lilongwe.

GoM (1997). *Malawi Inventory of of Green House Gas Emissions and Sinks for 1990*. Environmental Affairs Department Lilongwe: EAD.

GoM (1994). *National Environmental Action Plan*. Volumes I and II. Lilongwe. Environmental Affairs Department. Ministry of Natural Resources and Environmental Affairs.

FAO (2007a): *Enhancing Food Security and Developing Sustainable Rural Livelihoods Project:* Project Synopsis. GCPS/MLW/030/NOR, Liwonde, Malawi

FAO (2007b). *Consultancy report for a baseline survey on Enhancing food Security and Developing Sustainable Rural Livelihoods Project* GCPS/MLW/030/NOR, Liwonde, Malawi

IPCC (2007) *Climate Change 2007: impacts, adaptation and vulnerability*. Working Group II contribution to the Fourth Assessment Report of the IPCC, UNEP and WMO.

IPCC (2001) *Impacts, adaptation and vulnerability. Report by Working Group II on climate change impacts, adaptation and vulnerability*. IPCC.

IPCC (1995). *Guidelines for National Greenhouse National Green House Gas Inventories*: Inter-governmental Panel on Climate Change Reference Manual. Brackwell, United Kingdom.

NASFAM (2007) National Smallholder Farmers' Assiciation of Malawi's operational plans for 2007 and 2008. NASFAM, Lilongwe. Malawi

UNFCCC (1997): *Kyoto Protocol to United Nations Convention on Climate Change* FCCC/CP/1997/7/Add.1, Decision 1/CP3 Annex 7. http://www.unfccc.de

UNFCCC (1999) *Convention on Climate change*, Bonn Germany: UNFCCC Secretraiat. under the united nations framework convention on climate change (UNFCCC)National Adaptation Plan of Action

**Appendix 1: List of participants that attended the inception of the study**

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| Mr. Paul Jere | UNDP-UNEP- PEI |
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| Øystein Botillen | Norwegian Embassy |
| Blessings Mwale | FAO |
| Howard Standen | UNDP |
| Deusdent Peter Kafere | CARD, Bunda College |
| Jean-Paul Penrose | UNDP-UNEP-PEI |
| Marcello Dougnac | SCC/MLBP |
| James Banda (PhD) | ARDEP, Bunda College |
| David Mkwambisi | Bunda College |
| McDonald Gomani | Bunda College |

**Appendix 2: List of participants who attended the Stakeholder's workshop**

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|---|---|
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| Marcelloo Dougnac | SCC/MLBP |
| Eva Helene Østbye | Development Fund-Norway |
| Dyborn Chibonga | NASFAM |
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| Harris Mfune | Harvest Help/Find your Feet |
| Dan Taylor | Harvest Help/Find Your Feet |
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| Kate Dresser | NASFAM |
| Danken Warren | NASFAM |
| David Rohrbach | World Bank |
| Trent Bunderson | Total Land Care |
| Arild Skaara | Norad |