Malawi Country Climate Risk Assessment Report

Irish Aid, Resilience and Economic Inclusion Team, Policy Unit

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List of Acronyms

ADB	African Development Bank
AFOLU	Agriculture, Forestry and other Land Use
CAADP	Comprehensive African Agriculture Development Program
CC	Climate Change
CEPA	Centre for Environmental Policy Advocacy
CISANET	Civil Society Agriculture Network
COFs	Climate Outlook Forums
CSO	Civil Society Organisations
CSP	Country Strategy Paper
DCCMS	Department of Climate change and Meteorological Services
DFID	The Department for International Development –United Kingdom
DJF	December, January and February
DoDMA	Department of Disaster Management Affairs)
DRR	Disaster Risk Reduction
ENRM	Environment and Natural Resource Management
ENSO	El Niño Southern Oscillation
EU	European Union
FAO	Food and Agriculture Organisation of the United Nations
GCF	Global Climate change Fund
GCM	*GENERAL CIRCULATION MODELS*
GDP	Gross Domestic Product
GHGs	Green House Gases
HDI	Human Development Index
IIED	International Institute for Environment and Development
INDC	Intended Nationally Determined Contribution
IPCC	Inter-governmental Panel in Climate change
ITCZ	Inter-tropical Convergence Zone
LDCF	Least Developed Countries Fund
LUCF	Land use Change and Forestry
M&E	Monitoring and Evaluation
MAM	March, April & May
MGDS II	The Malawi Growth and Development Strategy
MOFDP	Ministry of Finance and Development Planning
MPI	Multi-dimensional Poverty Index
NAMAs	Nationally Appropriate Mitigation Actions (NAMAs).
NAP	National Adaptation Plan
NAPA	The National Adaptation Programme of Action
NCCMP	National Climate Change Management Policy
NDC	Nationally Determined Contribution
ND-GAIN	The Notre Dame Global Adaptation Initiative
NGO	Non-Government Organisation
NOAA	National Oceanic and Atmospheric Administration
ODA	Official Development Assistance
OECD	Organisation for Economic Co-operation and Development
SDG	Sustainable development goal
SON	September, October & November
SP	Social Protection
UNDP	United Nations Development Programme
UNFCCC	United nations Framework Convention on Climate Change
USAID	United States Agency for International Development
VSLAs	Village Savings and Loan Associations
WMO	World Meteorological Organization
WRI	World Resources Institute

Executive Summary

The economy and livelihood of Malawi is largely dependent on its natural resources, either from the land (agriculture), biodiversity (agriculture, forestry, tourism) or water (agriculture, fisheries, energy, health) as well as on its climate (rain fed agriculture) for foreign currency, employment, food security and raw materials for industrial production. This dependence on natural resources, coupled with rapid population growth, makes Malawi particularly vulnerable to the impacts of climate change and variability. Climate change has also exacerbated systemic inequalities between women and men, given that they experience climate impacts differently based on their capacities and vulnerabilities.

Climate variability and change are already affecting Malawi, which has experienced greater incidences of dry spells and intense rainfall events over the last two decades. These changes have led to an increase in the frequency of floods, droughts, pest and disease outbreaks, with severe economic and social consequences. Historical observations indicate the average annual temperatures have risen by 0.9°C since 1960, with changes in patterns of El Niño and La Niña, thus increasing climate variability and uncertainty. Climate projections indicate an increase in average annual temperatures. Even with an estimated increase in total annual rainfall, the number of rainfall events is likely to decrease, with significant increases in the intensity of each episode. Frequency of droughts and floods is likely to increase under the projected scenarios.

The Department of Climate change and Meteorological Services (DCCMS), under the Ministry of Natural Resources, Energy and Mining is making efforts to offer weather and climate services to meet the needs of the users but they are still plagued with challenges of weak policy and institutional support, inadequate technological and marketing capacity to meet the needs of an increasing sophisticated public and private sector clientele. However, with support from UNDP, the Government of Malawi has accessed the innovative Green Climate Change Funds of $12.3 million focusing on building weather- and climate-related services.

The Government of Malawi has put in place several policies and strategies to address climate change impacts across the different sectors including the Nationally Determined Contributions (NDC) as a requirement for UNFCCC to track and reduce emission targets. There are also institutional mechanisms for coordination of climate change action, however, challenges remain, including inadequate systems to mainstream climate change adaptation issues into national and subnational level planning processes and activities, coordination between different stakeholders, data collection and monitoring of climate-related changes as well as capacity and financial constraints to carry out adaptation actions both at national and local level.

The Irish Aid Malawi country strategy 2016-2020 is aligned with the Government of Malawi's National Growth and Development Strategy and also advances Ireland's aid effectiveness commitment in promoting collaboration and joint programming with other Development Partners. The overall goal is to increase the resilience of poor households to economic, social and environmental shocks in line with Malawi's growth and development strategy. Broadly the programme contributes to climate change through financing and support to implementation of the national social protection programme, enhanced community resilience programme, energy for the poor, agriculture and livelihoods programming, humanitarian response and disaster risk reduction and through research and learning promoted through the climate change and development learning platform, https://www.climatelearningplatform.org/key-partner-countries/Malawi managed by Irish Aid and International Institute for Environment and Development (IIED).

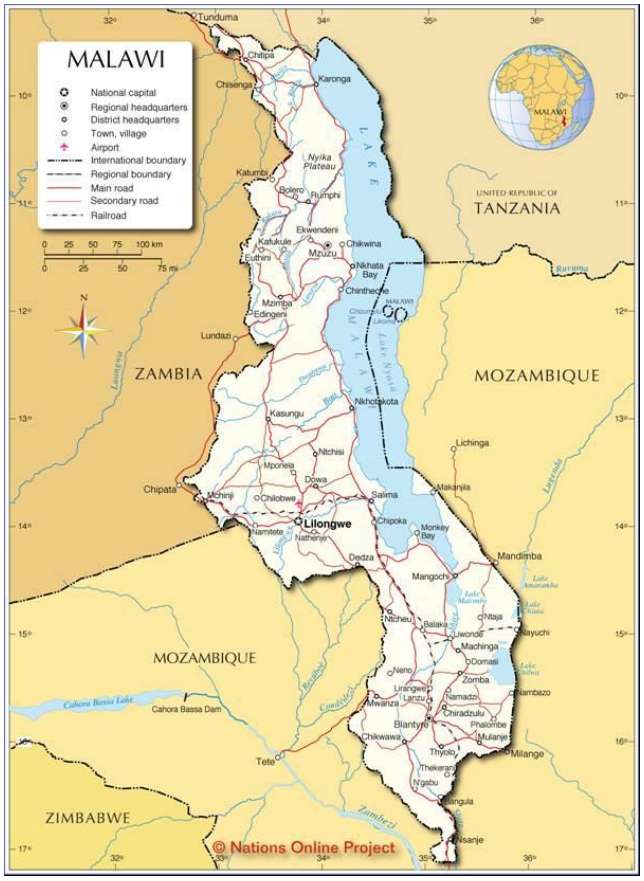
To improve programming and reduce vulnerability of the country and communities to climate change impacts, the following is recommended;

- Strengthen integration of climate change in development planning focusing on the nexus between climate change, disaster risk reduction, humanitarian response and development. This will reduce vulnerability and build resilience and sustainable development, given Malawi's vulnerability to climate change impacts
- Increased focus on addressing climate risks while focusing on inclusive economic models that can increase incomes for the poor
- Humanitarian response should take into consideration long term mitigation actions to reduce impacts than just reacting to emergencies. Resilience programming will be important to manage risks, focus on long term programming and financing while strengthening viable and innovative models for economic growth
- Coherent national policy efforts to promote and nurture entrepreneurship and private sector are necessary to create enabling conditions for industrialisation. This will require multipronged efforts to improve the business environment, develop skills, and strengthen provision of business development services to Micro, Small and Medium Scale Enterprises.
- Climate risk management and strengthening of food systems approach will be important across all development programmes to improve food security, nutrition, but also enhance economic development for the poor who depend on agriculture for their livelihoods
- Programmes should consolidate gains made and improve climate resilient approaches for agriculture, energy and forestry sectors to reduce emissions but also strengthen the adaptation and mitigation co- benefits. Energy, Agriculture and forestry sectors are the main causes of increase in greenhouse gas emissions in Malawi and they are vulnerable to climate change.
- Capacity building and systems strengthening of Government structures at national and sub national levels will be key to improve sustainable development, planning for uncertainties, managing risks and reducing vulnerabilities resulting from climate change and disaster impacts.
- Investment in generating and disseminating accurate, timely and reliable weather and climate information will be important to inform different sector adaptation and climate risk management plans and decisions regarding changes in climate.
- Gender analysis should be done across all climate change adaptation and mitigation programmes to understand the different capacities and vulnerabilities of women and men, boys and girls and ensure they are participating in climate decision making and that their vulnerabilities are reduced.

Malawi's global vulnerability ranking places it among the most at risk countries, highly susceptible to hazard, with high vulnerability scores and low coping capacity. The high vulnerability and low readiness scores of Malawi implies that it has both a great need for investment and innovations to improve readiness and a great urgency for action to address climate change impacts and strengthen the resilience of different sectors to the threats of climate change. This will greatly contribute towards sustainable social and economic development of Malawi and its people.

1.0. Country Context

Malawi is located in the southern part of Africa with a total area of 119,140 km2, of which 20% is water. The country is located between latitudes 90° 221° and 170° 031° S and longitude 330° 401° and 350° 551° E. The country has a tropical climate with variable temperatures, relative humidity and fertile soils[1]. The country's topography is highly varied; the Great Rift Valley runs North to South through the country, containing Lake Malawi, and the landscape around the valley at an elevation of around 800-1200m, but with peaks as high as 3000m. The country's climate is tropical, but the influence of its high elevation means that temperatures are relatively cool.[2]



According to the World Population review, January 2018, Malawi has a land area of almost 118,484 square kilometers, with an estimated population of 18,921,352 million which ranks 61st in the world. Malawi still has a fairly low population density of 129 people per square kilometer (86th in the world). However, Malawi is growing rapidly with a 3% annual growth rate. By 2050, the population is expected to hit 45 million, which is almost triple the 2010 population[3].

Real Gross Domestic Product (GDP) grew by 5.7% in 2014, but slowed down to 2.5% in 2016 after two consecutive years of drought, which has adversely affected the performance of agriculture, which accounts for about a third of the country's GDP. Flooding in southern districts, followed by countrywide drought conditions caused a decline in agricultural production. Maize, the key crop for food security purposes, had a 30.2% year-on-year drop in production. With the decline in maize production, the Malawi Vulnerability Assessment Committee estimates that 6.5 million people will require food assistance.[4] Poverty and inequality remain high in Malawi. Poverty has been increasing in rural areas where 85% of the population lives, compared to urban areas where it fell significantly from 25 to 17%. A key obstacle to reducing poverty is low agricultural productivity. The majority of the poor remain locked in low productivity subsistence farming (World Bank 2017).

Malawi's Human Development Index (HDI) value for 2015 was at 0.476, which put the country in the low human development category placing it at 170 out of 188 countries and territories. Between 1990 and 2015, Malawi's HDI value increased from 0.325 to 0.476, an increase of 46.4 percent. However it is still below the average of 0.497 for countries in the low human development group and below the average of 0.523 for countries in Sub-Saharan Africa (UNDP, 2016).

[1] Malawi National Biodiversity Strategy and Action Plan II (2015 – 2025)
[2] Mcsweeney et al, 2014
[3] http://worldpopulationreview.com/countries/malawi-population/ accessed on 18/01/2018
[4] http://www.worldbank.org/en/country/malawi/overview

The most recent survey data that were publically available for Malawi's Multidimensional Poverty Index (MPI)[5] for 2013/2014 reported that 56.1 percent of the population are multi-dimensionally poor while an additional 27.2 percent live near multidimensional poverty. The MPI shows that income poverty only tells part of the story, because there are other forms of deprivation that the poor suffer and they affect their livelihoods. In the case of Malawi, the multidimensional poverty headcount is 14.8 percentage points lower than income poverty. This implies that individuals living below the income poverty line may have access to non-income resources. The contributions of deprivations in each dimension in relation to education, health and living standards to overall poverty complete a comprehensive picture of people living in multidimensional poverty in Malawi

Climate variability and change are already affecting Malawi, which has experienced greater incidences of dry spells and intense rainfall events over the last two decades. These changes have led to an increase in the frequency of floods, droughts, pest and disease outbreaks, with severe economic and social consequences. The Government of Malawi has recognised the challenges and have initiated activities to determine vulnerability and adaptation priorities, and to integrate this knowledge into development and sectoral planning. However, challenges remain, including inadequate systems to mainstream climate change adaptation issues into national and subnational level planning processes and activities, data collection and monitoring of climate-related changes as well as capacity and financial constraints to carry out adaptation at the local level. Climate change adaptation is particularly important for a country like Malawi because of its high vulnerability or susceptibility to climatic factors[6]. Malawi's economy is dependent on rain-fed agriculture for foreign currency, employment, food security and raw materials for industrial production. Thus improving the resilience of different sectors to the threats of climate change would greatly contribute towards sustainable social and economic development of Malawi and its peoples[7]

2.0. Current and future Climate scenarios for Malawi

Malawi's climate is tropical, but the influence of its high elevation means that temperatures are relatively cool. In winter (JJA) temperatures drop to around 18-19°C, and in the warmest months (September to January) temperatures range from 22-27°C. Wet season rainfalls depend on the position of the Inter-tropical Convergence Zone (ITCZ) which can vary in its timing and intensity from year to year. In the south of Malawi the wet season normally lasts from November to February bringing around 150-300m per month, but rain continues into March and April in the north of the country as the ITCZ migrates northwards. Topographical influences also cause local variations to the rainfall with the highest altitude regions receiving the highest rainfalls. Inter-annual variability in the wet-season rainfall in Malawi is also strongly influenced by Indian Ocean Sea Surface Temperatures, which can vary from one year to another due to variations in patterns of atmospheric and oceanic circulation. The most well documented cause of this variability is the El Nino Southern Oscillation (ENSO). The influences of ENSO on the climate of Malawi can be difficult to predict as it sits between two regions of opposing climatic response to El Niño. Eastern equatorial Africa tends to receive above average rainfall in El Niño conditions, whilst south-eastern Africa often experiences below average rainfall. The opposite response pattern occurs in La Niña

[5] Identifies multiple overlapping deprivations suffered by households in 3 dimensions: education, health and living standards
[6] USAID 2012
[7] UNDP 2016

episodes. The response of climate in each of these two regions, and the extent of the area affected, varies with each El Niño or La Niña event causing mixed responses in Malawi.[8]

2.1. Current Climate Trends

Temperature

Mean annual temperature has increased by 0.9°C between 1960 and 2006, an average rate of 0.21°C per decade. Daily temperature observations show significantly increasing trends in the frequency of hot days [9] and nights in all seasons. The average number of 'hot' days per year in Malawi has increased by 30.5 (an additional 8.3% of days) between 1960 and 2003. The average number of 'hot' nights per year increased by 41 (an additional 11.1% of nights) between 1960 and 2003. The rate of increase is seen most strongly in DJF when the average number of hot DJF nights has increased by 5.5 days per month (an additional 17.6% of DJF nights) over this period.

Historic Weather and Climate

- Observations indicate that average annual temperatures have risen 0.9°C since 1960, an average rate of 0.21°C per decade.
- Changes in patterns of El Niño and La Niña, have increased climate variability and unpredictability.
- Long-term precipitation trends have been difficult to establish for Malawi given the high degree of intra- and inter-year variability in rainfall.
- There has been a noted increase in the frequency of flooding and drought events.

USAID, 2012

In comparison, the frequency of cold days [10] and nights have decreased significantly since 1960 in all seasons except in September, October and December (SON). The average number of cold days per year has decreased by 16 (4.3% of days) between 1960 and 2003. This rate of decrease is most rapid in March, April and May (MAM) when the average number of cold MAM days has decreased by 2.4 days per month (7.2% of MAM days) over this period.[11]

Precipitation

Year-to-year variability in rainfall is very sequential in Malawi and this can make it difficult to identify long term trends. Observations of rainfall over Malawi do not show statistically significant trends. Wet-season (DJF) rainfall over Malawi in 2006 was particularly low, causing an apparent decreasing trend in DJF rainfall but there is no evidence of consistent decreases. There are no statistically significant trends in the extremes indices calculated using daily precipitation observations.

Results from a regional analysis for southern Africa from six downscaled General circulation Models (GCMs) showed annual rainfall increases for Malawi. However, Model simulations show wide disagreements in projected changes in the amplitude of future El Niño events. Malawi's climate can be strongly influenced by ENSO, thus contributing to Uncertainty in climate projections for this region[12].

[8] UNDP Climate Change Country Profiles Malawi http://www.ndr.mw:8080/xmlui/handle/123456789/1117

[9] Hot' day or 'hot' night is defined by the temperature exceeded on 10% of days or nights in current climate of that region and season.

[10] Cold' days or 'cold' nights are defined as the temperature below which 10% of days or nights are recorded in current climate of that region or season

[11] Information on current and future climate trends refer to reports by Mcsweeney et al 2014 and Vincent, K. et al 2014 based on global and regional models

[12] Ibid, 11

2.2. Future Climate projections

Temperature

According to the GCM Projections of Future Climate, the mean annual temperature is projected to increase by 1.1 to 3.0°C by the 2060s, and 1.5 to 5.0°C by the 2090s. Under a single emissions scenario, the projected changes from different models span a range of up to 2.1°C. All projections indicate substantial increases in the frequency of days and nights that are considered 'hot' in current climate. Annually, projections indicate that 'hot' days will occur on 14-32% of days by the 2060s, and 15-53% of days by the 2090s. Nights that are considered 'hot' for the annual climate of 1970-99 are projected to increase more quickly than hot days, occurring on 27-53% of nights by the 2060s and 31-72% of nights by the 2090s. Nights that are considered hot for each season by 1970-99 standards are projected to increase particularly rapidly in December, January and February (DJF), occurring on 47-99% of nights in every season by the 2090s. All projections indicate decreases in the frequency of days and nights that are considered 'cold' in current climate.[13]

Projected Weather and Climate

- An increase in average annual temperatures from the 1970-99 average of 1.1-3.0°C by the 2060s, and of 1.5-5.0°C by the 2090s.
- Projected changes in annual precipitation for the 2030s range from a decrease of 13 percent to an increase of 32 percent from the 1970-99 average.
- Even with an estimated increase in total annual rainfall, the number of rainfall events is likely to decrease, with significant increases in the intensity of each episode.
- There will be an increase in the frequency of droughts and floods.

USAID, 2012

Precipitation

Overall, the models consistently project increases in the proportion of rainfall that falls in heavy events in the annual average under the higher emissions scenarios of up to 19% by the 2090s. These increases mainly arise from increases in heavy events in the wet seasons, DJF and MAM, and are partially offset by decreases in June, July and August (JJA) and SON. The models consistently project increases in 1- and 5-day rainfall maxima by the 2090s under the higher emissions scenarios. These also generally increase in DJF and MAM, but decrease in JJA and SON. The range of projections from different models is large and straddles both negative and positive changes (-13% to +32%). Seasonally, the projections tend towards decreases in dry season rainfall (JJA and SON), and increases in wet season rainfall (DJF and MAM).

While there are large uncertainties in future rainfall projections, decreases in rainfall are likely, particularly by the end of the century. Substantial increases in drought are expected under a business as usual scenario. Decreases in runoff and increased evaporative losses are also projected. These, combined with projected longer dry periods may have serious implications for food production. Countries with a single rainy season, such as Malawi, are expected to experience a delay in onset of precipitation with possible implications for agriculture, which will impact food security and exacerbate poverty and malnutrition[14]

[13] Ibid,11

[14] Trócaire, 2015. http://www.trocaire.org/sites/trocaire/files/resources/policy/malawi-climate-change-case-study.pdf

2.3. Green House Gas (GHG) Emissions for Malawi

According to the WRI CAIT climate data explorer for Malawi for the years 1990-2011, latest emission values excluding Land Use Change and Forestry (LUCF) were 17.73 tCO_2 with per capita GHG emissions of 1.15tCO_2 presenting 65.14% absolute Change from earliest to latest value. Total emissions values including LUCF were at 60.66 with per capita emissions of 1.66tCO_2 and 73.7% as absolute change from earliest (1990) to latest value (2011). The highest emission contributions are from industrial processes, waste, agriculture, LUCF respectively. Emissions from energy are mainly through other fuel combustions whose latest values are 23.48 with per capita emission of 1.52 tCO_2 and 42.49% as absolute change from earliest to latest value. [15]

According to Malawi's NDC, the main sectors contributing to GHG emissions are energy, agriculture, forestry and other land use (AFOLU), and waste. As at 2015, Forestry was contributing 78% of the emissions, followed by agriculture at 16% and energy at 4%. By 2040, Forestry contribution is projected to decrease to 65%, while energy is likely to increase to 17%, while agriculture will be constant. Between 2015 and 2040, total annual GHG emissions are expected to increase from the current level of approximately 29,000 Gg CO2 equivalents to the range of 42,000 Gg CO2 equivalents, an approximately 38% rise. However, there is at present significant uncertainty about future emissions, particularly beyond the year 2020. While some of these uncertainties pertain mainly to internal economic and political factors, as a least-developed country the pace and scope of future emissions growth and the nation's overall pursuit of low-emissions development will also hinge on the provision of international capacity building, technology transfer and financial assistance.

Through the Enhancing Capacity for Low Emission Development Strategies (EC-LEDs) program, Malawi and the United States have been working together to address the primary drivers of deforestation at both national and local scales, improve planning and analysis for low emission development, and secure new sources of climate financing. One of the key engagement has been on **s**trengthening the national GHG Inventory. U.S. climate change experts are working with Malawi's Environmental Affairs Department to improve the quality of GHG inventory data and reporting. GHG inventories are fundamental to tracking progress toward climate change goals, and for accessing new sources of climate change financing.[16]

The Government of Malawi is working with development partners to improve climate change related data management systems. Estimates suggest that between 14,000 and 16,000 Gg of CO2 equivalent will be saved per year by 2030 if a robust low emission development path is adopted.

2.4. Malawi's climate and weather information generation and management

The Department of Climate change and Meteorological Services (DCCMS) is under the Ministry of Natural Resources, Energy and Mining, with a mission of providing reliable, responsive and high quality weather and climate services to meet national, regional and international obligations through timely dissemination of accurate and up to-date data and information for socio-economic development. The department offers different services to the public on climate and weather including Aviation, Marine, agriculture and livestock management, water resources among others.

[15] http://cait.wri.org/profile/Malawi
[16] https://www.ec-leds.org/countries/malawi

The current observational network in Malawi includes 22 manned Surface Synoptic Stations, 15 agro-meteorological stations. There are also 33 Automatic Weather Stations (AWSs), 800 rainfall stations most of which are operated by voluntary observers and less than 100 are active every year. There are also 34 rainfall logging systems but with operational issues. The Upper Air Observation Station and the weather radar are not functional[17].

DCCMS monitors crop farming seasons using observations from a network of weather stations and rain gauges scattered over the country, Satellite information including National Oceanic and Atmospheric Administration (NOAA) rainfall estimates. Also used, is the FAO Crop Specific Water Balance model which relies on information on weather, climate, crop and soil water holding capacities and fortnightly crop reports. DCCMS provides the 10-day Rainfall and Agro meteorological bulletin, Weather forecasts and updates from 3 days, 10 days and seasonal weather forecasts[18]

The Government of Malawi, with the support from UNDP has recently secured funding from the Green Climate Fund (GCF) to scale up the use of modern early warning systems and climate information in the country. The project will be implemented by the Department of Disaster Management Affairs (DoDMA), with implementation support from the hydro-met agencies (Department of Climate Change and Meteorological Services and Department of Water Resources), agricultural extension services, fisheries and farmer agencies. The GCF funding will provide new opportunities to scale up the use of climate information and early warning systems in Malawi. The innovative $12.3 million project focuses on building weather and climate-related services and has the potential of reaching approximately 2 million people, providing farmers, fishers and communities impacted by a changing climate with the information they need to protect lives and build livelihoods. This includes investing in the use of climate information for planning agricultural and on-farm activities, providing warnings of severe weather for fishers on Lake Malawi, improving flood forecasting and monitoring, and fostering information exchanges through mobile platforms[19].

A pilot study on the use of climate information in decision-making in Malawi found that ministries and departments are not yet using medium to long term (5–40 years) climate projections, despite the availability of regionally downscaled information and the latest projections reported by the Intergovernmental Panel on Climate Change (IPCC). Current barriers that prevent use of weather and climate information in planning are the scale, accessibility and timing of information, as well as the nature of policy planning cycles.[20]

Key Challenges

Whereas there is a strategic plan in place and the policy is under development, the DCCMS does not have the required national legal instruments to define the mission and mandate of the Department. Their responsibilities and mandate are not well defined in the national policy and regulatory framework. Resource allocation to the department is also minimal affecting effective services including upgrading of equipment, plants and instruments required for improved

[17] Chavula, A. 2013. Weather Infrastructure and Expertise in Malawi (presentation by DCCMS during WMO workshop)

[18] https://www.metmalawi.com/

[19] UNDP, 2016

[20] Vincent, K, et al. 2015

information, products and services. With the current levels of funding, modernization of Meteorological Services and capacity development for staff will not be achieved.[21]

There are also challenges with the inadequate technological and marketing capacity to meet the needs of an increasing sophisticated public and private sector clientele as well as coordination and proper guidelines for meteorological, hydrological and climate related services. There are also challenges with Data Base Management Systems, production and dissemination of timely and accurate seasonal forecasts, numerical prediction and climate modelling, enhancing climate research services and technical as well as human capacity.

A study conducted on the actual and potential weather and climate information needs for development planning in Malawi[22] found out that the current weather and climate information is viewed as inappropriate to spatial and temporal scales of decision-making, since it is not downscaled to suit agro-ecological zones. For effective climate risk management, DoDMA for example would require timely information with spatial distribution of extreme events, as opposed to probabilistic average conditions currently offered by seasonal forecasts which makes early warning difficult to achieve.

Accessibility of weather and climate information is also widely considered a problem. Key issues revolve around interpretation and translation of the technical jargon into advice that can be used and further disseminated and tailored to the information user, including being made available in local languages and to illiterate users. Accuracy, reliability and uncertainty is also a challenge given the limitations of climate projections since there is not one set of scenarios that has been generated for specific use in Malawi. Timing of the receipt of climate information is also problematic. In the above study, the Government respondents did not think that the information they receive or the form in which it is provided is adequate, thus limiting their confidence and willingness to issue early warnings. Other ministries also said that they do not always receive information in a form that can help them to give early warning and prepare for disasters.

The level of downscaling of the weather information is also not adequate. The geographical range of the information is too large, so there is always generalisation for different agricultural zones. Lack of downscaling is due to the hardware/ equipment that the DCCMS have access to. This means that they cannot pick up sudden extremes e.g. heavy rain and strong winds.

Climate information is becoming more relevant for most sectors especially agriculture to support decision making and reduce uncertainties poses by climate variability and climate change. The Government of Malawi will need to strengthen the DCCMS in terms of financing and human resource capacity to be able to offer better services, given the climate change uncertainties.

3.0. Climate Change Hazards, Impacts and Vulnerability

Malawi is experiencing climate related hazards and extreme events which are increasing vulnerability of the communities to climate change across all sectors. This section summarises the climate change hazards experienced in Malawi, the impacts and vulnerability across sectors and categories of people.

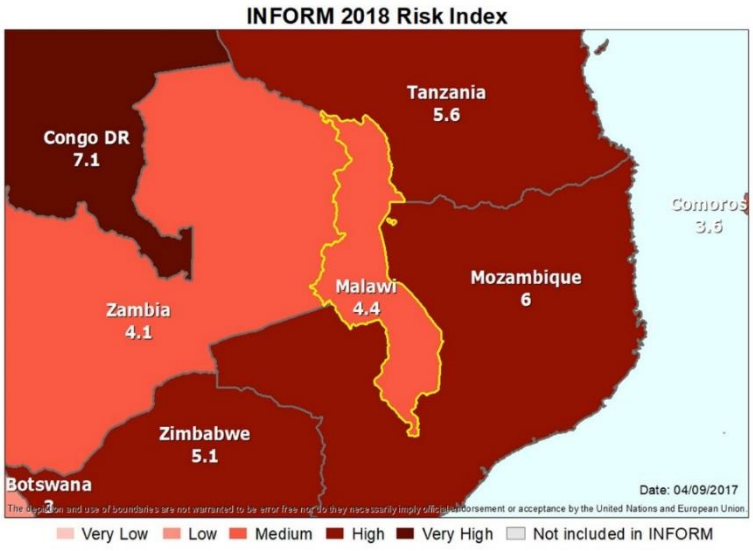
[21] Ibid, 20
[22] Vincent, K, et al. 2014

3.1. Climate change Hazards in Malawi

Malawi is already experiencing climate variability and change which has led to increase in incidences of dry spells and intense rainfall events over the last two decades. These changes have led to an increase in the frequency of floods, droughts, and pest and disease outbreaks, with severe economic and social consequences. With projected increases in temperatures, more erratic precipitation patterns, and increasing frequency and intensity of extreme weather events, already distressed economic and social systems in Malawi are likely to become more strained.

The World Bank climate profile states that Malawi is particularly prone to adverse climate hazards including dry spells, seasonal droughts, intense rainfall, riverine floods and flash floods. Between 1967 and 2003, the country experienced six major droughts and 18 incidences of flooding, which heavily impacted smallholder farmers. The 2011-12 droughts had severe effects on food security in many districts, with approximately 2 million people affected, particularly in the southern districts. Malawi has just recovered from an intensive flood event in 2015, which left many lives and livelihoods destroyed. The drought conditions (due to a strong El Niño) in 2015 resulted in extensive crop failures and, combined with rising food prices, up to 2.8m people were faced with worsening food security situation. According to the ND GAIN index[23] report for 2015 the high vulnerability score and low readiness score of Malawi i mplies that it has both a great need for investment and innovations to improve readiness and a great urgency for action. Malawi is the 39th most vulnerable country and the 21st least prepared to address climate impacts.

According to the 12th edition of the analysis of the Global Climate Risk Index,[24] less developed countries are generally more affected than industrialised countries, which may serve as a red flag for already existing vulnerability that may further increase in regions where extreme events will become more frequent or more severe due to climate change. Among the LDCs, Mozambique and Malawi were the most affected countries in 2015. The heavy rainfalls due to the intensified monsoon in South Eastern Africa which started in December 2014 and continued throughout January and beyond had disastrous consequences for infrastructure, agriculture and food security. Malawi was the 3rd most affected country hardest hit by the floods resulting from the torrential rainfalls. Around 638,000 people were affected with more than 170,000 still displaced months later. The climate risks are likely to increase the country's vulnerability, which is already high.



The Index for Risk Management (INFORM) statistics for 2018, ranked Malawi as medium risk being the 63rd out of 191 most at risk country, and the 123rd in terms of hazard and exposure, the 35th in terms of vulnerability and the 43rd in terms of lack of coping capacity. The INFORM model adopts the three aspects of vulnerability reflected in the UNISDR definition.

[23] The ND-GAIN Country Index, summarizes a country's vulnerability to climate change and other global challenges in combination with its readiness to improve resilience

[24] The Global Climate Risk Index analyses to what extent countries have been affected by the impacts of weather-related loss events

According to the report, the key hazards for Malawi are droughts and floods and the vulnerability scores are higher on social economic impacts, increased inequality which also affects vulnerable groups with impacts on development and high dependency on Aid. Malawi's low coping capacity is in areas of Governance, Infrastructure, communication and access to health services. INFORM is a global, open-source risk assessment for humanitarian crises and disasters. It can support decisions about prevention, preparedness and response.

3.2. Climate change Impacts and Vulnerability

Social Economic Statistics for Malawi

Population 2017: 18,294,524 [25]

Total Fertility Rate 2015[26]; 5 (no. of children per woman)

GDP per capita, PPP[27] (international $) 2015: 1,183.6

HDI 2015: 170 out of 188 countries[28]

Gender Inequality Index 2016; 145 of 187 countries[29]

Vulnerability Rank 2015; 155 out of 178 countries[30]

Climate Risk Index 2015; 80 out of 187 countries

3.1. Climate change Impacts on Agriculture and Food security

Agriculture is the backbone of Malawi's economy, however, the country is highly food insecure. About 1.8 million people (9.5% of the population) were food insecure in 2013/2014. A second consecutive year of drought recorded a decline of 14.7% over the 30% recorded in 2015 in the production of maize. Vulnerability to climate challenges manifested in a humanitarian crisis in 2016 with estimates of over 6.5 million people left food insecure and about 25% of Malawi's population were 'undernourished' between 2010 and 2012. Food prices are volatile, Malawi is highly aid dependent, and the population is expected to more than double in the next 40 years. Current and future food security are therefore critical. Malawi was amongst countries in the Southern African Region worst affected by the drought, with 36% of the population requiring food relief (WB 2014; Grist, 2015; Bhatia and Mwanakatwe, 2017)

Climate change, through higher temperatures, land and water scarcity, flooding, drought and displacement, negatively impacts agricultural production and causes breakdown in food systems. These disproportionally affect those most vulnerable people at risk to hunger and can lead to food insecurity. Vulnerable groups risk further deterioration into food and nutrition crises if exposed to

[25] World Population review

[26] http://data.worldbank.org/indicator/SP.DYN.TFRT.IN

[27] World Bank Data – GDP per capita, PPP http://data.worldbank.org/indicator/NY.GDP.PCAP.PP.CD

[28] UNDP 2016; Human development Index report

[29] http://hdr.undp.org/en/composite/GII

[30] ND GAIN country index

extreme climate events. In Malawi, the prevalence of stunting in children under age 5 was 42.4% in 2014, the prevalence of underweight children and wasting in children under 5 was 16.7% and 3.8%, respectively, in 2014. As Malawi's agricultural sector is based mostly on small rain-fed farms, yields are reduced by droughts and floods as well as low use of agricultural inputs (USAID 2012; WFP 2014; WHO, 2015; Grist, 2015). It is crucial for Malawi to build resilience to weather-related shocks to attain food security and to achieve sustainable development.

According to the IPCC 2014, the Maize based systems are among the most vulnerable to climate change, with estimated yield losses from 18-22% across sub Saharan Africa. Malawi's agriculture is predominantly smallholder focused, with droughts and floods exposing smallholder farmers to food insecurity, poor nutrition and loss of income which increases poverty levels. Several adaptation strategies have been devised, including changes in crops grown and changes in growing patterns, however, smallholder farmers have faced limitations in adapting to climate change because they lack capacity including knowledge, skills and finances to adapt. Rain fed smallholder agricultural production is responsible for 80% of food production but largely depends on the weather. Commercial farming produces only 20% of the food but it contributes over 80% of agricultural exports (Khamis, 2006; Grist, 2015). A balance is required between commercial production and nutrition needs through support to small holder farmers who are mostly responsible for food production.

- Smallholder agriculture largely sustains staple food production for growing populations in the poorest countries. Escalating climate risks need to be addressed through climate adaptation investments by local people and/or authorities at household, watershed, and local agricultural system and sector/national levels.

- Climate resilient agriculture requires investments in all-weather communications infra-structure, downscaling climate models to local needs and integrating with decision support tools, and landscape level investments in water resources, soil conservation, afforestation etc.
- Transforming poor people's lives who depend upon agriculture will require provision of health, social protection and education services in addition to managing climate risks to small holder farmers

Irish Aid & IIED, 2017

Malawi has advanced Climate Smart Options for Agriculture focusing on hard technologies to improve resilience and food security at farm level. However, climate smart approaches to food security should also include analysis further up the agricultural value chain, to reduce post-harvest losses, and also build in commercial possibilities for smallholder agriculture to link to markets. In addition, both the smallholder and commercial sector need to incorporate an understanding of the predicted impacts of climate change into their activities. Several initiatives on building resilience and climate smart agriculture are underway, however, they are currently piecemeal and require better coordination from local to national and across sectors.

The Malawi Growth and development Strategy (MGDS) II review report 2016 recommended that the MDGS III should take measures to implement a national food and nutrition security strategy, aligned to the SADC Food and Nutrition Security Strategy, given that Malawi has high levels of food insecurity and malnutrition with the world's highest child stunting rates. Although child stunting rates reported in the past 5 years have improved, from 47 percent in 2010, to 42.4 percent, in 2013, Malawi is still in a perilous position.

3.2. Climate change impacts on Environment and natural resources

The Malawi Growth and development Strategy II review report 2016 acknowledges that Malawi is amongst countries with low capacity to adapt to climate change, and limited capacity to manage the country's environment and natural resources, which include land, forestry, fisheries and water. Key challenges and constraints which limit the capacity of the country to adapt to climate change and in managing the environment and natural resources include; Inadequate capacity and training at individual and institutional levels in the implementation of policies, rules and regulations; inadequate expertise and equipment to determine the quantity, quality of various kinds of natural resources and lack of enforceable measures to use them to maximum benefit for the common good; Inadequate capacity to mobilize investment and resources into environment and natural resources based industries is also identified as critical. The outcome of these bottlenecks has been a plunder of natural resources through over-exploitation by self-interested opportunists. Women have been greatly affected due to increased energy poverty. On a positive note, Malawi has managed to develop an excellent array of polices and strategies, with a view to ensuring more sustainable use of the environment and natural resources, and better capacity to cope with climate change. The policies, however, need to be implemented and laws enforced.

3.3. Climate Change, Deforestation and Land Degradation

The country is affected by other environmental challenges especially deforestation and land degradation. The forest cover in Malawi has declined from 3.9 million ha in 1990 to 3.2 million ha in 2010, with an annual deforestation rate of almost 1% during the period 2005-2010, one of the largest in the eastern half of Africa. Forest ecosystems in Malawi provide resources and services that are critical for the health and livelihoods of communities and for the greater economy. Forests have been negatively affected by decades of deforestation, which has been driven by conversion to farmland, slash and burn agriculture, charcoal burning, bush fires and harvesting of wood (for tobacco curing, smoking fish, timber, poles, etc.) The reduction in tree cover has localized impacts on the land's ability to absorb and slow water during floods. The reduction of forests in Malawi also reduces the safety net of many rural inhabitants, as many poor farmers in southern Malawi depend on forests as a source of food and income during food shortages and crop failure (USAID, 2012).

Soil degradation has also led to soil losses averaged 20 T/ha/year, which translated in a yield loss of 4% - 25% every year. The effects of soil erosion and deforestation undermine further the livelihoods of rural communities and exacerbate the extent of food insecurity and rural poverty in Malawi. Loss of fertile soils also has several negative impacts on water cycle, biodiversity and supportive ecosystem services (Coulibaly, et al. 2015)

3.4. Climate change Impacts on Water resources

The projected increases in both droughts and floods are likely to cause stress on the country's water resources. Flooding can increase siltation and debris collection behind large dams, which can have a significant impact on power generation. In addition, severe droughts can cause a reduction in power production by reducing available water resources. Droughts can also lead to localized depletion of groundwater, making local boreholes insufficient to reach dropping water tables, which recede during droughts (USAID 2012). The Fifth Assessment Report (AR5) of the Intergovernmental Panel on Climate Change (IPCC) notes that climate change is beginning to impact freshwater ecosystems with elevated surface water temperatures evident in Lake Malawi.

Increases in temperature will lead to increases in evaporation and water stress, which will negatively affect crop growth, storage and transport to markets.

Malawi faces increased inland river flood risk due to climate change. It is projected, that by 2030, an additional 10,900 people may be at risk of river floods annually as a result of climate change and 12,400 due to socio economic change above the estimated 14,400 annually affected population in 2010 (WHO and UNFCCC, 2015). According to the Malawi Growth and development Strategy II review report 2016, Malawi recognises the background of failures associated with rain fed farming thus the need to develop the country's irrigation potential to ensure sustainable agricultural transformation and food self-sufficiency. Despite Malawi's massive irrigation potential of up to 471, 000ha, only a relatively small proportion of irrigable land has been fully exploited, with about 21 percent of the existing potential realized.

At the policy level, the review report notes the lack of clear coordination, low technological capabilities, characterised by lack of skills to drive the sector. Available reports show that with irrigation, smallholder productivity can increase by 1.1 tons per hectare while medium and large scale productivity can increase by 2.0 tons. The National resilience strategy, 2017 proposes to promote management systems and technologies that protect fragile land (river banks, dambo areas, steep slopes and hilly areas and water catchment areas)

Climate change affects the function and operation of existing water infrastructure as well as water management practices. Current water management practices are very likely to be inadequate to reduce the negative impacts of climate change on water-supply reliability, flood risk, health, energy and aquatic ecosystems

An increase of 5–8% (60–90 million ha) of arid and semiarid land in Africa is projected by the 2080s under a range of climate change scenarios.

IPCC, 2008

Aquatic freshwater ecosystems are of fundamental importance to the health and livelihoods of many citizens of Malawi, and they host exceptionally high biodiversity. Freshwater lakes also serve as a significant source of potable water and support the fishing industry. These critical resources are under pressure from a number of non-climate stressors, such as overexploitation of fisheries. Other non-climate stressors, such as poor land management and deforestation, have also had consequences for Malawi's aquatic ecosystems. Climate change can aggravate these impacts and have negative consequences on fish stocks and the biodiversity of Malawi's fisheries.

3.5. Climate Change Impacts on Health

Increased temperatures, droughts, and floods will result in a range of direct and indirect impacts to heath. Malaria is of particular concern to Malawi. As temperatures becomes warmer, it will become more suitable for breeding of mosquitoes even at higher altitudes, which historically have not been exposed to Malaria. Additionally, Malawi has one of the highest rates of HIV/AIDS in sub-Saharan Africa. The disease has an effect on households' ability to cope with climate change by reducing available labor and income, reducing local knowledge and skill base, and increasing healthcare expenditures. HIV/AIDS also increases the nutritional requirements of infected populations, increasing demand for food even as climate change enhances the pressures on food production (USAID 2012)

Some of the world's most contagious infections are also highly sensitive to climate: temperature, precipitation and humidity have a strong influence on the life-cycles of the vectors and the infectious agents they carry and influence the transmission of water and food borne diseases.

Climate conditions are projected to become significantly more favourable for transmission, slowing progress in reducing burdens, and increasing the populations at risk if control measures are not maintained or strengthened. For example, in the baseline year of 2008 there were an estimated 7,300 diarrhoeal deaths in children under 15 years old. Under a high emissions scenario, diarrhoeal deaths attributable to climate change in children under 15 years old is projected to be about 10.6% of the almost 5,800 diarrhoeal deaths projected in 2030. Although diarrhoeal deaths are projected to decline to about 3,100 by 2050 the proportion of deaths attributable to climate change will rise to approximately 14.9% (WHO and UNFCCC, 2015.) Climate change is expected to increase mean annual temperature and the intensity and frequency of heat waves resulting in a greater number of people at risk of heat-related medical conditions. The elderly, children, the chronically ill, the socially isolated and at-risk occupational groups are particularly vulnerable to heat-related conditions

Towards 2070, under both high and low emissions scenarios about 34 million people are projected to be at risk of malaria annually. Population growth can also cause increases in the population at-risk in areas where malaria presence is static in the future.

WHO and UNFCCC, 2015

In terms of household air pollution in Malawi, the percentage of the population primarily using solid fuels for cooking in 2013 was more than 95% for rural areas, 90% for urban with a national total of 95%. Percentage of total deaths from ischemic [31] heart disease, stroke, lung cancer, chronic obstructive pulmonary disease (18 years +) and acute lower respiratory infections (under 5 years) attributable to household air pollution was estimated at 20,300 in 2012. Women and children are at a greater risk for disease from household air pollution. Consequently, household air pollution is responsible for a larger proportion of the total number of deaths from ischemic heart disease, stroke, lung cancer and COPD in women compared to men. In Malawi, about 63% percent of an estimated 5,700 child deaths due to acute lower respiratory infections attributable to household air pollution (WHO, 2012).

Addressing the underlying causes of vulnerability to health impacts will be key in reducing risks. Transition from the inefficient use of solid fuels like wood and charcoal, towards cleaner energy sources of energy could save lives by reducing indoor levels of black carbon. Clean water sources and related hygiene and sanitation practices could positively contribute to reducing the health risks. Women and children are disproportionately affected by household air pollution and water borne diseases among other impacts and thus need policies, skills and knowledge to reduce the risks.

3.5. Economic Impacts of Climate change

The economy of Malawi and livelihood is largely dependent on its natural resources, either from the land (agriculture), biodiversity (agriculture, forestry, tourism) or water (agriculture, fisheries, energy, health). Over half of the population lives below the poverty line and more than 80% of the population practice subsistence agriculture with around 95% of the population in rural areas depending on wood fuel for their energy supply. This dependence on natural resources, coupled with rapid population growth, makes Malawi particularly vulnerable to the effects of climate change and variability (Pauw, Thurlow and Seventer, 2010; USAID, 2012).

In Malawi, agriculture plays a major role in the economy and it is important to also consider the effects that crop losses might have on international trade, production in non-agricultural sectors,

[31] Ischemia is a condition in which the blood flow (and thus oxygen) is restricted or reduced in a part of the body. Cardiac ischemia is the name for decreased blood flow and oxygen to the heart muscle.

labor employment, and household incomes and poverty. Agriculture, which accounts for 28% of GDP, contracted by an estimated 2%, on the back of a 1.6% decline in 2015 following floods in some parts of the country coupled with dry spells. The final crop estimates for the 2015/16 growing season show that production of maize, the main staple crop, decreased by 14% from 2.8 million metric tonnes in the 2014/15 cropping season to 2.4 million tonnes. The impacts of droughts and floods are often discounted or ignored given the infrequent nature of these events. However, these events are costing the Malawian economy 1.7 percent of its GDP every year in terms of production[32].

In 2016, Malawi's economy continued to face challenges emanating from adverse weather conditions. The drought reduced output of maize, the main staple crop, by 14%, necessitating maize imports to meet the supply gap, at a significant cost. The economic challenges were exacerbated by poor tobacco earnings, a rapidly depreciating kwacha, high inflation and high interest rates dampening consumer and business confidence. Average annual headline inflation in 2016 stood at 22.6%, slightly lower than the 2015 figure of 21.0%, with rising food inflation as the main driver. Inflation was projected to fall to 16% by the end of 2017 and decelerate further to 9.7% in 2018 assuming normalisation of food supply, improved fiscal discipline and stabilisation of the kwacha (Bhatia and Mwanakatwe, 2017). Climate change impacts will likely worsen the economic situation for Malawi, among other factors.

Climate change Impacts on Malawi's economy

- Tea, the second largest export crop, decreased by 23%
- Cotton and Sugar production fell by 54% and 21% respectively
- Net domestic borrowing increased beyond the budget by 1% of GDP due to the need to respond to the food crisis
- Real GDP growth is projected to rebound to 4.0% in 2017 and accelerate to 5% in 2018, driven by agriculture and services.
- The risks to the economic outlook for Malawi include; unpredictable weather conditions, inflation, weak tobacco prices and uncertainty over external donor inflows.
- Agriculture, which accounts for 28% of GDP, contracted by an estimated 2%, on the back of a 1.6% decline in 2015

Bhatia and Mwanakatwe, 2017.

The El Niño induced drought of 2016 which affected the entire Southern African Region had a negative impact Malawi's hydro power generation capacity. Power generation was reduced by 30% due to low levels in the Shire River, necessitating load shedding which affected economic activities in sectors such as manufacturing, which experienced low capacity utilisation. The in adequate power supply is also the result of under investment in power generation and transmission. To address power shortages, Malawi has embarked on plans to expand hydro generation capacity and improve the transmission and distribution system. The government is encouraging private investment in the energy sector to develop its potential. However, Malawi needs to also focus on integrated water resources management practices to ensure that water resources are sustained to support the energy industry.

Malawi's overall GDP grew at only 2.7% in 2016, down from 2.9% in 2015. With a population growth rate of 3%, this translated into a 0.3% decline in per capita income growth. In 2017, real GDP growth is expected to improve to 4.0% and subsequently reach 5% in 2018. The basis for economic recovery will be favourable weather conditions, achievement of macroeconomic stability and easing of supply side constraints, including power shortages. Agriculture sector growth is set

[32] Pauw, K., et al, 2010. Droughts and Floods in Malawi; Assessing the economy wide Effects

to rebound to 4%. Recovery of agricultural output and incomes would have positive spill over effects in manufacturing, transport and logistics, wholesale and retail trade and services. Real GDP growth will be further bolstered by public infrastructure projects, especially in transport and energy sectors (World Bank, 2014; Bhatia and Mwanakatwe, 2017)

The government is aware of the significant potential to transform the Malawian agricultural sector through investment in irrigation systems and value added activities. It has developed a new national agricultural policy and is working on incentives to diversify and improve the sustainability of the sector while also improving food security and nutrition. As a goal, the government seeks to commercialise agriculture and promote a shift from subsistence-based to market-based agriculture that includes the creation of agro-processing industries, which have significant economic benefits.

Generally, it is important to use hydrological and meteorological risk models and economic models in an integrated manner to facilitate better understanding of the economic costs of climate uncertainty and the longer-term dynamic implications of extreme climate events. Although it is imperative to quantify the potential economic losses associated with climate uncertainty further research is needed that explicitly considers the risk and uncertainty in designing and evaluating development policies in low-income countries like Malawi (Pauw, et al, 2010). Climate change impacts are cross cutting and will require a multi sectoral approach to reduce the economic impacts on the country. Climate projections for Malawi indicate that drought and flood events are becoming more frequent and uncertain, which suggests that the average annual economic impact might become even greater in the future. It is therefore crucial that policymakers address the severe implications of climate variability of development programmes and vulnerable communities and ecosystems.

3.6. Climate change, Gender inequality and Poverty

According to the Gender Inequality Index (GII),[33] Malawi has a GII value of 0.614, ranking it 145 out of 159 countries in the 2015 index. In Malawi, only 16.7 percent of parliamentary seats are held by women, and 14.9 percent of adult women have reached at least a secondary level of education compared to 24.2 percent of their male counterparts. Educational access is unequal between boys and girls with girls educated to master domestic chores while boys are encouraged to attend schools (Trócaire, 2015; OXFAM 2009). Exposure and sensitivity to climate risks vary between men and women with men having more opportunities than women to adapt to climate change through diversifying livelihoods away from subsistence agriculture. In Malawi women represent the larger proportion of the poorest people and are highly dependent on local natural resources. Therefore they are more likely to be vulnerable to climate variability and change than men because of social and cultural contexts that determine access to resources and the division of labour.

> Women are not just victims of adverse climate effects due to their vulnerability; they are also key active agents of change. Women typically form strong social networks within their communities, which can foster collective management of the risks posed by climate change. However, while their lives are typically closely tied up with natural resources and care giving roles, they are usually excluded from decision-making processes.
>
> UNDP, 2010

[33] Reflects gender-based inequalities in three dimensions – reproductive health, empowerment, and economic activity

Vulnerability also differs, in terms of climate impacts and it's important to identify the most vulnerable categories for effective response. A study by Trócaire (2015) identified the most vulnerable groups as the rural communities, especially women, children, female headed households and the elderly. The 2012/2013 rainy season 12 districts were affected by floods which affected smallholder farmers across the country. It was estimated that in such conditions the poorest households spent 75 per cent of their income on market purchases for food at exorbitant prices.

According to the poverty statistics for 2010, 70.9% of the people in Malawi are living on less than $1.90 a day. The people living below the national poverty line are 50.7% and the country inequality trend (GINI Index) stands at 46.1. A study by Trócaire found out that Malawi has among the highest proportion of the population entering into poverty in the wake of extreme events. This study found that following extreme climatic events under a changed climate, large productivity declines of approximately 75 per cent may be expected under business as usual scenarios.

Women represent the main source of agricultural labour in Africa and the fact that agriculture in tropical and subtropical areas is one of the sectors most vulnerable to climate change, some women remain vulnerable and poor. In fact, women represent the majority of people living on less than a dollar a day (Denton, 2002; UNDP, 2010). For instance, women account for 65 percent of smallholder farmers in Malawi and they are particularly exposed to food insecurity. Therefore, providing them with agricultural advice informed by climate and weather information is of crucial importance (ActionAid, 2015). A study by Kamis, 2006 found out that limited income opportunities in the face of increased floods and droughts have forced women to engage in unsafe sex practices, exposing them to greater risk of HIV. It was reported that girls as young as 13 are being forced into early marriage due to hunger, thus aggravating the impact of HIV and AIDS.

Because of systemic inequities between women and men, there are commonly, but wrongfully, held views that women's economic, political and social status is inferior to that of men. Consequently, women have been traditionally absent from decision-making processes regarding climate policy. Furthermore, cultural norms have also affected the ability of women to adapt to climate change because of the restrictions these norms impose on women (UNDP, 2010). This is counterintuitive since women are more dependent on natural resources for their livelihoods than men are and this renders them more vulnerable to the effects of climate change.

To address climate change inequalities and vulnerability, there is need to support adaptive capacities and reduce high exposure to climate risks and shocks. Government policies need to promote gender integration in all policies and programmes, with focus on targeting the most vulnerable, which have been identified as women, children, female headed households, the elderly and the rural poor. Support to index-based insurance, access to climate forecast and early warning information; facilitating emergency assistance in the form of social safety nets including cash/food transfer will be key in addressing vulnerability. Attention should also been given to the improvement of women's livelihood through better access to productive assets and resources. (Kamis, 2006; Coulibaly, et al. 2015)

3.6.1. Climate change and Youth

It has been globally recognised that the youth constitute the majority of the population in many countries and have an increasingly strong social and environmental awareness, which has the power to transform societies towards a low-carbon and climate resilient future.

The youth profile in Malawi indicates that out of the population of 13.1 million (Population and Housing Census, 2008) more than 40% are persons aged 10 to 35 years, with 67 per cent of the population under age 25 and 54 per cent aged under 18[34]. This has significant implications both for the dependency ratio (which is high) and for the trajectory of future population growth, given the large number of women entering childbearing years which heightens population growth even under circumstances of decreasing fertility. The country's young population is characterized by high incidences of poverty, unemployment, violence, HIV and AIDS, malnutrition, abuse, poor health, high illiteracy rates and psychological disorders. (MDGS II, 2011-2016)

Often the most willing to take risks to better themselves, youth are likely to be at the frontline of those migrating in anticipation of further environmental and resources decline in their communities. While much of this migration is likely to be internal, from rural to urban areas, the impact of climate change will be highly negative. Finding solutions that render adolescents, youth and their families less vulnerable to long-term displacement and trafficking should be a priority for both national and the international community

Students from Malawi articulated how climate change has had devastating effects on them; for example loss of family in floods, food insecurity and interrupted learning, when the schools are used as shelter to house victims during floods. National you initiatives like the youth climate dialogue (YCD) have been organized by the National Climate Change Programme in Malawi, which began in 2013 with UNDP support and focused on mainstreaming of climate change into the education sector.

The UNFCCC extended a constituency status to admit youth NGOs allowing them to receive official information, participate in meetings, request speaking slots and receive logistical support at UNFCCC conferences. In only four years YOUNGO has developed into a vibrant network of youth activists, through which youth make their voices heard and actively contribute to shaping the intergovernmental climate change policies. At UNFCCC conferences YOUNGO makes official statements, provides technical and policy inputs to negotiation groups, and engages with decision-makers through high-level meetings and in informal settings and raises awareness through various advocacy activities. Youth participation has brought moral, intergenerational and equity-based values as well as constructive technical and policy inputs to the negotiations.

United Nations Joint Framework Initiative on Children, Youth and Climate Change

Government of Malawi recognizes that youth have are a rich collection of skills, experiences and capacities. They represent a vast human resource potential which, if properly prepared and tapped, can contribute positively to their personal and national development. The Government put in place the national Youth Policy 2013, and climate relevant policy statements suggest that the youth should be involved in climate change mitigation and adaptation programmes as change agents to promote sustainable development. It also emphasises that environmental and climate change should be mainstreamed in all youth programmes and structures; and that programmes that provide for the participation of the youth in environmental conservation programmes such as tree planting gully reclamation and soil conservation activities should be put in place. This links with the MGDS II which recognized the potential that the youth have in fostering the growth of the economy. The strategy included Youth Development and Empowerment as a key priority area. The goal is to enhance effective youth participation in economic activities, with outcomes on

[34] Martine, George and Daniel Schensul (eds.) 2013. The Demography of Adaptation to Climate Change.

increased absorption of skills, technology and innovations by the youth; increased youth participation in decision making processes and improved coordination of youth programs

However, it will be important to design and fund adaptation strategies that enable youth to cope more effectively with climate change and engage in participatory planning. It is important to recognise that youth can be effective partners in addressing climate change and ensure their involvement in climate actions at different levels. It is also essential to strengthen both formal and informal education on climate change and viable lifestyles. In addition, sustainable production and consumption patterns must be promoted and youth supported as environmental champions in their local communities.

Partnerships should be developed between governments, intergovernmental, non-governmental and youth organizations for joint environmental initiatives aimed at building the capacity of youth as future leaders and driving forces behind a new climate change regime. Considerable efforts are also needed in strengthening the adaptive capability and resilience of youth in rural communities. More efforts must be made to ensure that youth are ready to take advantage of new environment oriented employment opportunities. Growing attention to climate change and sustainable development offers a chance for green economic growth. Green jobs not only provide much needed employment opportunities for youth, they also give youth the opportunity to engage and to contribute directly to the fight against climate change.[35]

4.1. Climate change policy Framework

Malawi is a signatory to various international treaties and instruments including the United Nations Framework Convention on Climate Change (UNFCCC). The Government has put in place a series of legislative sectoral frameworks and strategies to integrate environment and climate change management in socio-economic development activities. Key ones include: Vision 2020; the Malawi Growth and Development Strategies; National Environmental Policy (NEP) 2004; NAPA 2007; National Climate Change Investment Plan (2013); Malawi Energy Policy (2003); Food Security Policy (2006); Disaster Preparedness and Relief Act (DPRA) (1991); Environment Management Act (1996) and the Disaster Risk Management Policy 2015.

Whereas the above policies, strategies and plans are in place, most of them do not explicitly focus on climate change adaptation and mitigation. Climate change issues were classified within the context of general environmental management frameworks and they provide inadequate incentives and enforcement tools for climate change adaptation and mitigation. However, recognising the necessity for a comprehensive climate change specific policy, Malawi Government has of recent put in place specific policies and strategies that specifically address climate change under the national and international climate change framework, recognizing the multi-dimensional and cross-cutting nature of climate change.

[35] Fact sheet by the United Nations Joint Framework Initiative on Children, Youth and Climate Change.

4.1. Key Climate change policies and priority sectors

Policy Name	Policy Priorities
The National Resilience Strategy, 2018-2030	The five year National Resilience strategy aims to break the cycle of humanitarian assistance and has the following pillars; Resilient agriculture growth; Risk Reduction, Flood Control and Early Warning and Response Systems; human Capacity, livelihoods and social protection and Catchment protection and Management. It's a long term plan up to 2030 and it's in line with Sustainable Development Goals. Through the Plan, government brings a multi-dimensional approach to control floods, reduce food insecurity and grow exports, protect and manage the environment and catchments, enhance early warning system and provide social support interventions using a single monitoring and evaluation framework, enhanced coordination, pooling of resources and prioritization.
National climate change management Policy, 2016	The Policy's goal is to promote climate change adaptation, mitigation, technology transfer and capacity building for sustainable livelihoods through Green Economy measures for Malawi. Policy priorities include; Climate Change Adaptation, Mitigation, Capacity Building, Education, Training and Awareness, Research, Technology Development and Transfer, and Systematic Observation and Climate Change Financing. Cross cutting issues include gender consideration, population dynamics and HIV/AIDS.
National climate change investment plan 2003 - 2018	**The plan focuses on adaption and mitigation with the following priorities;** **Mitigation;** Reduction of Emissions from Deforestation and Forest Degradation (REDD+) Waste Management and Pollution Control Programme Enhancing Energy Saving Technology Programme **Adaptation** Integrated Watershed Management Programme Improving Climate Change Community Resilience through Agriculture Production Climate Change Proofing of infrastructure Development Enhancing Disaster Risk Management Capacity building in climate change
Malawi Vision 2020	This is the country's overarching long term strategy that aspires for a technologically driven middle-income economy while providing an enabling framework for addressing climate change and other environmental challenges in a comprehensive manner
Malawi Growth and Development strategy II, 2011-2016	The strategy focuses on six thematic areas which include; Sustainable Economic Growth; Social Development; Social Support and Disaster Risk Management; Infrastructure Development; Governance; and Gender and Capacity Development. Some of the key priority areas under these include; Agriculture and Food Security; Energy, Industrial Development, Mining and Tourism; Public Health, Integrated Rural Development; Climate Change, Natural Resources and Environmental Management.
Nationally Appropriate Mitigation actions (NAMAs) 2015	The NAMA highlights actions voluntarily to be undertaken by the country to reduce GhG emissions and/or enhance carbon sinks to absorb the GhG in the atmosphere. The Malawi NAMA covers five key sectors namely: agriculture, forestry, energy, transport and waste management. Implementation of the NAMAs will assist in achieving the mitigation goals as outlined in the National Climate Change Management Policy which is to promote the reduction of greenhouse gas emissions; and enhance the capacity of carbon sinks while ensuring sustainable development
Intended nationally determined contributions (INDC) 2015	The INDC under adaptation prioritised agriculture (crops, livestock, fisheries), water resources, health, infrastructure, land-use planning, transport, population and human settlements, disaster risk management, forestry; wildlife, energy and gender. The key sectors under mitigation include; energy, industrial processes and product use (IPPU), agriculture, forestry and other land use (AFOLU), and waste. These sectors are based on national priorities and there is emphasis on multi-sectoral collaboration in implementation, capacity building, research, and consideration for disaster risk management as well as the need to harmonise policies.
National Adaptation Plans (NAPs) – still under development	A NAP stock taking report has been completed with support from UNDP. Sectors reviewed for consideration include Agriculture, Water, Energy, Fisheries, land Use Change and Forestry, Wild Life and Biodiversity, Human health and cross cutting issues including gender and education
National Adaptation Programmes of Action, 2006	The NAPA focused on improving community resilience to CC impacts, improving Agriculture productivity and preparedness to cope with disasters and improving early warning. Adaptation needs

	have been identified for the agriculture, water, forestry, wildlife, fisheries, human health, energy and gender sectors. Five urgent actions were identified which include; 1. Improving community resilience to climate change through the development of sustainable rural livelihoods 2. Restoring forests in the Upper, Middle and Lower Shire Valleys catchments to reduce siltation and the associated water flow problems 3. Improving agricultural production under erratic rains and changing climatic conditions 4. Improving Malawi's preparedness to cope with droughts and floods: 5. Improving climate monitoring to enhance Malawi's early warning capability and decision making and sustainable utilization of Lake Malawi and lakeshore areas resources

4.1.1. NDC Implementation progress

The Malawi Government is planning to review and focus on specific priorities of the INDC before submitting to the UNFCCC. However, Malawi is prioritised under the Nationally Determined Contributions Leadership Compact (NDC LC). The U.S. Government NDC Leadership Compact will partner with 15 or more developing countries from Africa, Asia, and Latin America and the Caribbean that are leaders in their commitments and actions to move quickly in making substantial progress in addressing climate change. The NDC LC objectives include ; Enabling developing countries to move quickly in making substantial progress in achieving ambitious mitigation targets as reflected in their NDCs; and Showcasing leadership by these countries in their NDC implementation so they serve as regional or global role models and inspire replication of their successful approaches by other countries. Other targeted countries include Colombia, Kenya, Mexico, Morocco and Nigeria

Malawi is also prioritised under the Regional Technical Dialogues on Nationally Determined Contributions (NDCs) by the United Nations Development Programme (UNDP) and the UNFCCC Secretariat (and other organizations on ad-hoc basis for individual dialogues). Coming out of Paris, the dialogues are currently providing capacity building support to countries in moving toward NDC implementation. The primary objectives of the initiative are currently to:
1) Provide a forum for exchanging country experiences and perspectives on planning for NDC implementation, including envisioned challenges and support needs; and
2) Discuss next steps and key technical and institutional issues related to NDC implementation at the national level (strengthening institutional arrangements for managing the NDC process; designing implementation plans to translate contributions into concrete actions; developing systems to monitor progress toward NDC goals; mobilizing resources; mainstreaming into long-term planning and linking with development objectives; etc. The series of dialogues are expected to continue through 2017.[36]

4.1.2. Progress on National Adaption Plan (NAP)

Malawi commenced the NAP process in September 2014 through the establishment of the Core Team and the official launch. This was followed by initial sector training and commissioning of the preparation of Malawi's NAP Roadmap, including a target timeline for the 17 different steps involved in the NAP process (per the UNFCCC guidelines). The NAP Roadmap was expected to be formally adopted at the start of 2016. UNDP has supported the Environmental Affairs Department (EAD) with the launch of the NAP Stocktaking and a report has been shared.

[36] http://unfccc.int/files/essential_background/the_science/climate_change_impacts_map/application/pdf/ndc_leadership_compact_10-25-16_overview.pdf

The NAP Stocktaking established the knowledge base for developing a NAP, drawing on available data and information and conducted a gap analysis, identifying issues that require strengthening in order for the country to successfully undertake the NAP process. Potential barriers to the design and implementation of adaptation were also identified. Key sectors identified by the core team include; agriculture (crops, livestock and fisheries), water resources, transport, infrastructure and physical planning, population and human settlements, human health, disaster risk management, forestry, wildlife, and gender. The core team will be in charge of spearheading the multi-stakeholder consultation process, as well as directing the technical process of NAP production.[37]

Key recommendation by the NAP stocktaking process include; Commissioning a comprehensive current climate risk assessment for Malawi and updated climate change projections for Malawi with more recently developed scenarios, research on climate change's sectoral impacts in Malawi, Strengthen in-country climate change science generation capacity, design and put in place more comprehensive data gathering and management systems at different levels. It was also recommended that a searchable, user-friendly climate change science and adaptation information database be created, as well as making investments in climate change and scientific communication efforts. Aligning the NAP process with medium and long-term planning, and develop planning guidelines related to climate change for other planning processes was recommended as well as coordination between different sectors and actors working on climate change adaptation through existing forums like the Donor Working Group or with improved collaboration with the Technical Committee on Climate Change[38]

The Food and Agriculture organisation of the United Nations (FAO) has supported the ministry of agriculture to develop a sector NAP which is completed. This comes before the national NAP has been development and will need to be integrated in the national NAP to avoid focusing on different priorities in the same sector. In addition, FAO is working with the climate change department to extract the agriculture priorities from the national climate change management policy (NCCMP) 2016, and they are developing a work plan based on the NCCMP and the agriculture sectoral NAP, which they will support. FAO is also supporting government to develop a successor of the Agriculture Sector Wide Approach (SWAP) to the national Agriculture Investment Plan which will later be aligned to the NAP and will be a guiding framework for agriculture priorities and resource allocation.

4.2. Institutional Coordination for climate change in Malawi

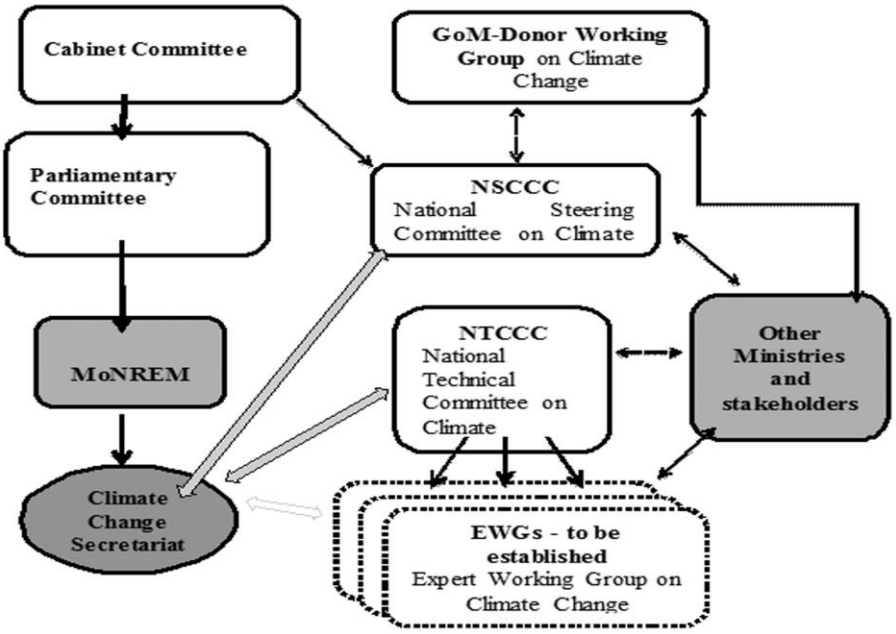
The Malawi Climate Change Management Policy 2016, recognising the need for effective climate change management, leadership and coordination has put in place a coordination structure with stakeholders cutting across different sectors key to the implementation of climate actions.
Considering that climate change significantly impacts key sectors of the economy and is multi-sectoral as well as crosscutting in nature, mainstreaming climate change into national and sectoral plans, policies and programmes is recognised as critical.

The relevant Cabinet Committee will enable all arms of government to coordinate their actions, the Parliamentary Committee will serve to assist in lobbying for passing of environment related policies and legislations in the national assembly. The existing National Technical Committee on

[37] **Vincent, K. et al 2014;**
[38] UNDP, 2016. Malawi NAP stocktaking report

Climate Change (NTCCC) will be strengthened by including other relevant sectors that are not currently represented in its membership. Furthermore, adequate representation of private sector has been recognised as important on the committee as green economy measures form an integral part of climate change management and require participation of private sector in this regard. The Natural Resources Sector Working Group (NRSWG) will provide oversight over the institutional coordination framework. The NRSWG comprises the National Steering Committee on Climate Change, the National Steering Committee on Forestry Management and the National Steering Committee on Meteorological Services.

Institutional Coordination Framework for Climate Change



The following key stakeholders are also identified for climate change coordination and action;

Development partners who provide resources for Government and organizations in Malawi to carry out climate related developmental activities.

Local Governments who should ensure that Community views and priorities are able to trickle upwards to District and national level plans.

In Malawi it has been noted that there is need for more research and capacity building on climate change issues and in this regard, **training and research institutions** have a pivotal role to play. Research which is context specific. Training must continue for enhancing capacity of individuals and organizations to mainstream climate change issues into development programmes for effective adaptation and mitigation to the impacts of climate change. **NGOs, FBO and CBOs** have an important role to play as they work closely with communities and can influence Government and communities to respond to climate change adaptation and mitigation, and they have the necessary resources to implement climate change projects community level. It is important for this group of stakeholders to realize that mainstreaming of climate change and disaster risk reduction into their activities will help climate proof and sustain their activities for the long term.

Private sector is recognised as an important stakeholder in terms of economic growth and job creation in the country and therefore must take an active part in climate change management. The private sector can contribute towards green growth through innovation and provision of green

jobs. Government commits to provide incentives and promote public-private partnerships to take this forward. Private sector is also encouraged to take an active part in decision making through membership in Technical Committee on Climate Change where they can air their views and participate in climate change management in the country. In particular, the private sector can take an active role in participating in projects for clean development mechanism, low carbon development, offsetting their emissions and investing in renewable energy, as part of the countries National Climate Change Investment Plan.

The media is also recognised for their role of creating awareness amongst all stakeholders including at community level about climate change issues. The dissemination of information should be based on good robust science and evidence and in this regard there is need to promote science journalism. Messages disseminated by media in a timely manner will empower communities to take necessary action on climate change adaptation, mitigation and disaster risk reduction.

4.3. Policy and Institutional Gaps for Climate Change Mainstreaming

Whereas the Government of Malawi has put in place several climate change policies and strategies as well as institutional coordination mechanisms, there are still challenges and gaps that need to be addressed which include the following;

The Malawi Growth and Development Strategy (MGDS II) notes that despite varied efforts to address environment and climate change, the sector still faces a number of challenges which require immediate attention for the country to sustain the development achieved so far. Some of these challenges include climate variability, weak institutional capacity for managing climate change, inadequate mainstreaming of climate change issues; weak enforcement capacity of laws and regulations; accelerated deforestation and poor land use management practices. These gaps affect effective mainstreaming of climate change and need to be addressed.

Most policies in Malawi were formulated long before climate change became an issue of importance. It is only recently that policy documents that include issues directly addressing climate change have been introduced. Insights to the policies of the pre 2004 period shows no deliberate inclusion of climate change strategies, but they still contain sections which are indirectly addressing climate change management. This requires review of some of the key policies to ensure that climate change is mainstreamed across the different sectors to reinforce the sector strategy plans.

A study by Civil Society Agriculture Network (CISANET) 2012 found that the donor community has been the powerful 'off stage' driving force in the policy debates taking place in Malawi on climate change. Most of the pressure on government to make climate responsive policies comes from civil society networks and Non-Government Organisations (NGOs) with the notable ones being Oxfam, CADECOM and Action Aid. However, behind the scene have been organisations like NORAD, Trocaire, Christian Aid, DFID, Irish Aid, World Bank and the EU providing the financial support to these organisations to put through policy reforms. Whereas there has been observed interest by Government which is opening up and showing interest in tackling issues of climate change at the policy level, the commitment to mainstream climate change across different policies and programmes has not taken root as yet. [39]

Lack of sufficient capacity on climate change issues at almost all levels remains the major limitation in Malawi in as far as policy development and climate change mainstreaming is concerned. It has been observed through a study conducted by the Centre for Environmental Policy Advocacy

[39] CISANET, 2012

(CEPA) that most of the people entrusted with policy making and also those that are implementing programmes on climate change both in Government and the NGOs, do not have much knowledge of climate change and its effects on the environment and other sectors (CEPA, 2009). This problem has also been exacerbated to some extent by the lack of sectoral coordination on climate change issues as there is no clear guideline on mainstreaming climate change into different sectors. This is re-echoed by the Malawi Growth and Development Strategy II (MGDS II) 2011 – 2016, which acknowledges the weak institutional capacity for managing climate change, inadequate mainstreaming of climate change issues and weak enforcement of laws and regulations. With the approval of the climate change management policy 2016, it's yet to be seen if the coordination for mainstreaming of climate change will improve.

The MGDS II attempted to integrate climate change as a priority and the environment sector as well as a policy framework that articulates issues related to both economic growth and development. However the review report for MGDS II notes that the country is still among those countries with a low capacity to adapt to predicted climate change. The capacity limitation stems partly from the high levels of poverty and limited financial resources to address the challenges effectively. These challenges are exacerbated by inadequate alternative livelihoods (the economy is still largely agriculture-based), lack of alternative affordable and reliable energy sources, inadequate budgetary allocations, lack of institutional co-ordination and weak community participation in environmental and natural resources management and climate change .[40]

It has also been noted that there are many policies, laws and programmes related to climate change but they are generally fragmented (sector-specific) and/or broadly framed thereby offering very limited scope for addressing the complexity of climate change policy goals in a mainstreamed manner. The legal frameworks do not provide enforcement mechanisms for reduction of greenhouse gas emissions. Similarly, measures for adaptation to climate change have been given a very brief attention despite the need for a comprehensive strategy to mainstream climate change issues into budgeting and planning processes. Studies provide ample evidence to suggest that there is lack of coordination among institutions that are involved in the management of climate change at the national level, resulting in duplication of efforts and disharmony and lack of synergy in supporting vulnerable areas and communities. Although the Government of Malawi has been keen to raise the profile of climate change issues and mainstreaming them in national planning, there is a lack of clarity on roles and responsibilities amongst the various agencies involved. Key ones include the Ministry of Development Planning and Cooperation, and Environmental Affairs Department; and Department of Climate Change and Meteorological Services.[41]

Weak Decentralisation structures have also affected mainstreaming of climate change at different levels. Whereas both before and during the MGDS II period, many policies in ENRM advocated for collaboration with local district councils to deliver their agenda. However, the councils do not have adequate human and complementary resources as well as operational capacity to deliver on the expectations. Top down approaches dominate the implementation processes and there is a weak link between the national policies and actions and the planning processes at Local Government level. However, it's at local level that climate action is happening, thus the need to strengthen bottom approaches to adaptation planning.

Several agricultural research studies and practices are being implemented in Malawi to improve resilience of smallholder farmers to climate change and increase agricultural production. Over 40

[40] MGDS II review report, 2016

[41] MOFDP, 2011. Sector policies response to Climate Change in Malawi; A Comprehensive Gap Analysis

organizations including different government departments, private sector, faith-based groups, and non-government organisations have responded positively to the effects of climate change by implementing research activities that address issues of climate change. However, there is no policy guideline to serve as a model to be copied by all stakeholders and there is high duplication of efforts by several stakeholders. The Malawi Government relies on institutional research funded by different organizations to inform agricultural practices because public expenditure on agricultural research and extension is currently low.[42]

5.0. Climate change financing for Malawi

The Government of Malawi has not yet prioritised climate finance in their plans and budgets, partly due to limited resources but also prioritisation across sectors. The proportion of Malawi's environment expenditure to total government expenditure and the country's GDP for the six year period from the 2006/07 to 2011/12 period was 3.15 percent and 0.96 percent respectively. As an MGDS II key priority area, Climate Change, Natural Resources and Environmental Management has received the least government allocation during the implementation period of the national development strategy, with less than 1 percent of national budget allocation between the period 2011/12 and 2015/16. This is despite the sector contributing 8 percent to GDP. Funding to the sector for the implementation of key projects and programmes has remained heavily donor dependent, with no substantial funding from government to roll out programmes from pilot projects supported by Development Partners. Furthermore, Climate Change and Meteorological issues were excluded in the MGDS II key priority areas, with only a peripheral reference, which meant they were really not a priority for the national development strategy (2011/12 – 2015/16).[43]

A further expenditure review study done by UNDP found out that only 3.5% of the funding went to DRR, environment and climate change, and only 1% of the total allocated to DRR, Environment and Climate Change, went to Local Governments. Without fiscal decentralisation for local Governments, harmonisation and coordination on planning and budgeting will be difficult and climate actions will not be implemented.

A Climate Change Investment Plan was launched in April 2014 which looks at priority sectors requiring financing, while a National Climate Change Communication Strategy is in place to sensitise various stakeholders and the general public on their roles in this arena. A draft report on a Sector-Wide Approach for climate change was also prepared at the end of 2011. Despite the number of planning and policy documents Malawi has prepared or that are under preparation it is widely acknowledged that the emphasis must now move from formulation to implementation[44]

There is very little linkage between the policy framework and budgeting. The MGDS II review report (2016) notes that many policies in climate change, environment and natural resources management have no deliberate connection with funding and financing issues that are necessary for the effective implementation of those policies. To address this general challenge facing the country, Malawi adopted a Medium Term Expenditure Framework (MTEF) in 1998. However, the pace of implementation of the Public Financial Management System has been slow. Overall, the Malawi Government financial management system has been weak as evidenced by a massive plunder of government resources by business opportunists, civil servants and politicians in 2013.

[42] Mwase, W. et al 2014
[43] MGDS II review Report, 2016
[44] http://www.gcca.eu/national-programmes/africa/gcca-malawi

The 2014 Public Expenditure Review (PER) also notes that except for the draft National Climate Change Policy (2012), now the National Climate change Management policy (2016) , most of the policies in ENRM have no financial or investment goals and strategies. This further makes their implementation problematic. Added to this challenge, all the key ministries involved in ENRM were unable to achieve their plans in full due to resource constraints, in particular, with the situation following the withdrawal of Development Partners to budget support.

However, development partners have continued to fund climate change adaptation through direct support and working through civil society organisations thus fulfilling member governments of the Organization for Economic Co-operation and Development (OECD)'s pledge in 2006 to integrate climate change adaptation into development assistance and ensuring that ODA will play a central role in adaptation finance for developing countries. The African Development Bank (AfDB), the World Bank, and other multilateral donors have been working towards integrating climate change adaptation into their own activities, with several funds dedicated solely to climate change, such as the Adaptation Fund and Green Climate Fund.[45]

A case study focusing on Tracking Climate Aid in Africa, focusing on Malawi, found out that the key agencies supporting climate change work include; USAID, DFID, AfDB, Norway, UNDP, FAO, JICA, EU, World Bank and Irish Aid. A low percentage of aid explicitly targets climate adaptation, but there are a substantial number of adaptation-relevant activities underway in more general capacity-building development projects that contribute to adaptation. Large donors (the World Bank, USAID, AfDB, and the European Union, in particular) show much greater prominence in climate change mitigation, as they implement more (and generally much larger) projects. In contrast, the FAO, the Flemish International Cooperation Agency, Norway and Ireland, all of which show strong adaptation emphasis by activity number and overall percentage of projects, though they simply do not have the same financial resources available.

The Government of Malawi has established a National Designated Entity (NDE) responsible for the development and transfer of climate change technologies for adaptation and mitigation; and a focal point and National Designated Authority (NDA) for the Green Climate Fund (GCF). Government is also in the process of establishing a National Implementing Entity (NIE) for the Adaptation Fund Board. With support from UNDP, Malawi qualified for the GCF funding for a project to strengthen early warning systems, led by the Department of Disaster management in conjunction with the national meteorology department, climate change department and water resources department, plus a CSO. This was done with support from UNDP as the accredited entity, since Malawi has not qualified for accreditation as a national implementing agency or national designated Entity. The funds from GCF are expected mid-year, 2017, to the tune of $12.3 million for a period of 6 years. FAO is also in very initial phases of supporting development of a GCF proposal with the ministry of agriculture and energy focusing on linking agriculture projects to environment degradation (livelihoods, energy, water deficit, incomes & reducing environmental degradation)

Over all, there is lack of predictable and reliable funding mechanisms from local and external sources. Government is largely depending on donors to fund the different programmes. In the NCCMP 2016, the government is prioritising enhancing implementation of the climate change activities through enhanced national budgetary allocation and establishment of a climate change fund, using lessons from Rwanda. Government will need capacity support to access international climate change financing (both multilateral and bilateral) as well as private sector investment funds.

[45] Baker, J, McDuff, S, Weaver, C. 2013. Tracking Climate Aid in Africa; A case of Malawi

5.1. Ireland's Contribution to Climate finance

In terms of financing, Ireland has made significant advances in delivery of climate finance in recent years. The climate finance mapping exercise identified a total of €35,201,946 in bilateral climate finance disbursements in 2016, an increase of 8.43% on the 2015 total of €32,464,410. Just two countries, **Ethiopia and Malawi**, accounted for almost 66% of total climate finance disbursements under Ireland's bilateral aid programme in 2016. Of the total, €26,771,296 in bilateral climate finance was spent on adaptation activities in 2016 representing over 18% increase over adaptation expenditure in 2015. Mitigation relevant expenditure was €1,254,725 in bilateral support in 2016.[46]

Much of this expenditure was on activities that had climate adaptation benefits in the agriculture sector and building resilience in regional rural economies as well as supporting nutrition and food security. The funding, in many instances, also contributed to multiple objectives, in the areas of Biodiversity and Desertification as well as Disaster Risk Reduction, Capacity Building, Technology Transfer, and Forestry in the different key partner countries

An examination of the funding provided to Civil Society programme partners in 2016 identified approximately €19,618,479 million in expenditure on climate and environment related activities. Irish Aid contributions to multi-lateral climate change funds and specialised UN bodies in 2016 amounted to €2,169,000. Relevant contributions to other international bodies (multi-country: IIED, WRI & MRFCJ) amounted to €1,850,000. These results are set out in Section 3 of the report.

Ireland will continue to support climate mitigation and adaptation in developing countries in line with our commitments under the UNFCCC. Ireland's public climate finance will be predominantly provided through bilateral grants to Key Partner Countries through Irish Aid, Ireland's overseas development assistance programme, together with direct grant contributions to various multilateral institutions or funds, such as the GEF, GCF and LDCF. Ireland is currently exploring ways to mobilise private climate finance to support mitigation and adaptation in developing countries. A cross-departmental working group is being established to progress this work.

5.2. Irish Aid Climate Finance in Malawi

In 2016, Ireland provided a total of €8,990,511 to Malawi in climate finance through its bilateral aid programme. In addition, Ireland provided €2,300,708 in 2016 in climate finance to projects in Malawi through its civil society programme. Climate relevant expenditure provided by Irish Aid to civil society organizations in 2016 was Rio marked and accounted for systematically for the first time, in cooperation with the project partners themselves. Projects funded directly by Irish Aid under the bilateral aid programme include improving the effectiveness and of investments in food security and sustainable agriculture, strengthening community resilience through social cash transfer programmes, accelerating the uptake of low emission energy efficient cook stoves, and strengthening community disaster resilience. Civil Society partners Concern, Trocaire, GOAL, Self Help Africa, Misean Cara, and Action Aid are helping to build resilience to climate change through

[46] Irish Aid, 2017; UNFCCC Reporting and Climate Finance Mapping 2016-2017

a wide range of projects including increasing food security and livelihood stability for the rural poor, improving population health, increasing smallholder skills and knowledge to benefit from diversified agricultural production, and engaging smallholders in networks and relevant policy processes to improve their livelihoods[47].

Overview of Climate Finance in Malawi in 2016

	Bilateral €	Civil Society €
Climate Finance Adaptation (UNFCCC)	4,503,819	1,366,982
Climate Finance Mitigation (UNFCCC)	320,00	19,899
Climate Finance Cross-cutting (UNFCCC)	4,166,692	913,827
Biodiversity (UNCBD	1,816,692	1,771,224
Desertification (UNCDD)	916,692	1,473,280
Disaster Risk Reduction (DRR)	8,415,731	N/A
Total Climate Finance	**8,990,511**	**2,300,708**

6.0. Donor Coordination in Malawi

The Ministry of Finance introduced the establishment of Sector Working Groups (SWGs) as a very important tool for facilitating Division of labour at sector level. Guidelines for the establishment of a SWG in each sector were launched in 2008.[48] There is now a Government of Malawi/Donor Working Group on Climate Change which comprises of representatives from the donor community and principal secretaries from government meant to have a cohesive approach in implementation of climate change activities. Further, a national task force on climate change comprising of government representatives, civil society and development partners was formed to develop a climate change implementation action plan for Malawi. This allows stakeholders to have a common approach and possibility of pooling resources for implementing various programs.

Whereas the Development Partners Coordination Group on Natural Resources, Environment and Climate Change and Government of Malawi Donor working group on climate change are in place, members feel that there is limited commitment to work as a team. The meetings focus on what each donor is doing than focusing on common understanding of resilience, engagement with Government and mainstreaming climate change across all sectors. UNDP is the new chair and they are looking at innovative ways of making the platform useful.[49]

The UN supports Malawi in its efforts to respond to the effects of Climate Change through the National Climate Change Programme (NCCP). The One UN Fund with contributions from Norway, DfID, the Expanded Fund Window coupled with the UNDP core resources enables the MoDPC to coordinate climate change activities under the NCCP by various Implementing Partners (IPs), e.g. the Departments of Environment Affairs, Climate Change, Energy, Forestry and others, with Technical Assistance from UNDP, FAO, WFP and the World Bank. This has significantly decreased the transaction costs for Government in dealing with numerous donors and IPs, as well as the reporting burden, which is now administered through one National Technical Committee, one National Steering Committee and a Government Development Partner Working Group on Climate Change[50].

[47] Irish Aid, 2017. Climate Action report for Malawi
[48] Malawi Ministry of Finance, 2010. Towards Division of Labour in Malawi
[49] Malawi BTO report, 2017
[50] UNDAF 2012 -2016

The Kiel working paper, 2015 on donor coordination in Malawi, quoting Powell and Findley (2012) noted that it may be desirable that several donors cluster their projects in areas with concentrated need. Such clustering, although ostensibly signalling a lack of coordination, may be the best strategy, a point that appears lost in much of the discussion on spatial coordination of donor activities. However, the study conducted in Malawi on Donor coordination found out that donors do not increasingly cluster in needier districts, and there is no significant association between the number of donors active in a particular district and the district's poverty headcount.

The working paper also quoting Tavakoli and Smith 2013, notes that the most realistic alternative of improving coordination would be to form coalitions of like-minded donors and increasingly use co-financing arrangements such as multi-donor trust funds or internationally coordinated budget support. However the findings of the case of Malawi suggests that donors made only limited use of these options even after the Paris Declaration of 2005.[51]

Weak inter-ministerial coordination and arrangements on climate change has also been quoted as a contributing factor to overall coordination. However, the cash gate scandal has affected direct Government support, most donors are working through sector budget support or implementing directly or through CSOs but with full involvement of Government sectors, which might explain the above scenario. There are instances where joint funding for specific programmes like social protection is working, but even then, each door is managing their own funds which becomes difficult for government to coordinate and track the many activities by different donors.

Another study by Jumbe, C.B.L, et al, (2008) has established that there is not much collaboration between the public and private sectors when it comes to issues of research and implementation of climate change issues such as greenhouse gases, vulnerability, mitigation and adaptation. Scientists do research that is academic-based not necessarily what government and other stakeholders would immediately use in the implementation of adaptation and mitigation actions.[52] Overall, a lot more can be done to improve coordination among donors.

7.0. Ireland's Approach to Climate Change Adaptation

One World One Future (OWOF); Ireland's Policy for International Development, 2013 has a vision of contributing to a sustainable and just world, where people are empowered to overcome poverty and hunger and fully realise their rights and potential. Amongst the key changes is the reorientation of efforts towards developing countries that are experiencing greater degrees of hunger, fragility and instability, because of conflict, disaster or the harmful effects of climate change. Climate change is one of the six priority areas, and the key decision is to put climate change at the centre by working hard to ensure that efforts are more firmly geared towards addressing this challenge, including promoting a balance between the social, economic and environmental aspects of development.

In addressing environment and climate change, Ireland recognises that in all countries, economic and social progress is dependent more than ever before on the health of the environment. Environmental hazards such as pollution, severe weather events and climate change threaten livelihoods and development, and could drive millions more into extreme poverty. Climate change

[51] Kiel Working Paper No. 1991 | March 2015; Do Aid Donors Specialize and Coordinate within Recipient Countries? The Case of Malawi
[52] Jumbe C.B.L, et al 2008

is projected to reduce crop yields for subsistence farmers in many African countries making them more vulnerable to food shortages. Two of the three goals in OWOF focus on reduced hunger, stronger resilience and sustainable development and inclusive growth, which speak to climate change commitments, including; working more strategically to advance economic growth which benefits poor people and is environmentally sustainable while supporting efforts that respond effectively to climate change. The top priority for the Government of Ireland is to reduce hunger and vulnerability, and build people's resilience to natural and other disasters.

> A resilience approach is a way of working that helps to build resilience in order to protect the assets – property, knowledge, well-being, security and social cohesion of poor people and countries in the face of a range of shocks and stresses. Adopting a resilience approach helps to shine a spotlight on the root causes of poverty, inequality and exclusion from the perspective of communities
>
> (Irish Aid, 2016)

Under climate change and development, there is focus on achieving a balance between the economic, social and environmental aspects of development. The approach follows on from 'Our Sustainable Future', a Framework for Sustainable Development for Ireland, the Government's policy framework for green and sustainable national prosperity. Efforts are also aimed at ensuring that developing countries, especially Key Partner Countries, can develop in a way that is resource-efficient, climate-resilient (protecting themselves from the risks of climate change) and low in carbon emissions.

Priority areas for action under climate change and development[53]

What we will do

- We will support developing countries and vulnerable communities to formulate national responses to environmental degradation and climate change as a matter of priority. In this, we will continue to focus primarily on improving people's resilience to climate change.
- We will build on the synergy between our priority areas for action and will appraise our programmes against the economic, social and environmental aspects of development, recognising their interlinkages and ensuring that these remain balanced at all times.
- Our efforts to support sustainable natural resource management (for example, maintaining land and soil fertility) will be continued. We will support developing countries to conserve and sustainably use their biodiversity, securing local ecosystems that are vital in all development efforts.
- We know that climate change impacts disproportionately on women, and we are committed to working to address this by supporting efforts to promote gender equality.
- We will support developing countries to maximise the potential of green development, including approaches to carbon sequestration (the storage of carbon that would otherwise be released into the atmosphere) for the reduction of poverty. Opportunities for engaging Irish expertise in the area of green technology and in off-setting emissions will be explored.
- We will support developing countries in their transition from the inefficient use of traditional energy supplies towards the use of modern energy sources such as solar energy and energy-efficient cook stoves.
- We will increase our focus on disaster risk reduction in development programmes - bridging the gap between our emergency interventions and our development efforts and supporting efforts to increase resilience to the adverse impacts of climate change.
- The international community has committed to provide $100 billion per annum by 2020 for climate action in developing countries within the ongoing climate change negotiations. Ireland will maintain its engagement with the UN Framework Convention on Climate Change and Kyoto Protocol global processes, and strive to meet the obligations arising from these.

[53] Extract from One World One Future; Ireland's Policy for International Development

The Climate Change and Development Learning Platform

Irish Aid in partnership with International Institute for Environment and Development (IIED) host an organised Climate Change and Development Learning Platform which focuses on research and capacity building. The initiative provides evidence and capacity for key partner countries to mainstream climate change into Irish Aid country programmes as well as publishing guidance notes and briefs on priority Irish Aid focus areas. The platform also links country level experiences to international policy frameworks. Details of the climate change work in Malawi can be accessed on https://www.climatelearningplatform.org/key-partner-countries/Malawi

Case Study; Developing Climate Resilience in Malawi by Combining Energy Delivery with Social Cash Transfer (SCT) / Social Protection Programmes

Irish Aid and United Purpose in Malawi are providing sustainable energy solutions to the rural poor by combining the delivery of energy technologies with Social Cash Transfer (SCT) / social protection programmes. The model links energy efficient improved cook stoves, solar lighting and sustainable biomass with the Government of Malawi SCT into a holistic energy package delivered to the poorest households (Embassy of Ireland, 2015). Phase 1 aims to improve uptake of new cook stove technologies designed to reduce bio-mass usage for the rural poor that are completely reliant on firewood to meet basic energy needs. In Balaka district, Irish Aid though United Purpose are currently reaching 8,381 households using the SCT and a subsidised voucher system to distribute clay cook stoves. Phase 2 (2016) provides the same SCT recipients with solar powered lighting units for use within the household. Finally, Phase 3 (2017) is a sustainable bio-mass initiative involving bamboo planting to establish energy self-sufficiency for all recipients.

The International Institute for Environment and Development (IIED) have developed a process of developing evidence to examine the utility of delivering energy solutions using SCT – itself a potential contributor to climate resilience for the poorest smallholder farmers through enhancing the productive and convertible assets essential to the resistance and recovery from shocks/stresses, whilst increasing the likelihood of graduation out of pre-existing conditions. The three components of the research show how well combing SCT with energy delivery: 1) achieves economic sustainability via cost-neutrality; b) develops unprecedented production/supply capacity for energy products in Malawi; and c) improves the rate of awareness, demand, uptake and adoption for energy products – especially for the poorest and most vulnerable households – in addition to the overall effectiveness in terms of reduced usage of biomass and protection of assets. Each component is a stand-alone piece of research, but together will present a holistic understanding of the attributes gained from using the SCT-energy solution model to provide energy products for the poorest households. Lessons will be relevant to related initiatives and policy planners aiming to assist the poorest households in accessing and using improved cook-stoves and renewable energy sources.

7.1. Irish Aid Malawi's climate change programming

The Irish Aid Malawi country strategy 2016-2020 is aligned with the Government of Malawi's National Growth and Development Strategy and also advances Ireland's aid effectiveness commitment in promoting collaboration and joint programming with other Development Partners. With a whole of Embassy approach, the strategy also contributes to different strands of Ireland's foreign policy, The Global Island, including engagement with international institutions, human

rights and humanitarian response. The overall goal is 'to increase the resilience of poor households to economic, social and environmental shocks in line with Malawi's growth and development strategy.

The strategy is well structured to address vulnerability and reduce poverty as well as addressing other factors that make people vulnerable e.g. improve livelihoods, diversifying livelihood strategies in areas vulnerable to flooding and drought. There is also focus on building disaster resilience to reduce the impacts as well as addressing humanitarian response where necessary. IA programmes are well aligned with the national climate change, Disaster Risk Reduction and development policies.

National Social Support Programme

The Malawi Growth and Development Strategy (MGDS II) recognises social protection as a key element in successful poverty reduction and inclusive economic growth. In 2013, the Malawian Government adopted the National Social Support Policy (NSSP) which covers the 5 key programmes of social cash transfers (SCTP); public works (PW); school meals (SM); village savings and loans (VSL) and microfinance. The Ministry of Finance, Economic Planning and Development (MFEDP) has been tasked with the overall coordination. The intention of the policy is to promote a holistic approach to poverty reduction. However, in practice the implementation of the NSSP remains fragmented with different programmes taken up by different stake holders in the country with different goals, approaches and targets and little coordination

Irish Aid is a strong partner with scalable systems including e-payments which are supported by government with plans of scaling up. Other positive practices supported by Irish Aid include the integration of energy for the poor, disaster management, climate smart agriculture and economic models like VSLA into the programme to build resilience of the most vulnerable. The purpose of this programme activity is to build evidence on the potential of Social Cash Transfer Programming (SCTP) in building resilience and reducing chronic recurrent food insecurity in vulnerable districts. A key component of the programme will be identifying impacts that the SCTP has on Balaka District on recurring disasters, particularly from increasingly frequent droughts. It is proposed to assess the potential of SCTP to reduce vulnerability of the poorest 10% of the population in the District and to reduce the impact of climate induced disasters. The programme is primarily focussed on addressing chronic food insecurity and high poverty with climate resilience as a secondary component. The Programme commenced in December 2012 and will run up to December 2017.

Irish Aid has also supported UNICEF to provide support on extending and Strengthening Resilience of the most Vulnerable - System's Strengthening and Linkages Creation through innovative approaches in the scope of the Malawian Social Cash Transfer Programme.

The Enhancing Community Resilience Programme (ECRP)

DFID, Irish Aid and Norwegian Ministry of foreign affairs have been providing £21,742,887, over a five year period 2011-2016 to enhance resilience of rural communities in Malawi. The funding is focused on providing support to 1.4 million people in vulnerable communities to manage, cope and recover from the impact of both climate variability and change. Funding is being provided through two NGO consortiums (one led by Christian Aid, and another by United Purpose) to scale up tried and tested interventions in vulnerable communities in the areas of Disaster Risk Management (DRM), Climate Smart Agriculture, Energy Conservation and Environmental Management; and Sustainable Livelihoods.

The goal of the 'Enhancing Community Resilience' project is to help eradicate extreme poverty and hunger in Malawi, whilst enabling households to build resilient, sustainable and profitable livelihoods. The programme reduces existing and future risks caused by natural hazards and climate change and strengthens the capacity of vulnerable communities to cope with current risks and adapt to new ones. ECRP aims to reach 600,000 people in eleven vulnerable districts in central and southern Malawi to build their capacity to increase resilience to climatic risks

The project is also involved with social protection by providing support to the Government's Malawi Vulnerability Assessment Committee (MVAC) which conducts annual assessments of people that are food insecure and vulnerable. The programme also supports strengthening of disaster risk reduction and climate change programmes of key Government Ministries and Departments to strengthen information sharing by various stakeholders on DRM and climate change adaptation.

Agriculture and Livelihoods programme

Malawi has taken concerted policy and institutional responses to CC, but they are remain in infancy, largely in reaction to national reporting obligations under the United Nations (UN) Framework Convention on Climate Change, and mostly donor supported due to limited financial support by Government.

Irish Aid implements a cohesive programme with focus on CSA, irrigation, improved seed, livestock, afforestation and energy as cross cutting. Focus is on improving agricultural productivity, diversification and improving nutrition through support to small holder farming systems. Promotion of value chain with climate smart interventions is also promoted. IA is also part of the donors supporting Farm input subsidy programme (FISP). IA Partners have contributed to various national policies including the national seed policy, irrigation policy, national agriculture policy among others. Weather forecasts are also being disseminated to the farmers on a weekly and seasonal basis to support small holder farmers make informed farming decisions.

The Agriculture Sector Wide Approach, the National Adaptation Plans of Action (NAPA), and the Malawi Growth & Development Strategy II, the national climate change management policy and strategy are the major policies on climate change and agriculture. However, climate change related sector policies and implementation remain disjointed and mainstreaming of CC adaptation is limited due to weak institutional support. However, the national climate change policy recognizes many of these challenges and seeks to address them. The fragmented treatment of CC adaptation, mitigation, and disaster risk management—rather than an integrated approach that harnesses their synergistic benefits both within agriculture and broader promotion of a green economy remains a challenge to be addressed and presents an opportunity for Irish Aid to engage with Government to strengthen systems for better integration of climate change and resilience building.

Pro –Poor Access to Energy

Energy is one of the main sectors in Malawi that is contributing 4% of the GHG emissions and forestry contributing 78% of the emissions. By 2040, Forestry contribution is projected to decrease to 65%, while energy is likely to increase to 17%. However with increased deforestation and ecosystem degradation, the decrease in emissions by the forestry sector is likely not to be achieved, worsening the climate impacts in the long run. Studies show that between 2000-2005 Malawi lost 35% of its primary forest cover, and is continuing to suffer primary deforestation at a rate of 3%

per annum[54]. To address the deforestation as well enhance energy access to the poor ,the government of Malawi has prioritised energy through scaling up the use of improved cook stoves to address environmental degradation and health issues and has set a target to produce 2 million cook-stoves by 2020.

Irish Aid Malawi is supporting the scale up of improved energy saving and clean cook stoves. The Ministry of Energy and Mining (Department of Energy) agreed to establish a National Improved Cook stove Task Force which includes the Government, civil society and the development partners. The Task Force was established in March 2013 and Irish Aid played a key role in supporting the initiative. Under the Irish Aid and IIED climate change and development learning platform www.climatelearningplatform.org/ a longitudinal case study research was undertaken to develop evidence around the utility of the sustainable energy business model that would generate useful evidence within the development context in Malawi in relation to coverage of energy products. The study is aiming to assess the performance of using Social Cash Transfers under the social protection programme to distribute ICS to the poorest households and is tracking indicators such as coverage, pro-poor access and biomass usage. Irish Aid and its partners have used the learning to input into the revised National Energy Policy and the Renewable Energy Strategy i.e. providing broad policy level direction. This piece of work is aligned to the Resilience pillar of the Irish Aid Malawi Strategy, thus strengthening integration of climate change internally but also informing national and local integrated development planning, taking into account climate change and impacts on ecosystems

Irish Aid Malawi and United Purpose are exploring possibilities of promoting increased Access to Sustainable Energy; Enhanced Markets for Sustainable Energy; and Innovative Carbon Finance and reinvestment Models which will benefit the poor through sell of carbon credits.

Humanitarian response and disaster resilience

Irish Aid is supporting disaster management and response in several programmes with stronger focus on long term resilience building and effective linkages to other programmes including social protection interventions. Since 2014, Ireland has been supporting the use of a cash based rather than food based humanitarian response. Linkages with village saving and loans Associations (VSLA) nutrition messaging and practices, and promoting fuel efficient cook stoves all contribute to a holistic approach to addressing disaster impacts, thus reducing humanitarian response needs. The building community resilience programme and the ECRP programme provide evidence of linking humanitarian response to development. The programmes support recovery and reconstruction for affected livelihoods.

The Embassy strategy 2012-2020 is committed to support national policy objectives, such as promoting a shift away from emergency response to more long term resilience building to address the annual humanitarian crisis. Programme decisions will increasingly be supported by political economy analysis. Partnership engagement will be rationalised, and streamlined where possible, based on assessment of performance, capacity, risk and emerging results. Linkage between policy objectives and outcome areas and joint programming with Development Partners will maximise Ireland's influence within financial and resource limitations. Management approaches will be cognisant of the need to maintain flexibility within the programme and annual planning cycles to

[54] http://rainforests.mongabay.com/20malawi.htm

facilitate appropriate responses to risks and opportunities arising from the increasingly fragile context. [55]

Gender and Climate Change Resilience

Women bear a disproportionate burden from adverse impacts of climate variability and change. Additional stresses from women's poverty, limited access to credit, marginal role in decision making, other intra-household inequities, and the increasingly greater responsibilities all exacerbate women's vulnerability to adverse climate variability and change, and limit their ability to take advantage of climate-related opportunities compared to men. A recent nationwide study showed empirically that gender affects choice and impacts of adaptive strategies, while male-headed households had a more pronounced maize-yield dividend from fertilizer and improved seed inputs than SLM strategies, this was not significant for female-headed households. (Zulu, L. 2016)

Irish Aid Malawi in the current strategy commits to conduct a gender analysis and audit to strengthen the Embassy's approach to gender issues. Some of the key areas for future focus are women's empowerment and the needs of the chronically ill will be an important consideration in disaster risk reduction, social protection and agricultural technology initiatives. Climate change vulnerability assessments by different partners should also include gender analysis so that systematic approaches are used to address gendered impacts of climate change.

8.0. Summary of Climate change implications for country development programming

- Climate change uncertainty in Malawi as predicted by the regional and global climate change models will require innovative approaches to manage risks. With the rainfall variability and the increase in temperature, the likelihood of increase in intensity and frequency of disasters (droughts, floods etc) is high. Integrating climate change in development planning will be very important as well as strengthening the nexus between climate change, disaster risk reduction, humanitarian response and development to reducing vulnerability and building resilience and sustainable development, given Malawi's vulnerability to climate change impacts
- GDP losses due to climate change is likely to increase if adaptation actions are not integrated into development planning and budgeting. If Malawi does not act now, economic models predict the direct overall costs due to climate change will be equivalent to losing at least 5% GDP annually. The current cost of addressing climate change and disasters amounts to 1.7% of Malawi's GDP (NCCMP 2016). The national economy will decrease under the BAU scenario, there is need therefore focus on addressing climate risks while focusing on inclusive economic models that can increase incomes for the poor.
- Climate induced disasters are likely to increase thus increasing pressure on humanitarian assistance requirements which are already high. If disaster resilience is not strengthened in the medium and long term it will affect over all ODA. Humanitarian response should take into consideration long term mitigation actions to reduce impacts than just reacting to emergencies. The number of people in need of humanitarian assistance in Malawi has increased by over 60% in recent years due to drought and flood impacts, and is likely to increase in the BAU

[55] Irish Aid Country Strategy Paper 2016-2020

scenario. Resilience programming will be important to manage risks, focus on long term programming and financing while strengthening viable and innovative models for economic growth.

- Coherent national policy efforts to promote and nurture entrepreneurship are necessary to create enabling conditions for industrialisation. This will require multipronged efforts to improve the business environment, develop skills, and strengthen provision of business development services to Micro, Small and Medium Scale Enterprises.
- Decrease in agriculture production and productivity with serious negative impacts on food security and nutrition is highly likely. Climate risk management and strengthening of food systems approaches will be important across all development programmes to improve food security, nutrition, but also enhance economic development for the poor.
- Energy, Agriculture and forestry sectors are the main causes of increase in greenhouse gas emissions in Malawi and they are vulnerable to climate change. Programmes therefore should consolidate gains and improve climate resilient approaches for agriculture, energy and forestry sectors to reduce emissions but also strengthen the adaptation co- benefits.
- Due to change in soil content and shift in agro ecological zones, climate change may usher in positive changes in terms of crop suitability where cotton, cassava and other root tubers will grow favourably in most parts of the country. According to Zulu (2016), cotton showed the highest potential for growth under Climate Changes under the three model scenarios. Productivity of cassava and other roots and tubers (add maize) is projected to increase by nearly 50% in all scenarios but acreage will drop slightly and net exports drastically by 2050 despite world price increases, and imports could be needed. Refocusing on changes in agro ecological zones need to be taken into account while promoting CSA and other agrculture programmes
- Capacity building and strengthening of Government structures at national and sub national levels will be key to improve sustainable development, planning for uncertainties, managing risks and reducing vulnerabilities resulting from climate change and disaster impacts.
- Investment in generating and disseminating accurate, timely and reliable weather and climate information will be important to inform different sector adaptation and climate risk management plans and decisions regarding changes in climate. The GCF funding already accessed by Malawi is a good step towards achieving this.
- Strengthening integration of climate change, disaster risk reduction and social protection mechanisms into development programmes will be important to make sure that the impacts of climate change and disasters is reduced on the very poor and vulnerable households
- Gender analysis should be done across all climate change adaptation programmes to understand the different capacities and vulnerabilities of women and men, boys and girls and ensure they are participating in climate decision making and that their vulnerabilities are reduced.

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