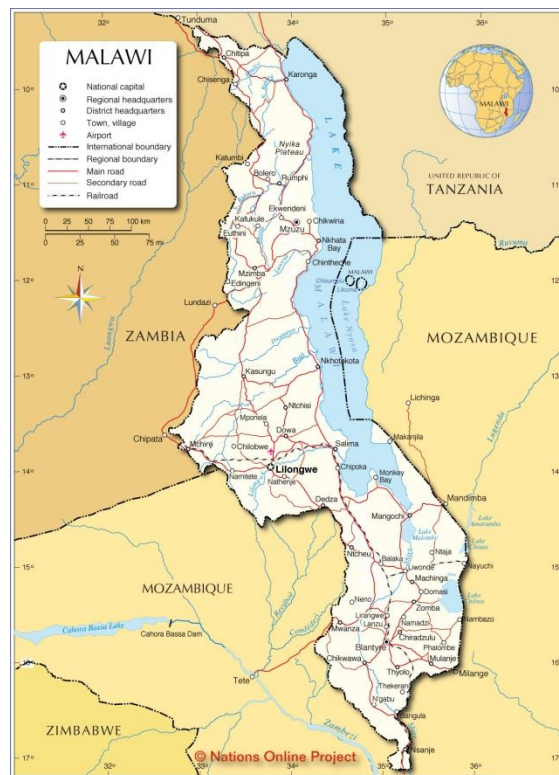




## FORESTS, RANGELANDS and CLIMATE CHANGE ADAPTATION in MALAWI AFRICA



A PRESENTATION MADE IN JOHANNESBURG ON 17<sup>TH</sup> JUNE, 2013

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## 1. INTRODUCTION

Malawi has a total area of 119,140 km<sup>2</sup> of which 20,902 km<sup>2</sup> (20%) is made up of inland waters dominated by Lake Malawi. It is bordered by Mozambique to the south, east and west, Tanzania to the north and Zambia to the west. Malawi lies between latitudes 9°22' and 17°03' S and longitude 33°40' and 35°55' E. Malawi has a population of over 15 million and is considered one of the most densely populated countries in the region. Malawi falls into the Least Developed Countries (LDC) categories.

The Government of Malawi recognizes that Global Climate Change has serious implications for the country. Globally, climate change has been recognized as one of the biggest challenges facing humanity. Even though Malawi's contribution to greenhouse gas emissions is low on a global scale, however, Malawi's unique and fragile ecosystems are particularly vulnerable to the impacts and effects of climate change, thereby negatively affecting the livelihood of Malawians. This vulnerability is exacerbated by Malawi's socio-economic and demographic factors such as a slim economic base, dependence on rain-fed agriculture, greater reliance on biomass energy, and low adaptive capacity at the community and national levels.

Malawi developed its National Adaptation Programme of Action (NAPA) in 2004. The NAPA identifies a number of adverse climatic hazards that Malawi has experienced over the last several decades. The most serious have been dry spells, seasonal droughts, intense rainfall, riverine floods and flash floods. Some of these, especially droughts and floods, have increased in frequency, intensity and magnitude over the last two decades, and have adversely impacted on food and water security, water quality, energy and the sustainable livelihoods of rural communities. The NAPA evaluated impacts of adverse climatic conditions in eight important sectors of economic growth as follows:

**Agricultural sector:** Malawi relies on rain-fed agriculture, and the current droughts have resulted in poor crop yields or total crop failure, leading to serious food shortages, hunger and malnutrition. Flooding has also severely disrupted food production in several districts of the country. The most vulnerable groups are rural communities, especially women, children, female-headed households and the elderly.

**Human health sector:** The human health sector is directly affected by climate change, and is especially linked to infant malnutrition and chronic ailments associated with malaria, cholera and diarrhoea as a result of droughts and floods. For example, malaria is expected to increase and spread to previous cool zones as temperatures increase due to global warming.

**Energy sector:** The energy sector primarily derives the hydro-electric power from the Shire river. The hydro-electric power generation has been negatively affected by the droughts and floods. The water flow disruptions in rivers have been exacerbated by siltation caused by poor and unsustainable agricultural practices, deforestation, and noxious weeds, such as water hyacinth.

**Fisheries sector:** Droughts and floods are the major climatic hazards affecting the fisheries sector, and have been responsible for the declining, or even drying up, of water bodies resulting in low fish production and loss of biodiversity. Floods have been responsible for the destruction of fish ponds, such as in 2000/01, while droughts have been responsible for drying of lakes, such as Lake Chilwa in 1995 which resulted in total loss of fish stocks.

**Wildlife sector:** The major climatic hazard that affects the wildlife sector is drought. Drought affects animal reproduction systems and migratory habits. For example, the 1979/80 drought resulted in the deaths of Nyala in Lengwe National Park in Chikwawa and the migration of most animals from the game reserve.

**Water sector:** Water is a critical resource for human and industrial use, and for the maintenance of ecosystems. Increasing droughts and floods seriously disrupt water availability, in both quantity and quality

**Forestry sector:** The major climatic hazards that threaten the forestry sector are extended droughts, which lead to land degradation and loss of soil fertility, as well as forest fires. For example, during the drought of 1995, some 5,550 ha (or 36%) of Chongoni forest were destroyed by forest fires caused by human activities such as hunting resulting in smoke haze, pollution, loss of seedlings and biodiversity.

**Gender:** Women bear most of the burden in activities that are most impacted by adverse climate, including collection of water, firewood and ensuring daily access to food. In addition, the changing demographics as a result of the impacts of the HIV/AIDS epidemic, are leading to women taking up greater responsibilities as sole heads of households and taking care of the sick and orphans.

## **2. NATIONAL PRIORITY ACTIONS FOR ADDRESSING CLIMATE CHANGE IN FORESTRY**

In the NAPA, afforestation and re-afforestation programmes are prioritised in order to control siltation and for the provision of fuel wood and sources of alternative cash income as a means of adaptation. The activities are also a means of mitigation to climate change. The NAPA prioritises afforestation activities in the Upper and Middle Shire Valleys catchments because of their importance as a source of forests products (timber, poles and firewood) for the rural communities for home use and for sale in adjacent urban centres of Blantyre and other towns. Protection of the catchment is also important as Shire River provides hydro electric power for the country. Recently, the Upper and Middle Shire Valleys have been heavily deforested, resulting in heavy siltation and trash accumulation at the water intake dam at the hydro electric power plant on the Shire River. This has resulted in frequent power outages which are a burden to the electricity supplier, industry and households. The proposed interventions in the area include: (i) improved extension services to ensure sustainable land and forest management, (ii) forest fire management at the community level, and (iii) periodic monitoring of plant development to identify species that may be in danger of dying back or are facing serious reproductive ability with diurnal and seasonal climate changes.

Other priorities in the sector include:

- Production of a revised national forestry policy in order to address issues of climate change and other emerging issues.
- Production of a REDD+ strategy including issues of monitoring, reporting and verification.

## **3. KEY GAPS, CONSTRAINTS AND CHALLENGES IN ADDRESSING CLIMATE CHANGE**

The NAPA recognizes the importance and urgency of addressing the problems associated with climate change because these affect the sustainable livelihoods of all Malawians. However, the NAPA identifies several barriers that hamper the implementation of these activities. Apart from limited internal capacity to fund adaptation activities, Malawi is also constrained by several other factors, including: (i) extreme poverty of the most vulnerable groups, who are also illiterate, making it difficult to transfer new technologies and conduct meaningful long-term planning, (ii) poor infrastructure, especially poor roads and bridges, making it difficult to access rural areas, hence difficulties in delivering farm inputs (e.g., fertilizers and seeds), and accessing markets, (iii) limited credit opportunities for rural communities, to allow family households easily access farm inputs, (iv) food insecurity in the Southern Africa Development Community (SADC) that would make it difficult for Malawi to acquire food from neighbouring countries, further aggravating the costs of coping with current droughts and floods, (v) existence of a large number of HIV/AIDS orphans, creating a major drain on family energy, cash and food, a situation that is more critical in rural areas among the poor, with limited capacity to produce enough food and are easily attacked by diseases, (vi) poor health conditions of resource-poor rural communities, leading to high rates of malnutrition, especially in children and the elderly, limiting the ability of the people to effectively respond to opportunities for work, and (vii) limited analytical capability of local personnel to effectively analyze the threats and potential impacts of climate change, so as to develop viable adaptation solutions.

The above constraints impact on management of forest resources and are the underlying (drivers) causes of deforestation. Other underlying causes are high population, poverty, lack of alternative sources of energy and HIV/AIDS. The direct causes of deforestation are wood biomass (firewood and charcoal) energy requirements, agriculture expansion, settlement expansion and uncontrolled fires. The local poor need forest resources as safety nets and for provision of forest services and products. In general poor funding allocation to the sector limits law enforcement and implementation of forestry related adaptation programmes.

#### **4. ASSISTANCE REQUIRED FOR CLIMATE CHANGE ACTIONS**

1. The NAPA estimated that management of upper and middle Shire River for forestry activities would require US\$ 2.0 million.

However, forestry sector needs assistance for other areas of the country. Apart for that the country needs assistance in the following:

- i) Development and implementation of REDD+ activities.
- ii) Implementation of adaptation activities.
- iii) Implementation of Sustainable Forest and rangeland management.

#### **5. RECENT CLIMATE CHANGE ACTIVITIES AND PROJECTS RELATED TO FORESTS AND RANGELANDS**

There are several climate change activities and projects related to forests and parks and wildlife which are being supported by Government, development partners and Non-Governmental Organisations (NGOs).

### **1. Management of Forest Reserves, government and private plantations parks and wildlife reserves, village forestry areas, customary land forests and tree planting.**

The Government of Malawi with support from NGOs, the Private sector is engaged in protection of natural forests in protected areas and customary land forests; tree planting and provision of forestry extension services. These forest management activities contribute to mitigation and adaptation to climate change.

### **2. Tree Planting for Carbon Sequestration and Other Ecosystem Services Project (2007-2012)**

The Programme was a Malawi Government initiative and supported from local resources. The aim was to reward forest managers based on the principles of international carbon trade. The Programme objective was *'To increase the area under forest cover in Malawi in order to enhance carbon sequestration and other ecosystem services, that shall contribute to the reduction of greenhouse gases (GHG) and in particular, carbon dioxide in the atmosphere'*.

The programme has contributed to the improvement of livelihoods for participating farmers through payments made as compensation for area planted, care for the trees and the purchase of seedlings from farmers.

### **3. Malawi REDD Project – Forest Conservation in Nyika National Park and Mkuwazi Forest Reserve.**

The project was for the conservation of forest within Mkuwazi Forest Reserve and Nyika National Park in the Northern part of Malawi. The Project was initiated under USAID supported COMPASS II. It was being implemented jointly by Malawi Government, Malawi Environment Endowment Trust (MEET) and Leadership for Environment and Development- Southern and Eastern Africa (LEAD-SEA) It was a REDD project to be implemented under the Plan Vivo. Standard voluntary carbon market. The project had the following objectives:

- To ensure continuous forest cover for carbon conservation, maintenance of biodiversity, protection of watersheds, and prevention of soil erosion.
- To ensure increased and continued supply of forest products.
- To provide alternative income generating activities for improved livelihoods, and
- To provide improved energy saving stoves so as to decrease the pressure on the forest reserves for provision of firewood.

Carbon credits were advertised on the Plan Vivo website but there were no takers.

### **4. REDD+ readiness Initiatives**

The Government of Malawi has embarked on a process of becoming REDD+ ready by developing a REDD+ strategy. So far it has received support from the Japanese, Norwegian, and American Governments. Below are initiatives related to getting ready for REDD+:

**i) Japan Supported Forest Preservation Programme**

The Government of Japan in response to the global initiatives to mitigate climate change challenges initiated a number of programmes which focus on strengthening capacity development as well as promoting technology transfer for reducing deforestation and forest degradation in developing countries. The objective of Grant Aid called ‘Program Grant for Environment and Climate Change’ is ‘To support adoption of policies and planning related to countermeasures against deforestation/forest degradation in developing countries’. Malawi is one of the 22 countries (9 in Africa) benefitting from the grant.

The Programme activities included provision of vehicles and various GIS equipment and carrying out Forest Resource Mapping(FRM).

**ii) Lake Chilwa Basin Climate Change Adaptation Programme (LCBCCAP) upscaling activities**

The Government of Malawi through the Department of Forestry in the Ministry of Natural Resources, Energy and Environment in collaboration with LEAD SEA under the Lake Chilwa Basin Climate Change Adaptation Programme (LCBCCAP) which is supported by the Royal Norwegian Embassy embarked on a process of getting Malawi ready for REDD+ in 2012. LEAD SEA is implementing the LCBCCAP in collaboration with the Department of Forestry and WorldFish Center. The process started with consultation and training of technicians on climate change issues.. However, the work is now continuing with assistance from USAID as outlined below.

**iii) Department of Forestry REDD+ strategy development with support from USAID.**

USAID is supporting the Government of Malawi through the Department of Forestry to produce a REDD+ strategy. The US Government is providing technical and financial support. So far a Technical Advisor on REDD+ has been provided and consultative meetings and study tours are being done.

**5. USAID Kulera Biodiversity Programme by Total Land Care**

USAID/Malawi is assisting with the conservation of biodiversity in Malawi’s protected areas (PA) by engaging communities in the management and use of protected areas under participatory governance structures and improving the livelihoods of these communities through agricultural activities and sales of natural resource-based products that provide sustainable economic incentives for participation.

**Project Objectives:**

- **Improved governance of PAs** through a participatory, decentralized structure that provides economic incentives to support sustainable natural resource management.
- **Improved rural livelihoods** around the borders of protected areas under a framework that promotes increased food security, diversification, sound resource management, village savings

and loans, and incomes. The ultimate goal is to transform livelihoods from subsistence survival to thriving rural enterprises that are self-sufficient.

- **Increased rural incomes** from ecotourism and enterprises among local producers and entrepreneurs to produce process and market agricultural and natural products. A value chain approach will be used to evaluate the progress and status of products and enterprise initiatives to date to target interventions that address critical weaknesses or gaps.

REDD+ program. KULERA also includes a site-level REDD+ activity that plans to link with private carbon markets.

## **6. Trees of Hope (Clinton Development Initiative)**

The Initiative started in 2008 and is coordinated by the Clinton Development Initiative (CDI). It is implemented in two Districts of Malawi. It operates under the Plan Vivo standard. The Programme achieved Plan Vivo certification in September 2011. Over 2000 rural households are participating. Covers over 1500 ha in total and 500km of boundary planting.

### **Project Objectives**

- To coordinate community-led effort in establishing tree-based land use systems for carbon sequestration.
- To sensitize the targeted communities in climate change, carbon trading and adaptive mechanisms.
- To facilitate access of participating communities to carbon finance from voluntary carbon markets.
- To promote improvement and resilience of community livelihoods in the face of climate change.
- To build capacity in rural communities in management of carbon finance programs

### **Achievements to date**

- 85 000 tons (certificates) certified and eligible for sale following monitoring results of 2011 Initial 25000 tons (certificates) deposited with Mark it registry.
- Sale agreement template developed and entered into with to date 500 producers.
- Benefit sharing structure decided with 55% of sale price due to producers.

## **7. Bio Energy Resources Limited (BERL) Jatropha project**

Bio Energy Resources Ltd (BERL) was formed in Malawi in 2006. It is establishing a national scale bio fuel business in the country. The organisation organises farmers to plant jatropha plants and buy the seed from them. The organisation claims carbon credits on the carbon market. The organisation is currently working with f smallholder farmers to plant *Jatropha Curcas*. Most of the farmers involved in the growing of the plant do boundary planting. The Organisations Visionary goals are:

## **8. Majete REDD+ Project**

The activities are being implemented by African Parks Majete with the support of the African Parks Foundation and the Cirrus Group. The **African Parks Network** is a not for profit company that focuses on the rehabilitation and long-term management of conservation areas through the establishment of public-private partnerships with African Governments. The **Cirrus Group** specializes in the development of land-use based responses to climate change. The Group has experience in climate change projects, with understanding of the risk and feasibility aspects of REDD projects, systems ecology, GHG emission auditing, corporate climate change strategy, and the status of global carbon markets and national REDD programs in the region.

The principle aim of the project is the sustainable management of Majete Wildlife Reserve (Majete) through the implementation of a broad suite of activities both within the boundaries of the reserve and adjacent communities. The realization of these activities will lead to the conservation of Majete being a truly viable land-use option over the long-term and not gradually converted to open farmland as is the general case throughout southern Malawi.

The Project developers submitted a REDD+ PIN to Malawi Designated National Authority who gave them a letter of ‘no objection’.

## **9. Dzalanyama Forest Conservation Project**

Dzalanyama Forest Reserve is one of the most important water catchment areas for the capital city Lilongwe. It provides all the water to the capital city. It is also a source of livelihoods for surrounding communities through provision of fuel wood, poles and timber as well as non-timber forest products. Dzalanyama Forest Reserve is identified as an important area for biodiversity conservation at National level, having a variety of flora and fauna including various bird species. In recent years, due to population and economic pressure, there has been an increase in illegal harvesting of trees for charcoal and firewood. Other sources of deforestation and Forest degradation are encroachment and uncontrolled fires..

The Government of Japan through the grant aid entitled ”The Forest Preservation Programme” provided a JICA Advisor for Forest Conservation Management. The advisor in collaboration with the Department of Forestry is in the process of developing a Forest Management Plan and an Action Plan for Dzalanyama Forest Reserve with an integrated and scientific approach involving various stakeholders in related sectors such as water, agriculture and energy. Issues of Payment for Ecosystem Services including REDD+ will be addressed. The Programme is working in partnership with Wildlife Environmental Society of Malawi (WESM) where UNDP through the GEF Small Grants has provided some funds.

## **10. National Programme to Manage Climate Change in Malawi and Malawi Africa Adaptation Programme**

### **i) Climate Change Programme**

The government of Malawi with support from its cooperating partners is undertaking a comprehensive program to address Climate Change issues in its development agenda. The Government in 2008 developed a programme “to develop a strategic framework for responding to the challenges that climate change poses for sustainable economic development and national



food security in Malawi.” The goal of the formulation phase was “to develop an evidence-based strategic framework, national program and funded Phase I implementation plan for managing response to climate change in Malawi. The Forestry sector is benefitting in areas of capacity building, land resource (including forests) resource assessment and networking including attending international and local for a. The framework defined outputs to be delivered during the formulation phase as follows:

- **Institution Building:** In this component support was provided for completion and refinement of the strategic framework and national program, drawing on results of diagnostic work and a process of broad-based stakeholder dialogue. Support was also provided for capacity building and setting up of a knowledge management system and a media-based communications program on climate change. The programme is also developing a National Climate Change Policy.
- **Climate Change Risk and Adaptation Assessments:** The component involved filling in critical information gaps and diagnostic assessments which resulted in the production of a Climate Atlas, a set of land cover and land use diagnostic products; an assessment of land use options for adaptation and mitigation; and updated crop yield and crop suitability projections.
- **Strategic/Programmatic Investment Analyses and Interventions:** Under this component adaptation and mitigation interventions will be designed, investment proposals formulated and funding commitments obtained for the first 5-year implementation phase to follow. A climate investment plan has been produced.

The Programme has now entered implementation phase while completing some of the activities started in the Formulation phase.

## ii) **Malawi Africa Adaptation Programme (Japanese supported and implemented under the Climate Change Programme).**

The Malawi AAP complemented and built on existing climate change initiatives in the country to ensure that Malawi’s development is sustainable and climate resilient. The Programme built the capacity of national and local government institutions and key civic-society stakeholders so that climate-relevant policies can be reviewed and measures applied. The project aimed at delivering mechanisms for improving climate-related planning at national and district level; strengthen technical, legislative and non-state institutions to support effective, coordinated adaptation; implement tested adaptation measures and a climate investment plan which includes a range of financing options, and lessons for sharing nationally and internationally. The key agencies for coordination and delivery were the Ministry of Development Planning & Co-operation (MDPC) and the Ministry of Natural Resources, Energy, Energy and Environment (MNREE). These agencies worked with other Priority Sector Ministries as well as non-state implementing agencies and coordinating institutions.

## **11. Lake Chilwa Basin Climate Change Adaptation Programme (LCBCCAP)**

The Programme is supported by the Royal Norwegian Embassy for implementation of Lake Chirwa Basin Climate Change Adaptation Programme. The overall goal of the programme is to secure the livelihoods of 1.5 million people in the Lake Basin and enhance resilience of the natural resource base.

The LCBCCAP involves integrating climate change participatory research and management process by involving multiple stakeholders across sectors.

## **12. Adaptation to Climate Change on Access and Use of water and Forestry Resources in the Liwonde- Mangochi Protected Area Complex in Malawi to enhance Food Security**

This project is investigating climate change adaptation strategies by communities in Liwonde – Mangochi Protected Area Complex (LMPAC) in relation to access and use of water and forest resources, and how the proposed strategies will ensure the sustenance of food security. The research methodology emphasizes community participation in data collection and analysis, including the use of Participatory Geographic Information Systems (P-GIS). The value of P-GIS is that it will assist in building a holistic picture of trends in access and use of water and forest resources in order to develop robust adaptation strategies that will ensure food security. In water resources, the project intends to develop anticipatory adaptive strategies that could counter the effects of droughts and floods, whereas in the forestry sector the main thrust will be the estimation of carbon stocks in protected forest reserves for purposes of establishing a project on carbon financing for people to have money to buy farm inputs, among other uses

## **13. SUSTAINABLE LAND MANAGEMENT IN THE SHIRE RIVER BASIN PROJECT (GEF/UNDP)**

Shire River Basin is important as it is a source of hydro-electric power for the whole country apart from supporting local livelihoods. However, extensive land use including extensive tree felling coupled with bushfires in the Middle and Upper Shire have resulted in severe deforestation, land degradation and soil erosion. Forests on customary land are neither controlled nor protected hence they are prone to over-exploitation. Grazing is also intensive on grasslands of floodplains, near lakes and streams and wetlands. All this has led to dramatic land degradation in the Shire basin. In order to address the above issues, Government and UNDP/GEF developed the Private Public Sector Partnership Project on Sustainable Land Management (SLM Project ) in the Shire River Basin with the goal being the provision of the basis for economic development, food security and sustainable livelihoods while restoring the ecological integrity of the River shire Basin”.

Specifically, the objective is: “To reduce land degradation in the Shire River Basin through improved institutional, policy and Payment for Ecosystem Services (PES) arrangements.” The objectives will be achieved through 4 key outcomes:

- Policy and institutional arrangement for basin-wide SLM, including preparatory work for the establishment of the River Shire Development Authority
- Private public partnerships providing financial incentives for SLM
- Improving knowledge and skills at all levels to support SLM;
- Crop insurance providing the basis for increased access to credits as well as increased use of up to date weather information in decision making for improved livelihood systems.

The Project will promote sustainable charcoal production and promote green water credits.

#### **14. SADC Support Programme on Reducing Emissions from Deforestation and Forest Degradation (REDD)**

The Development of Integrated Monitoring Systems for REDD+ in the SADC Region project pursues the objective of (1) developing and putting into practice integrated monitoring systems for the development of forest areas, carbon stocks and emissions from deforestation and forest degradation, and (2) integrating this into an approach supported by all SADC member countries. The key measure of this project is to achieve high accuracy in the calculation of emissions with a special combination of innovative remote sensing technology and terrestrial surveys of corresponding emission factors. In these and other important areas the aim is that the technical, institutional and human resource capacities in selected countries should be strengthened (capacity development).

This project will contribute to enabling the SADC countries and the region to make the technical and institutional preparations for participating in a REDD+ mechanism and in the medium term receiving compensation payments for reducing emissions, and/or preserving and extending carbon sinks in tropical and subtropical forests. If appropriately transparent distribution mechanisms are available, these compensation payments can improve the livelihoods of indigenous and local population groups.

Malawi was selected as the “trans boundary pilot site” with Zambia of the four pilot countries in SADC to strengthen Capacity development. Others are Botswana and Mozambique. An assessment of Malawi Capacity development was done in October, 2012 by a SADC-GIZ team of consultants.

#### **6. FUNDING OPPORTUNITIES**

The country has received various support from different donors for implementation of forestry related climate change management projects and activities. Some of the support has been provided in a multi-sectoral approach while other is Departmental.

<b>Project/ Activity</b>	<b>Partners</b>
Management of Forest Reserves, government and private plantations parks and wildlife reserves, village forest areas, customary land forests and tree planting.	Government, Civil Society and the Private Sector.
Tree Planting for Carbon Sequestration and Other Ecosystem Services Project (2007-2012)	Government Resources
Malawi REDD Project – Forest Conservation in Nyika National Park and Mkuwazi Forest Reserve.	USAID
REDD+ readiness Initiatives	USAID, Japan, Norgweian Government

USAID Kulera Biodiversity Programme by Total Land Care	USAID
Trees of Hope	Clinton Development Foundation
Bio Energy Resources Limited (BERL) Jatropha project	
Majete REDD+ Project	Africa Parks
Dzalanyama Forest Conservation Project	Japan Government, GEF/ UNDP Small Grants
National Programme to Manage Climate Change in Malawi and Malawi Africa Adaptation Programme	UNDP, World Bank, DfID
Malawi Africa Adaptation Programme (Japanese supported and implemented under the Climate Change Programme).	Japanese Govt
Lake Chilwa Basin Climate Change Adaptation Programme (LCBCCAP)	The Royal Norwegian Embassy
Adaptation to Climate Change on Access and Use of water and Forestry Resources in the Liwonde- Mangochi Protected Area Complex in Malawi to enhance Food Security	
Sustainable Land Management in The Shire River Basin Project (GEF/UNDP)	Govt of Malawi, GEF/UNDP
SADC Support Programme on Reducing Emissions from Deforestation and Forest Degradation (REDD)	

## 7. RECOMMENDATIONS AND CONCLUSIONS

Malawi is one of the most vulnerable countries to the effects of climate change. The major climatic events include: dry spells, droughts, floods and heat waves. These have had devastating effects on food, water, health and energy, negatively impacting on the sustainable livelihoods of vulnerable rural communities. Some of these events have increased in frequency, magnitude and geographical coverage, thereby negatively affecting the socio-economic well being of all Malawians.

Forests and rangelands are an important component of the environment. The sector needs support to achieve sustainable forest management, preparation for participation in the UNFCCC REDD+ initiative and implementation of mitigation and adaptation forestry programmes.