



GOVERNMENT OF MALAWI

SECTOR POLICIES RESPONSE TO CLIMATE CHANGE IN MALAWI

A Comprehensive Gap Analysis

**Ministry of Finance and Development Planning,
National Climate Change Programme**

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ABBREVIATIONS AND ACRONYMS

ADD	Agriculture Development Division
ADP	Agriculture Development Programme
AIDS	Acquired Immunodeficiency Syndrome
BLADD	Blantyre Agriculture Development Division
CA	Conservation Agriculture
CAADP	Comprehensive Africa Agriculture Development
CCA	Climate Change Adaptation
CCCCC	Caribbean Community Climate Change Centre
CDEMA	Association of Caribbean States, the Caribbean Disaster Emergency Management Agency
CRMI	Caribbean Risk Management Initiative
DCCMS	Department of Climate Change and Meteorological Services
DNPW	Department of National Parks and Wildlife
DoDMA	Department of Disaster Management Affairs
DPRA	Disaster Preparedness and Relief act
DRR	Disaster Risk Reduction
EAD	Environmental Affairs Department
EIA	Environmental Impact assessment
EMA	Environmental Management Act
EPA	Extension Planning Area
FAO	Food and Agriculture Organisation
GFDRR	Global Facility for Disaster Risk Reduction
GHG	Greenhouse Gas
HIV	Human Immunodeficiency Virus
IPCC	Intergovernmental Panel on Climate Change
IRLAD	Irrigation, Rural Livelihoods and Agricultural Development Project
ISDR	Integrated Strategy for Disaster Reduction
KRADD	Karonga Agriculture Development Division
LULUCF	Land Use, Land Use Change and Forestry
MGDS	Malawi Growth and Development Strategy
MEA	Multilateral Environment Agreements
MPEI	Malawi Poverty and Environment Initiative
MPRSP	Malawi Poverty Reduction Strategy Paper
NAPA	National Adaptation Programme of Action
NEP	National Environmental Policy
NEPAD	New Partnership for Africa's Development
NSREP	National Sustainable and Renewable Energy Programme
NWDP2	Second National Water Development Project
NWP	National Water Policy
OECD	Organization for Economic Corporation and Development
OFDA	Office of Foreign Disaster Assistance

PAs	Protected Areas
R&D	Research and Development
REPN	Regional Energy Planning Network
SADC	Southern African Development Community
SAPP	Southern African Power Pool
SLADD	Salima Agriculture Development Division
SLM	Sustainable Land Management
SVADD	Shire Valley Agriculture Development Division
TORs	Terms of reference
UNCBD	United Nations Convention on Biodiversity
UNCCD	United Nations Convention to Combat Desertification
UNCED	United Nations Conference on Environmental Development
UNDP	United Nations Development Programme
UNEP	United Nations Environmental Programme
UNFCCC	United Nations Framework Convention on Climate Change
WSSD	World Summit on Sustainable Development

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EXECUTIVE SUMMARY

Introduction: Climate supports the productive sectors of Malawi's economy, chief among them include agriculture, forestry, national parks and wildlife, fisheries, tourism and energy. Not surprising, grim projections of the long-term consequences of climate change threaten the long-term economic growth in Malawi. The impacts of climate change are occurring in many different forms such as increased rainfall variability, sudden and severe floods, droughts, prolonged dry spells, thunderstorms and hailstorms. The country is increasingly becoming vulnerable – a situation aggravated by the country's low adaptive capacity, overdependence on rain-fed systems and severe environmental and natural resource degradation. Moreover, the women, the elderly and children are increasingly becoming the most vulnerable in the society. Malawi is one of the contributors to Green house Gas emissions in the atmosphere which is causing global warming thereby causing climate change. According to the results of the 1990 and 1994 inventories, Malawi is a net emitter of carbon dioxide (CO₂). This is a result of land use and land use changes affecting the forestry sector.

While significant efforts in the fight against climate change are ongoing, this study signals existing policy gaps which need immediate redress. The study is an integral part of a project - *Building Capacity for integrated approaches to climate change adaptation in Malawi*. The general objective of the project is to enhance Malawi's existing climate initiatives by strengthening capacity for long-term investment in, and management of climate change for sustainable development.

The aim of the report is to help policy makers and national stakeholders to consider the national policy needed to contribute to the fight against climate change. This can be done by either embarking on addressing existing policy gaps in sector policy documents and/or formulating a standalone policy. In any case, the policies should seek to reduce vulnerability and raise resilience; that is, to strengthen the national adaptive capacity. The absence of a comprehensive climate change policy coupled with the lack of deliberate strategic responses will continue frustrating achievement of most national development goals chief among them include the *Millennium Development Goals*, and the *Malawi Growth and Development Strategy*.

Scope of work: The study follows guidelines contained in the Terms of Reference (TORs) which specified tasks as follows: a) Review climate change and adaptation related policies and laws in Malawi b) Identify and review national, regional and international policy best practices c) Undertake gap analysis of current policy measures and legal frameworks related to climate change and adaptation; and identify policy/or institutional constraints related to climate change adaptation. Specifically, the study provides answers to the following key questions: i) what do the national policies state with regard to climate change, adaptation and mitigation development? ii) What are the notable gaps in the policies across sectors with regard to climate change, adaptation and mitigation development? iii) What is government's commitment in implementing existing policies related to climate change? iv) What can government and other organizations learn from the varied experience of preparing for, and integration of adaptation and mitigation measures in development programmes? v) What are the key factors for successful integration of Climate Change Adaptation (CCA) into existing policies and laws, and development programmes? What are the entry points for mainstreaming integrated CCA and mitigation into development planning? What are the critical aspects of the enabling environment?

Methodological Approach: The study objectives were addressed with a methodological process involving a desk review, stakeholder engagement and case studies. Stakeholders were consulted from the grass roots to the national level. The review involved a rigorous synthesis of policy and legal documents to identify gaps; and finally lessons were drawn for best policy practices from both local and international case studies.

Key Findings

Finding #1: There are many policies, laws and programs 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. Malawi has numerous policies related to climate change such as the National Environmental Policy (2004), the Forest Policy (1996) the National Water Policy (2005), the National Energy Policy (2003) and the Draft Agriculture Policy (2010), supported by legal frameworks including the EMA (1996), The Forestry Act (1997), Water Act, Energy Act and the Disaster Preparedness and Relief Act (DPRA) (1991). The list is long but these are just some of the examples. There are also national strategies such as the Malawi Development and Growth Strategy (MDGS), the National Strategy for Sustainable Development (NSSD), and the National Adaptation Programme of Action (NAPA). Except for the NAPA, these documents do not necessarily focus on climate change mitigation and adaptation measures, although indirectly they support these goals. The legal frameworks do not provide enforcement mechanisms for abatement of greenhouse emissions. Similarly, measures for adaptation to climate change have been given a very brief attention despite the need for a comprehensive strategy.

Finding #2: There are clear differences being drawn between CCA and Disaster Risk Reduction (DRR) in the country. Yet, these two fields have the potential to benefit if policies combined them to address natural disasters in general and those related climate change in particular. The DPRA was enacted in the wake of the flush floods in Phalombe (i.e. the Phalombe disaster). The DPRA provides some framework for disaster management. The key provisions relate to the institutional framework for dealing with disasters such as floods, disease, food crisis and others. The DPRA however focuses on relief and does not deal with adaptation issues for sustainable management of climate change in general although disasters in particular are the key focus. Moreover, the DPRA was enacted without any policy guidance. The Government of Malawi together with stakeholders is currently in the process of developing a National Disaster Risk Management Policy. This should provide the opportunity to provide input into the process based on experience working on community-based adaptation and disaster risk management programs over the years. Combining the two into a single long-term policy framework would provide greater benefits by preventing duplication of efforts.

Finding #3: Almost all legal, policy and sectoral development frameworks reviewed here engage very limited research in the process of integration of climate change.

The study shows that the policies and legislation do not have provision that encourage research on Climate change mitigation and adaptation, yet there are existing knowledge gaps necessary for effective response to climate change. While research on climate change is generally expensive the benefits over time cannot be questioned. Management of climate

change by its nature ought to be adaptive depending on emerging challenges. This requires continuous knowledge generation to support decision making.

Finding #4: Climate change impacts will be significant on communities, including the natural resources they own and rely on; however, while the NAPA is well-informed and well-intentioned the ability of government to reduce the vulnerability of communities still remains limited.

Field visits in natural disaster prone areas gathered the understanding that drought and floods pose a growing threat to the poor communities (especially women and children) living in these areas. These shocks, in addition to causing deaths and injuries, give rise to long-lasting damage, as buildings, homes and infrastructure are destroyed and scarce resources are diverted to coping with reconstruction. Despite the frequent occurrence of floods in many districts of the country the response to floods has remained ad-hoc and short-term providing largely reliefs. Except for the relief after disasters, vulnerable communities lack the necessary capacity to deal with these events for the long-term benefits.

Finding #5: While there are limited efforts directed towards addressing climate change within public sector policies, there is apparent lack of coordination resulting in duplication of efforts and disharmony. Policies that are formulated without considering the cross-links can unintentionally undermine the effectiveness of public sector policies and programs because of unaddressed conflicts between the strategies.

Observations 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.

Lessons from Case Studies

Policy on Floods: The case studies provide several examples of domestic policies that can reduce vulnerability and increase resilience. Regulations that govern development should seek to avoid construction of homes and industrial sites in areas subject to risk of earthquake or flooding; failing that, such regulations should encourage (with subsidies and other incentives, if necessary) buildings and settlements more likely to withstand such hazards. Rural-development policies should provide incentives for households to engage in farming and settlement behavior that does not increase the rural sector's vulnerability to hazards (e.g. deforestation). Furthermore, these policies should encourage urban and rural development that will permit the timely delivery of post-disaster aid (by avoiding entirely unregulated and chaotic "irregular" urban settlement, for example). Finally, such regulations must be effectively monitored and enforced. Whether the resources necessitated by such policies are generated domestically or are financed by foreign aid, their effective implementation will require location-specific knowledge that can only be provided by domestic policy-makers in concert with their constituents.

Integration of CCA and DRR: The Caribbean case study offer informative lessons on the integration of CCA and DRR. Firstly, disaster risk management and climate change adaptation share commonalities in purpose in that they aim to reduce the vulnerability of societies to hazards by improving the ability to better anticipate, resist and recover from their impact. There is enormous value added if adaptation efforts draw on the national platforms and other disaster risk reduction tools and experiences within and outside the Hyogo Framework. Disaster risk reduction provides many tried and tested tools for addressing risk. Thus, rather than implement climate change adaptation policies separately, there is benefit in recognising that climate change is bringing a range of new risks and hazards. Disaster risk reduction is increasingly contributing to adaptation as the disaster management debate moves beyond core humanitarian actions of emergency response, relief and reconstruction towards disaster prevention, preparedness and risk reduction.

Farming Policy Options: The local case studies provided us with the opportunity to draw lessons on how the agriculture sector is engaging various adaptation measures to not only the impacts of climate change but also the deteriorating production environment. As the impacts of climate change intensify, smallholder farmers in the country are increasingly adopting Conservation Agriculture (e.g. maximum groundcover/minimum tillage, crop rotation and agro-forestry practices) to reduce the vulnerability of agricultural systems and that of rural communities that depend on them for their livelihoods to climate change or climate variability. Rainfall variability is a major constraint. However, the effects of variable rainfall are often exacerbated by local environmental degradation. Therefore, curbing land degradation can play an important role in mitigating the negative impacts of climate change. Agro-forestry systems not only provide a great opportunity for sequestering carbon, and hence helping to mitigate climate change, but they also enhance the adaptive capacity of agricultural systems. Field observations showed that compost manure use is integral to Conservation Agriculture but the practice has the potential to contribute to CH₄ emissions if not properly used. These technologies/practices need to be assessed more effectively through research to provide comprehensive guidelines for scaling up the technologies.

“Green Economy” a pathway to sustainable development: The case studies from some developed and developing countries such as Germany, United Kingdom, Brazil, Nigeria and South Africa have shown that it is possible to embark on development with a green agenda. The successful introduction of measures to curb greenhouse emissions from the transport and industry sector shows that it is possible to embrace the green economy concept as a pathway sustainable development.

Policy Recommendations

Recommendation #1: The nature of climate change impacts in Malawi necessitates that adaptation, mitigation and DRR activities need to be linked across the full range of time frames, spatial scales and sectors. To do this, an integrated policy that recognizes the multiple dimensions and cross-cutting nature of climate change should be formulated by harmonizing all policies and programs and bridging all the gaps articulated in this study. The integrated policy should articulate new policy instruments combining all instruments which may work better in practice than reliance on a single instrument.

Recommendation #2: Malawi’s response to climate change impacts has largely focused on adaptation with little attention given on deliberate abatement measures. It is therefore

recommended that a climate change policy to be developed or sector policies should provide enough attention to mitigation measures to embrace both key areas of climate change.

Recommendation #3: The mandate of the DCCMS is to monitor, predict and provide information on weather and climate that would contribute towards the socio-economic development of the country. This mandate can only be achieved with comprehensive policy guidelines that take into account the multi-sector nature of climate change. The policy should further be supported by a legal framework to strengthen the department's mandate.

Recommendation #4: The DPC in collaboration with the DCCMS and the EAD should formulate a comprehensive climate change policy integrating DRR, CCA and mitigation which share commonalities in purpose in that they aim to reduce the vulnerability of societies to hazards by improving the ability to better anticipate, resist and recover from their impact. DRR provides many tried and tested tools for addressing risk. Adaptation efforts at national and more local levels can be enhanced when these tools are combined with knowledge of climate change. Many of the experiences gained by the disaster management community over the years can usefully inform the development of climate-related policy.

Recommendation #5: Government should ensure that the assessment studies on the impacts of climate change and relevant scientific institutions are well funded, that they act on the advice with informed decision making, and that hazards remain on the agenda at all times. Short, medium and long-term action is required to help reduce the current and future risks and vulnerabilities of different groups and communities. This action requires strengthened capacities, greater awareness and information, better targeted and more effective policies, and increased financing.

Recommendation #6: Each development sector should formulate, implement, improve and maintain local monitoring frameworks for vulnerability and resilience tracking and reporting.

Recommendation #7: Malawi's development pathway should be sustainable and this should be achieved by embracing the "Green Economy " strategy that other developed and developing countries are taking, especially in the transport and industry sector.

A. GENERAL INTRODUCTION

1.0 Introduction

The study on the policy analysis has been undertaken cognizant of the tremendous risks imposed by climate change and the urgent need for national policy response with a comprehensive long-term strategy. If ignored, climate change has the potential to undermine fundamentally even the finest development initiatives the country has unfolded. The policy analysis is therefore intended to provide supportive and relevant information to stakeholders in the policy-making process with three possible responses i) addressing existing sector specific policy gaps ii) formulating an integrated national policy or iii) undertaking both options i) and ii). In any given case, the path taken is expected to meticulously provide solutions to those risks arising from climate change, and directly contribute to the well-being of the poor and vulnerable people who are facing the burden on the ground. The study follows guidelines contained in the Terms of Reference (TORs) with specified tasks as follows:

- a) Review climate change and adaptation related policies and laws in Malawi
- b) Identify and review national, regional and international policy best practices.
- c) Undertake gap analysis of current policy measures and legal frameworks related to climate change and adaptation; and
- d) Identify policy/or institutional constraints related to climate change adaptation.

The tasks are clustered to address three key questions: i) what do the national policies state with regard to climate change, adaptation and mitigation development? ii) What are the notable gaps in the policies with regard to climate change, adaptation and mitigation development? iii) What is the government's commitment in implementing existing policies related to climate change? iii) What is the nature of the policy required to address climate change in Malawi based on existing policy gaps?

1.1 Study Approach

Identification of the national policy and legal issues concerning climate change adaptation and mitigation can be facilitated when there is a clear understanding of the scientific, financial and socio-economic bases to guide how best to reflect this understanding in relevant policies, plans and actions. The approach of this work focused on priority sectors based on previous climate change country studies and other national development documents (NAPA, initial communications, vulnerability assessments etc). The process was arrived through an inception workshop held with the Project Implementation Unit in collaboration with the National Technical Committee on Climate Change. The TORs were addressed with a rigorous review of selected national and sectoral policy documents (**Appendix 1**). Stakeholders were consulted from the grass roots to the national level through field visits and key informant interviews. The 7 climate change hotspots districts of Chikhwawa, Nsanje, Karonga, Salima, Zomba, Thyolo and Kasungu were visited. During the visits focus group discussions coupled with key informant interviews were conducted with smallholder farmers

and the local community. Key informant interviews were also done with government and non government officials in various sectors.

1.2 The Case for Policy Analysis

Many reasonable combinations of local experiences supported by scientific evidence about climate change conclude with a convincing case for policy analysis to facilitate tangible actions. To begin with, climate supports many productive sectors of Malawi's economy, chief among them include agriculture, forestry, parks and wildlife, fisheries, tourism, energy and the industry. This makes climate one of the key determinants in the national development goals of fighting against poverty, economic growth and food security. Hence, if not well managed climate will gradually more undermine future efforts aimed at achieving development goals in the country. This is fundamentally true at the time when climate change is already being observed and the impacts are globally experienced through rising temperatures, melting glaciers, shifting rainfall patterns, increased storm intensity and rising sea levels. Greenhouse gas (GHG) emissions – mainly from fossil fuel use, deforestation and agriculture have caused climate change (Intergovernmental Panel on Climate Change, IPCC, 2001; 2007a). According to the results of the 1990 and 1994 inventories there is clear evidence to suggest that the country is one of the contributors to the GHG emissions in the atmosphere. At that time, the total CO₂ emissions made up 66% of total CO₂-equivalent emissions followed by about 25% from methane largely attributed to land use and land use changes, the use of chemical fertilizers, rice cultivation (realizes methane) industrial processes, the use of liquid fuels, charcoal and coal.

The impacts of climate change in Malawi have emerged in many different ways resulting in serious adverse effects. Firstly, rainfall has become unpredictable causing shifts in seasons with uncertainties in food production. Secondly, besides droughts, there is notably increased frequency and intensity of floods in the districts situated along the lakeshores, in addition to those situated in the Lower Shire. Thirdly, in other parts of the country, strong winds and landslides during prolonged torrential rains have been observed. These weather related events have resulted in loss of lives, property and livelihoods. Notably, during the 1992/93 rainy season, landslides not only killed over 500 people but also caused severe damage to socio-economic structures in parts of Mulanje and Phalombe districts¹. From 1979 to 2008, natural disasters affected nearly 21.7 million people and killed about 2,596 people.

Malawi is perpetually exposed and vulnerable to drought and floods, and the associated hazards of disease epidemics and landslides. Droughts have affected the supply of electricity which is approximately 100% hydropower generated from Shire River an outlet of Lake Malawi. Existing supplies are threatened by low water flows and sedimentation of the Shire River where almost all of the power generation facilities are located. Power disruptions occur frequently, especially in dry years (Kaluwa, Mtambo & Fachi 1997:47). While Malawi has an estimated national hydro-power potential of 800MW, more than half of the capacity remains undeveloped. The current capacity was installed based on 1970 and 1980 designs. During that

¹ Malawi Initial National Communication to the UNFCCC

period Lake Malawi reached a 400-year record water level. The droughts of 1991/92 and 1993/94 and other subsequent years, provided a stark warning that Malawi could face a serious threat to economic disruption and possible power rationing. Now climate change has the potential to contribute to rendering the country's hydropower fragile and unreliable².

Malawi has taken significant strides towards addressing climate change, such as the production of the Initial and Second National Communications (GoM, 2002; GoM, 2011³), vulnerability assessments with the subsequent production of the National Adaptation Programme of Action, NAPA (GoM, 2006). However, the emergence of a comprehensive analysis of climate change related policies to guide policy makers in the country has generally lagged behind. Nonetheless, Malawi's development agendas and various policies (e.g. Vision 2020, MPRS and MGDS I and II) recognise that the land resources are largely used by vulnerable smallholder farmers and that greater effort is needed to support their uptake of sustainable and viable production systems and management practices that provide a viable living and food security. Reducing losses to weather-related disasters, meeting the Millennium Development Goals and wider human development objectives, and implementing a successful response to climate change are all aims that can only be accomplished if undertaken in an integrated manner. Currently, policy responses to address each of these independently may be redundant or, at worst, conflicting. The degree to which existing laws, policies and development programmes integrate climate change in general and, therefore existing policy gaps have not been systematically documented.

Furthermore, the Bali Roadmap⁴ obliges policy makers in the country (and other developing countries) to consider the national policy and legal instruments to contribute to the fight against climate change. Due to high climate-related risks for Malawi and the likelihood that these will increase substantially in the future, climate change mitigation, disaster risk reduction (DRR) and climate change adaptation (CCA) represent important policy complementary goals. This study analyses policy gaps that exist in response to the climate change problem. The policy analysis undertaken will enable Malawi to treat some of the underlying causes of vulnerability. The aim of this report is to help policy makers and national stakeholders in the country to consider the national policy needed to contribute to the fight against climate change by either addressing existing policy gaps and/or formulating a standalone policy. In any given case, the path taken should meticulously focus on providing solutions to changing climate while directly improving the well-being of the poor and vulnerable people who are facing the burden of adverse impacts on the ground.

² These figures are based on the Initial National Communication produced in 2003. Malawi prepared the First communication in fulfilment of her commitment as a Party to the UNFCCC. Malawi signed the UNFCCC in 1992.

³ The Malawi Second National Communication is being printed according to Mr. E. Njewa of the EAD.

⁴ COP 13 and COP/MOP 3 were held from 3 - 14 December 2007 in Bali, Indonesia.

1.3 Key Sources of Country Vulnerability

Vulnerability is described as the degree to which the country is susceptible to, or unable to cope with, the adverse effects - including climate variability and extremes. The term is further used to refer to the people and communities living in a specific system, including the vulnerable system itself (e.g., low-lying areas such as lakeshores); the impacts of this system (e.g., flooding of lakeshores and agricultural lands or forced migration); or the mechanism causing these impacts (UNEP, 2009). The interaction of multiple stresses such as land degradation, biodiversity loss, poverty, HIV and AIDS, population pressure, and high proportion of low-input, rain-fed agriculture aggravate vulnerability of the country and the people. At the country level, Malawi's vulnerability is linked to specific geo-climatic factors: (i) the influence of the El Niño and La Niña phenomena on the country's climate, and the positions of tropical cyclones developing in the Mozambique channel, resulting in highly erratic rainfall patterns; (ii) the existence of a hydrological network composed of 78 Water Resource Units (WRUs) contributed by three lakes (Malawi, Chilwa, Chiuta) and three rivers (Shire, Ruo, Songwe), shared with the neighboring countries of Mozambique and Tanzania⁵.

Malawi is highly densely populated creating pressure on the limited resource base. The country is severely poor yet facing a widespread HIV and AIDS pandemic (12% prevalence rate), chronic malnutrition, declining soil fertility, shortages of land and inadequate agricultural policies (Action Aid, 2006). The economy is heavily agriculture-based, with around 85% of the population living in rural areas. About 6.3 million Malawians live below the poverty line, the majority in rural areas, with more than 90% relying on rain-fed subsistence farming to survive. Malawi has been observing the highest rate on deforestation in the Southern Africa Development Community (SADC) region with deforestation at 2.8 percent per year. Forest coverage is decreasing, instead of moving upward to the target of 50%. The study undertaken by the UNDP-UNEP Poverty Environment Initiative (PEI⁶) in 2010 estimates that unsustainable natural resource use costs Malawi US\$ 191 million, or 5.3 percent of GDP each year. Evidence strongly suggests that increased droughts and floods may be exacerbating poverty levels, leaving many rural farmers trapped in a cycle of poverty and vulnerability (Phiri et al, 2005). The population is therefore particularly vulnerable to climate change, especially through resulting impacts on water and food security. Because of

⁵ Malawi's vulnerability to disasters has been well articulated in the Draft Policy on Disaster Risk Management

⁶ The UNDP-UNEP Poverty-Environment Initiative (PEI) provides support to countries to mainstream environmentally sustainability natural resource management into national and sectoral development processes. Such mainstreaming will ensure that poverty reduction is not undermined by the unsustainable use of natural resources.

The UNDP-UNEP PEI supports governments to:

Include environmental sustainability as a core objective in development planning & implementation so that poverty reduction and other economic development objectives are not undermined by the unsustainable use of natural resources.

Build capacity so that decision-makers know: How environmental sustainability contributes to development & How to include environmental sustainability in development planning & implementation

this, their adaptive capacity is compromised as the effects of climate change have the potential to intensify existing vulnerability dimensions (IPCC, 2007). Other commentators on climate change have indicated that:

“Poor countries and particularly the poorest people within them are critically vulnerable to shocks that disrupt their lives and livelihoods. Their poverty increases their vulnerability...and it limits their ability to cope with and recover from the shocks.”⁷

Regarding biodiversity, wildlife populations (animals) outside protected areas in Malawi have been utterly decimated. Only protected areas (National Parks, Wildlife and Forest Reserves) harbour significant wildlife populations but equally they are increasingly being threatened by habitat destruction, encroachment, poaching and other human-caused stresses. Some species such as rhinoceroses have locally gone extinct in places where they existed such as Kasungu National Park, Majete Wildlife Reserves and Liwonde National Park. However, efforts are being made to restock them. In Lengwe National Park climate change coupled with poaching threaten the *nyala* species⁸. Hence on the background of climate change human disturbances on natural ecosystems in the country are creating increased risks of extinction. The loss of biodiversity increases overreliance on agriculture with limited alternatives from the natural ecosystems.

Generally, Malawi has not been able to rise to the challenge of unsustainable land management and the past ten years have seen a dramatic deterioration of land soil qualities, cropping of increasingly marginal lands, rapid and severe depletion of forest resources and increased siltation of waterways and lakes (GoM, 2009). As the quality and quantity of natural assets decreases, their productivity declines (crops, livestock, forestry products, fisheries) which negatively affects rural incomes, poverty levels and economic growth. This in turn engenders a further deterioration of natural resources as people are increasingly cropping less productive plots of land. In addition they turn to charcoal production and brick making to supplement their incomes, thus further depleting forestry resources and silting river beds. These activities increase the exposure of natural resources to the impacts of climate change.

It should further be recognised that, on the background of changing climate, Malawi is grappling to achieve various development goals including food security, economic growth and poverty reduction. Due to the fact that, Malawi's economic and social performance heavily relies on the performance of the wider agro-ecosystems (crop-soil systems, livestock-rangeland systems) and natural ecosystems (fisheries, forestry and wildlife) which are being challenged by these multiple anthropogenic risks, climate change provides another source of vulnerability. The IPCC suggests that future vulnerability depends not only on climate change but also on development pathways. Sustainable development pathways such as the

⁷ DFID 2004: Climate Change and Poverty; the impact of climate change on vulnerability of the *poor*'

⁸ A study by Mkanda (1996) and another study by Kazembe (2009) suggested that *nyala* are the most vulnerable species in terms of climate change.

“green economy” can reduce vulnerability. On the international scene, efforts are being directed to economic growth based on the green economy⁹ concept with pathways to sustainable development and poverty reduction (UNEP 2011). To be successful, however adaptation and mitigation issues should be mainstreamed in national and international sustainable development priorities and sector programs. The design of climate change policies should also promote activities with multiple benefits to catalyze progress in achieving sustainable development goals, while contributing to adaptation and mitigation objectives.

1.4 Mitigation and Adaptation - Complementary Policy Goals

In Rio de Janeiro in 1992¹⁰, the United Nations Framework Convention on Climate Change (UNFCCC) agreed that, for Least Developed Countries (including Malawi); it is important to underscore Article 2, the objective of the convention, which not only refers to stabilization of atmospheric concentrations in the atmosphere, but also refers to doing this in a way that allows sustainable development to proceed – ecologically (“ecosystems adapt”), socially (“food security”) and economically (IPCC 2007). It is now almost two decades after the Rio conference, however, a recent report on Global Assessment on Disaster Risk Reduction (ISDR, 2009) concluded that both mortality and economic loss risks resulting from climate change related hazards are heavily concentrated in developing countries (including Malawi). Disturbingly, in these countries the poor are disproportionately affected. To make matters worse, the United Nations Development Programme report indicates that the impending critical food insecurity resulting from erratic rainfall patterns and decreasing crop yields, will contribute to increased hunger (UNDP, 2010).

The policy analysis undertaken here recognises two key goals linked to addressing climate change and these include mitigation and adaptation. Mitigation – refers to human intervention to reduce the anthropogenic forcing of the climate system; it includes strategies, laws and policies to reduce greenhouse gas sources and emissions and enhancing greenhouse gas sinks. Mitigation however, has been at the heart of the climate international negotiations from the outset. Particularly, reaching agreement between developing and developed countries on the action on mitigation has been the major bone of contention. Recently, the Bali negotiations agreed on what developing countries might do on mitigation. For developing countries, mitigation actions need to be developed in a bottom-up manner to achieve reductions relative to baseline emissions (IPCC, 2007). For developed countries, these actions should involve commitments to absolute emission reductions. Nevertheless, what is common for both developed and developing countries is that they take “measurable, reportable and verifiable” mitigation action. Many means to achieve this have been proposed and they include market mechanisms, national policies, accounting issues and role of land use, land-use change and forestry (LULUCF). The study approach gives focus on both mitigation and adaptation policies as the two are related from both conceptual and practical dimensions (**Figure 1**).

⁹ UNEP defines green economy as one that results in improved human well being and social equity while significantly reducing environmental risks and ecological scarcities. The key goals of green economy are low carbon, resource efficiency and social inclusion.

¹⁰ United Nations Conference on Environment and Development (UNCED), Rio de Janeiro, 3-14 June 1992.

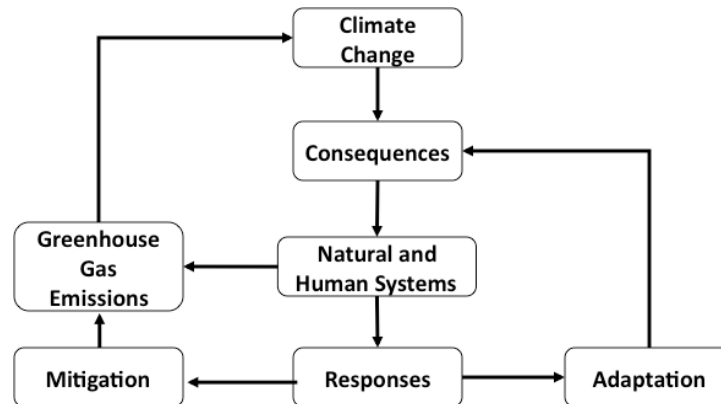


FIGURE 1: Adaptation and mitigation in the context of responses to climate change (Source: UNDP, 2010). The scope of the current study borrows heavily from this framework.

Adaptation - involves a process of sustainable and permanent adjustment in response to new and changing environmental circumstances¹¹. This may involve adjusting behaviour, livelihoods, infrastructure, laws and policies and institutions in response to experienced or expected climate change events (**Figure 1**). Initially however, adaptation has been identified as an appropriate response for developing countries because it is associated with supporting development processes and can facilitate the continuation and improvement of existing livelihoods. Nevertheless, adaptation is now included on the policy agenda alongside mitigation in most if not all developed countries.

The synergy between DRR and CCA – In recent years, there have been many calls for the closer integration of CCA and DRR in international policy processes, national governments and community-based projects. These two fields share a common focus in that they are both concerned with reducing the vulnerability of communities and contributing to sustainable development. Because of this, both CCA and DRR can play an important role in reducing the adverse impacts of climate change. Reducing risks related to current weather and climate conditions is usually the best way to prepare for addressing risks related to climate change (**Figure 2**). As a result, some countries and territories have already started to take action to coordinate their DRR and CCA efforts and to integrate both disaster risk and climate change considerations into their development and poverty alleviation policies, plans and activities (UNDP 2010). Inspired by these emerging approaches to addressing climate change, our analysis therefore is not confined within the spheres of mitigation and adaptation goals but extends to review DRR.

¹¹ Conceptually, there are many definitions of adaptation. Here we adopt definition in the scheme of Schipper, Cigaran & Hedger (2008).

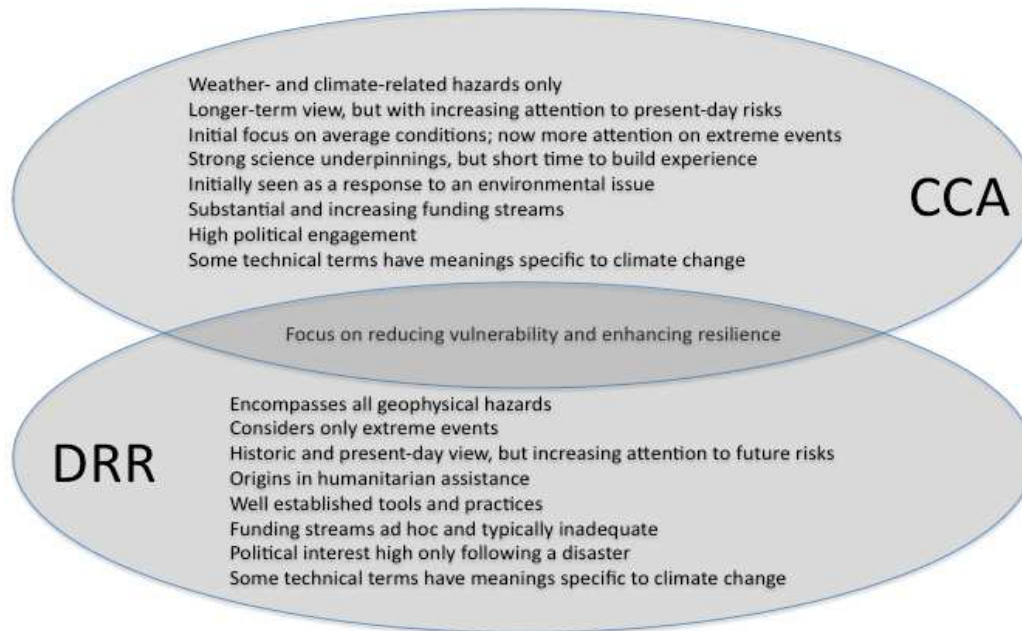


FIGURE 2: DRR and CCA - The common ground and the differences (**Source:** adapted from Gero et al., 2009).

B. POLICIES AND LEGAL FRAMEWORKS – MAPS AND GAPS

2.0 Introduction

The analyses scrutinize three aspects (i) the degree of incorporating climate change adaptation and mitigation in the sectoral development and planning processes (ii) national policies and laws on climate change adaptation and mitigation and how they have translated into programs at the grass root levels (iii) the extent to which sectoral policies address climate change and barriers to integration in sectoral strategies. The major outputs of all these analyses are the policy gaps upon which recommendations are generated in the subsequent chapter.

2.1 International Policy and Legal Framework

At the centre of efforts to address climate change on the international stage is the United Nations Framework Convention on Climate Change (UNFCCC) – an integral component of the Multilateral Environmental Agreement (MEA). “The UNFCCC specifically provides the basis for concerted international action to mitigate climate change and to adapt to its impacts. Its provisions are far-sighted, innovative and firmly embedded in the concept of sustainable development” (UNFCCC 2006a).

BOX 1: Key Objectives of MEA

Convention to Combat Desertification

Objective: To combat desertification and mitigate the effects of drought in countries experiencing serious drought and/or desertification, particularly in Africa, through effective actions at all levels...with a view to contributing to the achievement of sustainable development in affected areas.

Achieving this objective will involve long-term integrated strategies that focus simultaneously, in affected areas, on improved productivity of land, and the rehabilitation, conservation and sustainable management of land and water resources, leading to improved living conditions, in particular at the local level.” (Article 2, UNCCD).

Convention on Biodiversity

Objective: The objectives of this convention are....the conservation of biological diversity, the sustainable use of its components and the fair and equitable sharing of the benefits arising out of the utilization of genetic resources...” (Article 1, CBD).

Framework Convention on Climate Change

Objective: “The ultimate objective of the Convention and any related legal instruments that the Conference of the Parties may adopt is to achieve.....stabilization of greenhouse gas concentrations in the atmosphere at a level that would prevent dangerous anthropogenic interference with the climate system. Such a level should be achieved within a time-frame sufficient to allow ecosystems to adapt naturally to climate change, to ensure that food production is not threatened and to enable economic development to proceed in a sustainable manner.” (Article 2, UNFCCC).

Adapted from UNFCCC (2002).

2.1.1 Malawi's Policy Fulfilments to the MEA

Malawi shoulders the obligation of ensuring the path to sustainable development under the MEA including the UNFCCC¹², UNCCD¹³ and CBD. Under the UNFCCC, there are specific commitments and obligations pertaining to national environmental management which Malawi has assumed and for which policy needs must be fulfilled. These can be considered in the following areas: Under Article 12 Malawi has developed, periodically updated, published and made available to the Conference of the Parties national inventories of anthropogenic emissions by sources and removals by sinks of all greenhouse gases not controlled by the Montreal Protocol. **Table 2.1** provides a summary of progress about how the MEA has been implemented as well as the policy gaps in adaptation to climate change.

TABLE 2.1

Climate Change Policy Maps and Gaps with reference to implementation of the UNFCCC, the UNCBD and the UNCCD

National level	Local level
<p>The UNFCCC requires all signatory countries (including Malawi) to communicate reports on their national circumstances and potential vulnerability to global climate change (UNFCCC 1992). Malawi has made progress but this is just the first step:</p> <ul style="list-style-type: none"> • Malawi's First National Communication to the UNFCCC was completed in 2002. It proposed several vulnerability and adaptation strategies and actions, as did other assessment documents produced subsequently. • Malawi's Second National Communication has been completed, but cannot be made available until it is approved; NAPA was prepared and submitted to the UNFCCC in 2006. • Malawi Developed the National Environmental Policy (NEP, 1996) which acknowledges that climate is natural resource important for socio-economic development. NEP has outlined a number of guiding principles to minimize the adverse impact of climate change and variability through reduction of air pollution and greenhouse gas emissions. • Despite this commendable progress the consultants note that the country does not have a comprehensive policy aimed at climate change mitigation and adaptation. Yet, such a policy is a core element of successful implementation of the convention on Climate Change issues. 	<p>District councils still lack significant administrative and operation systems independent of the central government; moreover, traditional governance systems are embedded in the country's modern governance structures; for these reasons, implementation of initiatives has not proceeded at a pace that might have been expected.</p> <p>For example, district assemblies lack effective enforcement mechanisms to govern the management of local climate. Yet, at the local level rampant deforestation and pollution both are key threats to the local climate.</p> <p>Our consultations with local communities in affected areas reveal that knowledge about the dangers of future climate changes has not trickled down to the grass roots. This is despite that there is misconception regarding the cause of weather related disasters. As a result unplanned settlements in flood prone areas, use of fragile river banks and construction of unsuitable structures in these areas continue to increase their vulnerability. Technological development and transfer to grassroots still lags behind.</p>

¹² Malawi became signatory to UNFCCC in 1992 and ratified in 1994. Under the UNFCCC falls the Kyoto Protocol, an important subsidiary legal instrument which makes major demands on capacity

¹³ Malawi is a signatory to UNCCD since 1992

2.1.2 The MEA Implications for Adaptation and Mitigation

Box 1 signals a number of important areas adopted in the conventions which cover both climate change adaptation and mitigation policy goals. First, these conventions share a common focus on sustainability – either through the achievement of sustainable development in drought affected areas, the sustainable use of biodiversity or the assurance of sustainable economic development through the mitigation of climate change. Second, each convention aims at increasing the robustness and resilience of ecosystems which in turn promotes the reduction in the economic and social vulnerability of the country and its people (UNCCD). More so, the preparation of NAPA reports has been largely guided by these principles and preparation teams were meant to exploit the synergies that arise from these agreements.

Malawi's current effort has delivered important results but remains a first step. Overall, the climate regime has prompted the country to prepare short-term and small-scale climate change strategies (e.g. the NAPA) and to build some needed processes for GHG inventories (National Communications). The National Strategy for Sustainable Development has been developed. However, more explicit commitments to climate change mitigation are required. Following, the Bali Action Plan all nations must play an active role in working toward an agreement that delivers effective steps toward global emission reductions. More development-oriented climate architecture is needed to upscale these initial efforts.

Currently, climate policy instruments are limited as they operate within the context of general environmental management frameworks. Hence, they are limited in scope reducing their effectiveness in addressing the full range of challenges posed by climate change. Further, they provide inadequate incentives and enforcement tools for mitigation action. Both the Initial and Second National Communications to the UNFCCC and the (NAPA) developed by Malawi outline strategies that can contribute to GHG mitigation while addressing other critical development objectives. These plans can serve as a basis for defining and recognizing nationally appropriate actions in a new climate policy. However, Government faces national and local challenges in meeting international commitments, while ensuring that climate action remains compatible with its development agenda. Thus, we have witnessed a slow implementation process of the NAPA. Given the multi-agent and collective action nature of the climate problem, government will need to set incentives for local governments, households, communities and particularly the private sector, through pricing, taxation, regulation, and long-term planning.

2.2 The National Policies and Legal Frameworks

2.2.1 The Malawi Constitution

The Malawi Constitution of 1995, Section 13 (d) calls upon the state *“To manage the environment responsibly in order to prevent the degradation of the environment, provide a*

healthy living and working environment for the people of Malawi, accord full recognition to the rights of future generation by means of environmental protection and the sustainable development of natural resources and conservation and enhancement of biological diversity of Malawi". An analysis of this provision, entails a strong climate change related legal framework. The constitution recognizes the need to shape the path to sustainable development by embracing principles of environmental protection, sustainable natural resource use and conservation of biodiversity. These are all underscored in the Article 2 of the UNFCCC.

As such the proposal to come up with a climate change policy is in line with the call for environmental protection and sustainable development which have been underscored in the Article 2 of the UNFCCC. It can therefore be deduced that efforts to come up with a national climate change policy are supported by the constitutional provision. Thus, the constitution should serve as the overarching guidance in redressing sector-specific policy gaps and/or the development of a standalone policy for climate change. Given that the constitution promotes sustainable development, the mitigating potential of reducing emissions from deforestation and degradation (REDD) and other forest related issues has the potential to provide increased opportunities for Malawi.

2.2.2 The National Environmental Policy and Environmental Management Act (1996)

Summary of the NEP and EMA principles are displayed in **Table 2.2**. The mandate for the National Environmental Policy (NEP) is derived from the Constitution of Malawi, 1995 with guiding principles contained in Section 13(d) articulated in the previous statement. In 1994, the government undertook a broad-based consultative process to develop the *National Environmental Action Plan* (NEAP), which identifies key environmental problems, their underlying causes and appropriate responses at the policy and other levels¹⁴. The NEAP was followed in 1996 by the *National Environmental Policy* and the *Environmental Management Act (EMA)* which marked a significant departure from previous policies and laws. Whereas in the past the government was the sole manager of natural resources, the 1996 Policy and Act paved way for the devolution of management powers to individuals, communities, user associations and other entities. Climate change was one of the priority issues which were identified in the NEAP.

TABLE 2.2
The National Environmental Policy and policy gaps in relation to climate change

Overall Policy Goal	Key Guiding Principles	Key Gaps In Relation to Climate Change
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¹⁴The nine key environmental issues identified were: soil degradation; threats to forests, fisheries and water resources; threats to biodiversity, including wildlife; human habitat degradation; unsustainable population growth; climate change; and air quality issues. Causes of these problems were identified and solutions proposed.

<p>The overall policy goal is the promotion of sustainable social and economic development through the sound management of the environment and natural resources.</p>	<p>Promote sustainable utilization and management of the country's natural resources and encourage, where appropriate, long term self-sufficiency in food, fuel wood and other energy requirements.</p> <p>Facilitate the restoration, maintenance and enhancement of the ecosystems and ecological processes essential for the functioning of the biosphere and prudent use of renewable resources.</p> <p>Promote the ecosystems management approach so as to ensure that sector mandates and responsibilities are fully and effectively channelled towards sustainable environment and natural resources management.</p>	<p>The NEP is a general policy directed towards achieving environmental, natural resource and poverty reduction goals. It also indirectly relates to the UNCBD and the UNCCD but indirectly contributes to possibly meeting the UNFCCC objectives.</p> <p>The issue of climate change mitigation is at the centre of the UNFCCC but the NEP has cursorily tackled it.</p> <p>The lack of effective enforcement presents the key challenge facing implementation of the NEP and EMA. For example cultivation along riverbanks to meet food security has eroded stability of river ecosystems consequently changes in river courses have resulted in frequent floods. Actual implementation of policies and legislative reform is stalled or deadlocked as legal mechanisms have yet to be developed. For example, to date there are few endorsed village by-laws or signed resource management contracts under the new legislation. Most agreements have to be negotiated with the ministry concerned on a case-by-case basis.</p> <p>Sound environmental management has a potentially important role to play in reducing many of the risks posed by climate related hazards. However, the NEP is silent on extreme weather events such as floods and droughts.</p>
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The NEP and EMA Implications for Mitigation and Adaptation

In line with the Malawi constitution, the overall goal of the NEP and EMA is to promote sustainable social and economic development through the sound management of the environment and natural resources. The specific policy goals address issues of environmental security for health and well being of people, sustainable utilisation and management of the country's natural resources, long-term self-sufficiency in food and energy, ecosystem integrity and sustainable environment and natural resources management. The policy promotes the rights of every person to a clean environment while also at the same time stating that every person has a duty to promote sustainable utilisation and management of the environment and natural resources, including taking legal action against any person whose activities or omissions have or are likely to have adverse effects on the environment. The policy recognizes the tradeoffs between economic development and environmental management. Further, the NEP recognises climate as a very important natural resource to the effect that if not well managed can become a constraint to socio-economic development. All these policy objectives have huge implications for adaptation and mitigation to climate change.

2.3 Review of Policies by Sector

2.3.1 Agriculture and Food Security

The agriculture sector in Malawi employs approximately 80 percent of the country's workforce and contributes over 80% of its foreign exchange earnings. However, the sector is

entirely dependent on rain-fed production. The country receives an average of 850 mm of rainfall per year, adequate for rain-fed crop production and for recharging underground aquifers. However, the distribution and intensity of rainfall is erratic and water storage capacity is limited. As a result, the sector is prone to serious droughts and floods. Overall, the situation can be considered one of water scarcity, primarily due to lack of water storage. Only 20 percent of the total farmed area in Malawi is under water management (less than 900,000 ha), and only a limited proportion of this (54,000 ha) is irrigated. In fact irrigated land constitutes only 10 percent of the estimated physical potential. The livestock sector still remains undeveloped.

Despite its importance, in Malawi agriculture activities contribute to GHG emissions. The 1994 records show that the sector produced significant non-CO₂ emissions. The total emissions consisted of 49 Gg of CH₄ mainly from enteric Fermentation (30 Gg) and rice cultivation (15 Gg). The other emissions consisted of 7 Gg of N₂O from agricultural soils, 2 Gg of NO_x and 72 Gg of CO from prescribed burning of savannah and field burning of agricultural residues.

The mission of the Ministry of Agriculture and Irrigation is to **promote economic growth by raising farm incomes, employment and household food security through the development of partnerships and promotion of private sector investment for increased agriculture productivity, diversification, commercialization and the sustainable use of the nature resources**. On the other hand, the Land Resources Conservation policy of 1999 recognizes water as an important resource and a requirement for sustainable agricultural production and development in Malawi (GoM, 1999). The policy also recognizes that water is a threatened resource due to pollution, siltation of water courses, pasture degradation, forest degradation and deforestation. Agriculture is also the major user of water. Approximately, 32% of the total land area of Malawi is suitable for rain fed agriculture, representing the largest single land use in the country and therefore a major player in catchment management and water conservation. However, there are policy gaps to support the agriculture sector (**Table 2.3**).

TABLE 2.3
The Agriculture sector policy frameworks with policy gaps related to climate change

Policy	Policy Goals	Policy Objectives	Gaps in Relation to Climate Change
Agriculture and Food Security Policy (2006)	To improve food security of the population. The goal implies increasing agricultural productivity as well as diversity and sustainable agricultural growth and development.	<p>To ensure that all Malawians at all times have both physical and economic access to enough nutritious food for an active, healthy life.</p> <p>To ensure that the ways in which food is produced and distributed should be environmentally friendly and sustainable.</p> <p>To ensure that both the production and consumption of food are governed by social values which are just and equitable as well as moral and ethical? The ability to acquire food is ensured;</p> <p>To ensure that the food is obtained in a manner that upholds human dignity.</p>	<p>Agriculture sector is one of the contributors to Greenhouse Gases (GHG) emissions. This policy does not explicate measures to regulate GHG emissions by various agricultural activities.</p> <p>It does give a definition of “Environmental friendly and sustainable” but that remains broad in the context of climate change mitigation.</p> <p>The agricultural and food security policy does not have objectives to control production of tobacco which has led to heavy use of forest products resulting in loss of carbon sink hence increase in green house gases which leads to global warming and climate change.</p>
The Draft National Agriculture Policy (2011)	To contribute to the attainment of national food security, poverty reduction and national economic development objectives as outlined in the MGDS.	<p>Facilitating the creation of a conducive and supportive policy environment for effective development of the agricultural sector throughout all stages of the value chain.</p> <p>Strengthening the capacity of the stakeholders in the sector in provision of agricultural services.</p> <p>Enhancement of coordination and collaboration amongst relevant stakeholders operating in different sub-sectors of the sector.</p> <p>Provision of clear strategic policy direction to all stakeholders involved in the sector along the value chain stages.</p>	<p>The draft agriculture policy has a thematic area on climate change and environment whose objective is to promote adaptation and mitigation technologies and interventions to minimize future adverse effects of climate change on agricultural production and rural livelihoods. The policy is still a draft; however the issues of climate change should have been tackled in each thematic area to address adaptation and mitigation issues for each theme.</p> <p>Promotion of CA is not articulated as a policy action towards climate change adaption but dimba production is, yet CA has potential as a CC adaptation measure.</p>

The Agriculture Sector Policies and Implications for Mitigation and Adaptation

Adaptation - Soil and Water Conservation measures are increasingly gaining attention as a priority activity in the Department of Land Resources and Conservation. This is one of the most important policy options reflected in promoting conservation agriculture (CA) currently being adopted by smallholder farmers in almost all the districts in the country. Several technologies have been introduced under CA, which include maximum ground cover, minimum tillage and crop rotation. Some of which have long been integrated in the farming

system (e.g. crop rotation). These technologies work with other agricultural practices such as use of organic manure, vetiver grass contour planting, and promotion of soil conservation. It was observed during field consultations that in some cases CA is not necessarily being promoted as an adaptation measure but in other cases where dry spells are eminent it is being seen as an adaptation measure. For instance, in Chikhwawa some farm families benefited from CA technologies when the district experienced dry spells and registered significant yields (Box 2).

Box 2: Experience with Conservation Agriculture, Fatsani Club, Dalo EPA, Chikhwawa

I am a married woman from Fatsani Association in Mtuwa Village, Dalo EPA in Chikhwawa District. The village has been experiencing dry spells and droughts since 2006. The onset of rains has changed from October to December and lasts until mid January. This was especially for 2010/2011 season. Due to the drought my family experienced food shortages, lack of water for us and our cattle and livestock death. This was catastrophic to the family. To survive we relied on ganyu, piece work, collection of water lily tubers. We could also cut grass and sell. For drinking water we relied on the village borehole. It serves both us and livestock. When I go to fetch water, I spend 4 hours at the borehole because of traffic; I leave home at 4.00am and return at around 8am.

The agriculture offices recognizing the problems mobilized the village community and advised us to form groups so that we can take on CA and Water Harvesting Technologies which could provide moisture to our crops. The CA and water harvesting technologies included minimum tillage, maximum groundcover, swale construction, compost manure making, water harvesting and making hay and silage for livestock.

As an association we constructed a water harvesting structure for our group demonstration plot of 0.4 ha. We practiced all the CA technologies on the demo plot and planted cotton. Although it was a drought year we harvested 5 bales of cotton which we sold for MK85, 000.00. We shared the cash equally amongst group members. I tried the technologies on our farm of 15 ha and we got high yields of cotton (45 Bales). The cotton fetched high prices at the market with total sales amounting to MK1, 000,000.00. Some of the money we bought a motor bike. In addition we got 37 bags of maize on an area of .5ha where box ridges, swales were made. This type of farming has benefitted my family and many people in our club would like to emulate my example, because of the benefits we have realized as a family. The technologies are good for us because of the frequent dry spells we experience.

In addition, the country is promoting crop diversification including sorghum, millet and rice cultivation to meet food deficits which might arise from maize crop failure. While these activities significantly support adaptation to food production they have huge implications for GHG mitigation efforts. For example, the use of composite manure as well as rice production could increase methane emission.

As regards the reduction of GHG emissions from agricultural activities, it requires the long-term nature of solutions that focus on *processes rather than products*. Instead of “once and for all” practices, the sector will need policies that themselves adapt to changing conditions and that combine different practices into balanced packages. Development of mitigation

measures will require policymakers to treat activities as ongoing experimental and learning processes, based on targets and milestones, strong performance-based monitoring and evaluation systems and enabling frameworks for interactive engagement with stakeholders and communities.

In terms of adaptation policy options, climate change has brought about a new set of weather patterns and extremes that are well beyond what smallholder farmers are capable of dealing with. External help is necessary to rebuild or enhance the social and ecological resilience among rural communities. Local adaptation strategies are not sufficient on their own to respond to climate change. However, they can serve as useful entry points for up-scaling by governments, relief organisations and development agencies.

The NAPA (GoM, 2006) proposed a number of strategies and measures geared at the agricultural sector to adapt to the adverse effects of climate change. However, providing a list of adaptation measures is one thing, and it is quite another to ensure that the appropriate policy and institutional environment is in place to make this agricultural transformation happen. Most of the strategies proposed to address future climate change (see the US Country Studies) are even valid today and the rural communities would be much less vulnerable if these strategies were widely implemented. Factors constraining the widespread use of improved technologies today are not likely to change significantly in the future (Kandji et al 2006). Fundamental to these factors is lack of political will, hence in agreement with Kandji et al (2006) that there is need for political will to remove these technical and policy barriers that exists. Otherwise no breakthrough can be expected in climate change adaptation.

Another important issue that has been raised by Kandji et al (2006)¹⁵ which is largely overlooked by the impacts and adaptation studies is that of the inter- and intra- seasonal variability of rainfall. Long-term changes in climatic parameters such as temperatures and rainfall may be dealt with quite successfully if the right crop species/varieties or cropping techniques are used. What communities and development planners should be more worried about is the increased frequency of climate extremes such as droughts and floods. Therefore, developing the necessary skills to produce timely seasonal forecasts and communicate them to all relevant stakeholders should be a major priority for various governments.

With regards to mitigation, many options have been identified in the SNC as follows: i) improved rice cultivation practices, ii) improved animal husbandry practices, iii) improved manure management practices, iv) improved fertilizer management practices, v) application of zero tillage or conservation farming and vi) application of agro-forestry practices, which include crop rotations, mixed cropping and intercropping systems.

¹⁵ Kandji and colleagues have provided a comprehensive discussion of the current vulnerability of the southern African region to climate variability, the projected impacts of climate change and the various strategies and policies that are being deployed to address climate issues, focussing mainly on the agricultural sector.

2.3.2 The Energy Sector

Access to clean, affordable and sufficient energy for all is an important prerequisite for a nation's development. Energy occupies the centre stage in almost all daily production activities. Malawi, with the current population of about 14 million people, uses a variety of both commercial and non-commercial energy sources. Malawi's energy supply system comprises five components: biomass, electricity, liquid fuels and gas, coal and other renewable energy sources. However, 93% of the population does not have access to modern energy services (IHS, 2005).

The energy sector is a source of GHG emissions. The 1994 records estimated the emissions at 661 Gg of CO₂. This was the result of the combustion of liquid fossil fuels such as gasoline, jet kerosene, diesel and paraffin and solid fuel (coal) which contributed 530 Gg and 131 Gg, respectively (GoM, 2003).¹⁶ The non-CO₂ emissions from fuel combustions comprised 135 Gg of CH₄, 24 Gg of NO_x, 880 Gg of CO and 1 Gg of N₂O. Emissions from international bunkers were not computed by then. The Energy Policy and Act do not deal directly with controlling these issues of climate change. They are only implied in the provisions for mitigating environmental degradation (Table 2.4). While the energy sector, especially the hydropower, has been one of the contributors to the emissions of GHGs, it has also been the most affected by the impacts of extreme weather events. This is true for both floods and droughts (Section 1.2).

The objective of the National Energy Policy (2003) is **to provide reliable and affordable energy for economic development of the country**. The National Energy Policy also aims at improving the Energy Sector governance and mitigation of environmental, safety and health impact of energy production and utilization. The main source of energy for Malawi is biomass energy which is continuously leading to the degradation of the environment including river catchment areas especially in hills and mountains. Degradation is affecting stream flow and ground water recharging process.

On the other hand, coal which is one of the energy sources has health and environmental negative impacts. For example, mining activities associated with coal result into pollution waste that is discharged into water courses and the environment. The policy recognizes the potential negative impact of coal and provides for Environmental Impact Assessment according to Environmental Management Act and also provides for awareness campaigns to inform energy producers and users of the dangers of various forms of energy production and utilization. While there has been a National Energy Policy (An Integrated Energy Policy, 2003), it has had an energy rather than emission reduction focus. We have identified a number of gaps that could be addressed (Table 2.4).

¹⁶ All the figures on the GHG emissions are based on the 1994 estimates. The Government of Malawi submitted these figures to the UNFCCC through the Initial National Communications. While the second National Communications has been completed, consultants could not access these as they have not been officially released.

TABLE 2.4
The Energy Policy with policy gaps in relation to climate change.

Policy	Policy Goals	Policy Objectives	Gaps in Relation to Climate Change
Energy policy (2003)	<p>To make the energy sector sufficiently robust and efficient to support the government of Malawi's socio-economic agenda of poverty reduction, sustainable economic development and enhanced labour productivity.</p> <p>To catalyze the establishment of a more liberalized, private sector driven energy supply industry in which pricing will reflect the competition and efficiency that will develop in the reform process.</p> <p>To transform the country's energy economy from one that is overly dependent on biomass to one with a high modern energy component in the energy mix.</p>	<p>To improve efficiency and effectiveness of the commercial energy supply industries.</p> <p>To improve the security and reliability of energy supply systems.</p> <p>To increase access to affordable and modern energy services.</p> <p>To stimulate economic development and rural transformations for poverty reduction.</p> <p>To improve energy sector governance.</p> <p>To mitigate environmental, safety and health impacts of energy production and utilization.</p>	<p>The policy has poor or no governance measures for new energy technologies at national level. Some of which are not friendly to the environment and contribute to GHGs emissions.</p> <p>The energy policy does not have standards and does not limit or state the degree to which implementing the policy will specifically impact climate change at grass root level.</p> <p>Monopoly by ESCOM makes some policy objectives a lip service and there is lack of adequate investment in the energy sector.</p> <p>The Malawi government is the signatory to Rio Declaration, Agenda 21 and Kyoto protocol which emphasizes on the need to control atmospheric emissions, gases and substances through efficiency in energy production, transmission, distribution and consumption but Government of Malawi currently is non-operating member of Southern African Power Pool (SAPP) which gives Malawi the option of importing and exporting electricity as to improve the reliability and security of power supply.</p> <p>It has been observed that in Malawi electrical tariff is very high and electrical supply is not reliable due to intensive blackouts as such people depend on charcoal and firewood which has led to deforestation and aggravated the issue of climate change.</p>

The Energy Sector Policy and Implications for Adaptation and Mitigation

Observation has shown that the use of generators for power generation is increasing as hydropower is becoming unreliable. Similarly, the use of charcoal, fuel wood and coal remain inevitable. The obvious gap remains the ability to control emissions from fuel combustion in the residential and industrial sectors. The Energy Policy provides no mechanisms to force domestic and industrial consumers to reduce emissions. The various existing approaches involve incentives and advocacy to reduce energy use, both for self-interest and for wider social benefits. This has extremely important implications for mitigation of GHG emissions in the country. The sector needs to have a direct control of GHG emissions through application of planning and building regulations. As in the Transport Sector, planning controls and building regulations are important because they determine the energy requirements for this sector for several decades.

The Energy Sector and its policy needs to explore and upscale a number of selected mitigation options including: (i) cooking using grid-electricity (ii) efficient lighting technologies (iii)

efficient firewood cooking stoves (iv) increasing the efficiency in ESCOM's capacity and energy balances (v) increasing the ethanol to petrol blending ratio and (vi) switching from paraffin (kerosene) lamps to PV lamps.

The use of efficient cooking stoves instead of the traditional three-stone open fire cooking system is the most important mitigation option; it is estimated that the switch will yield about 650 Gg of GHG emissions (CO₂equivalent) reduction in the household sector by year 2040. The use of grid electricity for cooking involves improving access to affordable and modern energy sources. This can be done through: (i) rural electrification (to reach at least 30% in 2020) at an annual electrification rate of 7% (UN, 2005), (iii) reduction in biomass use (to reach 50% in 2020), and (iii) increasing publicity campaigns on the value of switching from firewood to grid electricity in rural and peri-urban areas.

The promotion of efficient demand side management mitigation option can be done through: (i) increasing customer connections by 1,000 per year, (ii) promoting the use of the 3-high efficiency compact fluorescent lamps, (iii) introducing a time-of-use tariff approach as an incentive for medium and low voltage industrial customers, and (iv) increasing the use of prepaid meter connections. Finally, increasing the ethanol to petrol blending ratios option can be done by simply increasing the ethanol to petrol blending ratio to 20% ethanol and 80% petrol.

2.3.3 The Transport Sector

The transport system in Malawi remains underdeveloped. The key modes of transport are the road, marine, civil aviation, and rail. The Transport Policy has been developed based on these modes of transport. Each area of policy has a goal, objectives and strategies. These areas of policy include: The Road transport, Civil Aviation, the Rail transport and Maritime transport.

The Road Transport Policy has an environmental objective and strategies to take care of environmental issues. The objective is to prevent adverse environmental effects of road construction and ensuring that the infrastructure itself is environmentally friendly. The strategies include: include in the planning for the construction of roads environmental impact assessments (EIAs) and energy conservation; promote environmental protection and resource conservation; ensure that roads do not impede drainage and cause accumulation of water pools that become breeding grounds for mosquitoes; ensure that drainage outlets do not become the source of soil erosion and promote use of more energy-efficient and less pollutant modes of transport.

The Civil Aviation Policy has dealt with environmental issues in its objectives and strategies e.g. the objective is to prevent adverse effects of the construction of an aviation infrastructure and ensure that the infrastructure and operations are friendly to the environment. The *Strategies include undertaking* environmental impact assessments in all new airport projects; implement conventions ratified by government on environmental protection.

The Rail Policy also deals with environmental issues; the objective is to prevent adverse environmental effects of rail construction and ensuring that the infrastructure is environmentally friendly. The strategies include environmental impact assessment (EIA) and energy conservation issues in the planning for rail construction; promote environmental protection and resource conservation; ensure that rail lines do not impede drainage; implement soil conservation measures along the railway line and promote use of more energy efficient and less polluting types of locomotives.

The Maritime Transport Policy goal is to encourage an efficient and productive maritime transport system that will contribute towards local and international *shipping*, trade and tourism and ensure safety of life and property and the prevention of pollution of the environment.

Despite having specific policy areas with their goals and objectives, the transport policy has an overall goal and specific objectives (**Table 2.5**).

TABLE 2.5
The Transport Policy with policy gaps in relation to climate change.

Policy	Policy Goals	Policy Objectives	Gaps in Relation to Climate Change
Transport Policy (2003)	To ensure the provision of a coordinated transport environment that fosters a safe and competitive operation of commercially viable, financially sustainable, and environmentally friendly transport services and enterprises.	to meet economic demand and socio-political needs while minimizing cost to the economy; to ensure safety, security, and disaster preparedness and response; to minimize negative impacts of sectoral activities on the environment; to achieve effective co-ordination between and within the sectors; to encourage the transport sector to strengthen institutional capacity through human resource development; to promote private sector investment and operations, wherever possible, and to promote a more business-minded approach by public sector bodies; to promote competition within and between modes; to obtain maximum national and regional benefit from cooperation with the multi-lateral bodies and donor community; to improve availability and maximize utilization of transport infrastructure and equipment in both urban and rural areas; to provide meteorological services and products to suit each individual transport mode so as to realize maximum	There are no mitigation measures on emissions from locomotives. The enforcement of emissions is not that advanced as developed countries because the emissions are negligible. Efforts to mitigate emissions are in a way being taken care of by policies on control of age of car imports. The Road Traffic Department emphasizes on Road Safety than awareness and control of emissions from vehicles. Although the Ministry of Transport especially the Marine department follows the International Maritime Organization conventions and implements the International and Inland Water Shipping regulatory frameworks, there are no mitigation measures on emissions rising from pollution from ships. This also applies to Civil Aviation and rail operations.

		benefit and minimize losses. to provide for the needs of the disadvantaged including people with disabilities, the aged women and children	
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The Transport Sector and Implications for Adaptation and Mitigation Policies

The Transport Sector is one of the most important components of Malawi's GHG inventory, but has been largely overlooked in terms of the contribution that it can make to the Climate Change Programme. There have not been attempts to estimate the contribution of this sector to GHG emissions. Moreover, a review of the Transport Policy suggests that there are no mitigation measures on emissions from locomotives. The enforcement of emissions is generally lacking perhaps because the emissions are negligible. Interestingly, efforts to mitigate emissions are in a way regulated through policies on control of age of car imports. Although the Ministry of Transport especially the Marine Department follows the International Maritime Organization conventions and implements the International and Inland Water Shipping regulatory frameworks, there are no mitigation measures on emissions arising from pollution from ships. This also applies to Civil Aviation and Rail operations. The Transport sector in Malawi could learn from the green transport policies that are being implemented in developed and developing countries, to make its policies responsive to climate change mitigation measures (Box 3).

Box 3: Examples of Green Transport Policies in Action

Municipalities across the world have employed a range of instruments and policies to enhance the efficiency of their transportation systems and improve their quality of life. In central London, a "congestion charge" reduced daily vehicle journeys by 70,000 and CO₂ emissions by 20%. Singapore's Electronic Road Pricing and Vehicle Quota System slowed increasing car use and motorization. Bogota's bus rapid transit system (BRT) is contributing to a 14% drop in emissions per passenger, and as a product of its success BRT has been replicated across the globe in Lagos, Ahmadabad, Guangzhou and Johannesburg. In Europe, cities are following Zurich's example of investing in a tram system as the backbone of urban transport in preference to an expensive underground system. Emissions standards and car-sharing schemes have reduced car dependency while low-emission zones and timed delivery permits have helped reduce congestion and pollution, bringing enhanced productivity and well-being to urban dwellers.

2.3.4 The National Parks and Wildlife Sector

Wildlife conservation is mainly concentrated in protected areas (PAs) covering about 21% of the land areas of the country. These PAs function as catchments containing various forms of wetlands, other ecosystems and mega animals. However, the wildlife resources especially animals are increasingly threatened by two major factors: climate change and human pressures. There is quite a huge variation in the level of vulnerability depending on the species being managed, the current management (concession vs. government), and type of protected area (national parks vs. wildlife reserves). The level of poaching in PAs is a growing concern in Malawi. Lengwe National Park and probably most of the PAs in the Lower Shire are highly vulnerable due to highly variable climatic conditions. A characteristic feature of the climate in the Lower Shire is high temperatures during the dry season. This diminishes availability of the very limited forage. The rainy season is very short and the period is highly variable. Nevertheless, the objective of the Wildlife Policy (2000) is to ensure proper conservation and management of wildlife in order to provide for sustainable utilization, equitable access and fast sharing benefit from wildlife resources for both present and future generations (Table 2.6).

TABLE 2.6

The Wildlife Policy Goals and Objectives and the gaps in relation to climate change

Policy	Policy Goal	Key Policy Objectives	Gaps in relation to climate change
Wildlife Policy and Wildlife Act (2000)	To ensure proper conservation and management of wildlife resources in order to provide for the sustainable and equitable access to the resources and fair sharing of benefits from the resources for both present and future generation of Malawians.	<p>To ensure the adequate protection of representative ecosystems and their biological diversity through promotion and adoption of appropriate land management practices that adhere to principles of sustainable use.</p> <p>To enhance public awareness and understanding of the importance of wildlife conservation and management and its close relationships with other forms of land use.</p> <p>To take the necessary legislative steps as well as pertinent enforcement measures to curtail the illegal use of wildlife.</p> <p>To create an enabling environment for wildlife based enterprises.</p> <p>To develop cost effective legal, administrative and institutional framework for managing wildlife resources without compromising the special ecological attributes of the resources</p>	<p>The policy adequately covers principles relevant to reducing vulnerability of wildlife from human pressure such as poaching. However, the policy does not provide for measures to reduce vulnerability to climate change of the most sensitive species such as the <i>nyala</i>. This is despite that compelling scientific evidence suggests that <i>nyala</i> species are under threat (Mkanda, 1996).</p> <p>Policy guidelines on conservation of wetlands are currently weak if not completely missing. Wetlands are important as carbon sinks as well as human life support systems. Farmers are increasingly utilizing wetlands and <i>dambo</i> areas for cultivation thereby threatening sustainability of their ecological functions.</p> <p>Birds are important indicators of climate change. Despite that the policy gives very limited attention on the conservation of birds.</p>

Wildlife Policy and Implications for Adaptation and Mitigation

On one hand, GHG emissions as a result of uncontrolled fires in the National Parks and Wildlife Reserves are of great concern. The policy does not provide specific measures to address this. On the other hand, adaptation features most. For example, the Wildlife policy of 2000 recognizes the role that the sector plays to maintain water supplies through catchment conservation and management of wetlands for the benefit of both wildlife within PAs and other water users downstream. The wildlife policy advocates Environmental Impact Assessment (EIA) as one way of mitigating negative impacts of various developments (e.g. tourism) on the ecosystems in particular. Moreover, under section 2 c (iv) the Wildlife Policy recognises wildlife management as an exceptionally complex activity i.e. many factors are unknown or not fully understood. As a result, adaptive management strategy is advocated as an appropriate approach to ensure sustainability. The principle of adaptive management is particularly important in incorporating emerging issues such as climate change adaptation. The policy also provides for cross border cooperation, various stakeholder participation, research, monitoring and public education of wildlife conservation and utilization. These are important tenets to integrate in addressing climate change issues.

A component of the wildlife policy is research. In its framework the DNPW is engaged in monitoring and evaluation of wildlife management activities. One of the routine activities in each PA is the collection of weather related data sets such as temperature and rainfall. This is particularly important for systematic observation of climate and climate related parameters. Nonetheless, observation has shown that PAs have very old and limited equipments for meteorological data collection. Other PAs have entirely ignored this important activity.

The issue of fire management has received little attention. Burning releases CO₂ in to the atmosphere. While fire management is an integral part of wildlife habitat management, observation has shown that this is one of the illegal activities perpetrated by poachers from adjacent villages. Fire destroys forage for wildlife and changes habitat structure. During bad years of rainfall fire management is crucial. Unfortunately the Wildlife Policy has given a cursory attention to fire management. Similarly, the conservation of birds continues receiving limited support, and this is despite their importance in monitoring climate change.

2.3.5 The Forestry Sector

The forest sector plays a key role in a number of areas. It provides for environmental management such as provision of clean water sources, sustainable livelihoods of both urban and rural population, aesthetic values and cultural values. Despite the important roles above, their use for livelihoods and development results in forest deforestation and degradation. Forest conversion causes deforestation through land use whereby forests are converted into cropland or rangeland. Deforestation is a major concern presently growing at 2.8% annually translating into an estimated loss of 50, 0000 hectares of forest per year. Other activities such as roads, rail and dam construction in addition to settlement also contribute to deforestation. In addition weather events such as high temperatures and high wind velocity and low relative humidity during dry season negatively exacerbates bush fires that destroy plantations and natural forests.

Consequently, the bush fires, increased use of firewood and charcoal, increased seasonal burning are identified as major sources of CO₂ emissions. For example, in 1994 changes in forestry, woody biomass, forests, grassland conversion and soils emitted 14003Gg, 2183Gg and 2342 Gg, respectively. The estimate of 1994 indicates 305Gg decrease from those of the 1990 levels. It is not surprising that in 1994, Malawi was a net emitter of CO₂ due to the contribution from land use land use change and forestry. The destruction of forests through burning and the decaying of woody biomass results directly into significant contribution of CO₂ to the atmosphere. However, the expansion of forests and the maintenance of existing stands can capture a lot of CO₂ from the atmosphere and maintain it on land over decades. During 2000, the GHG emissions from the forestry and land-use sector totalled 17,512 Gg CO₂ equivalents, mainly through changes in forest and woody biomass, forest conversion and soil out-gassing.

In terms of vulnerability to the impacts of climate change projections show that some forests will change to drier forest types under moderate to extreme climate scenarios. Besides the impacts of climate change forests both on customary land and in reserves are threatened by anthropogenic activities largely arising from population growth. The current deforestation rate is estimated at 2.8% annually (GoM 2003¹⁷). Malawi has responded to the concerns above in the forest sector by developing a national forest policy (1996) Forest Act (1997) and Community Based Forest Management supplement to the policy (2003). The Forestry Act, 1997 provides for participatory forestry, forest management, research, education, forest industries and protection and rehabilitation of environmentally fragile areas. The act among other issues seeks to protect trees and other resources in forest reserves, conserve and enhance biodiversity, protect and facilitate management of trees on customary land, promote community involvement in the conservation of trees, promote sustainable utilization of timber and other forest produce and protect fragile areas such as river banks and water catchment. The 1996 forest policy was set out to introduce the concept of participation and to promote CBFM in the forest sector. It recognizes local communities tenurial rights over natural resources by assigning to them authority and responsibility. Due to this local communities are highly involved in conservation of natural forests within customary lands.

¹⁷ GoM 2003: Initial national Communication to the UNFCCC. This figure is based on this communication.

This is possibly contributing to the increased forest land cover in Malawi. In addition local communities are engaged in afforestation and reforestation which reduces pressure on forest energy needs and helps in reclamation of forest degraded areas. The forests also act as carbon sinks for mitigation measures to climate change. Despite all these efforts there are policy gaps in relation to climate change that needs addressing (**Table 2.7**)

TABLE 2.7
The National Forest Policy with policy gaps in relation to climate change.

Policy	Policy goals	Policy objectives	Policy gaps in relation to climate change
Forest Policy(1996) and Forest Act (1997)	To sustain the contribution of the national forest resources to the quality of life in the country by conserving the resources for the benefit of the nation.	Provides an enabling framework for promoting the participation of local communities and the private sector in forest conservation and management, eliminating restrictions on sustainable of essential forest products by local communities, and promoting planned harvesting and regeneration of the forest resources by Village Natural Resources Committees (VNRC's):	<p>Forests are vulnerable to climate change, however the policy goals and objectives do not provide for direct impacts of climate change;</p> <p>Climate change will impact on species composition however the policy does not provide for biodiversity conservation.</p> <p>With increased temperatures there are possibility that some forests will become drier, despite this the forest policy does not provide for adaptation measures</p> <p>Current efforts to control forest fires as well as charcoal making and use are either inadequate or have failed. This threatens future increase in CO₂ emissions by the sector. There are emerging opportunities to tap from e.g. REDD+ and Clean Development Mechanisms (CDM) that the policy should benefit from to address issues of Climate change.</p> <p>There are many forest afforestation, forestation and conservation objectives addressed in the policy with linkages to livelihoods and conservation, however there are no guidelines to meet the balance between conservation needs and the need for mitigation to climate change.</p> <p>The policy does not provide for creation of awareness for dangers posed by deforestation in relation to the impacts climate change.</p>

The Forestry Policies and Implications for Adaptation and Mitigation Policies

The destruction of forests through burning and the decaying of woody biomass results directly into significant contribution of CO₂ to the atmosphere. However, the expansion of

forests and the maintenance of existing stands can capture a lot of CO₂ from the atmosphere and maintain it on land over decades. During 2000, the GHG emissions from the forestry and land-use sector totalled 17,512 Gg CO₂ equivalent, mainly through changes in forest and woody biomass, forest conversion and soil out-gassing.

Malawi requires two interventions in order to check forest depletion and degradation, (i) forest protection and conservation, and (ii) reforestation and afforestation. Forestry protection and conservation, and reforestation and afforestation have the desired potential to significantly reduce GHG emissions through various tree planting programmes that enhance carbon storage, which may increase the carbon pool to 756 million t C by 2040¹⁸.

Ongoing changes in international policies in forestry are creating new opportunities which Malawi could benefit from. These include the Reducing Emissions from Deforestation and forest Degradation (REDD) and Clean Development Mechanism (CDM) architectures. Such changes will help Malawi demonstrate the role of its forestry policy in the co-generation of livelihoods, biodiversity, and carbon benefits from forests.

Private finance through carbon markets can play a major part in funding mitigation. The existing carbon offset markets will likely remain a major source of climate finance for Malawi; making use of these markets should be of a high priority for Malawi. However there is a proliferation of opportunities in Malawi stemming from the REDD and CDM, which are not currently regulated by any policy framework. The challenge is to ensure that these opportunities benefit local communities who are affected most by the burden of Climate Change and have a low adaptive capacity.

2.3.6 The Water Sector

Malawi is endowed with vast expanses of water systems as evidenced by major water bodies notably, Lake Malawi. Some of the water systems are shared with neighboring countries of Tanzania and Mozambique, and on a wider scale form part of the Zambezi River Basin. These water systems cover over 21 percent of the country's territorial area. There are also widespread groundwater sources whose occurrences are associated with three major aquifers namely the basement, escarpment and alluvial. In the Malawi's Vision 2020, Poverty Reduction Strategy Paper (MPRSP) as well as Decentralization Policy, the overriding policy is that of poverty reduction.

In Malawi, population growth over the years has increased demand for water for domestic consumption, irrigation, power, transport and other uses. In addition, these water resources are being continuously threatened from climate change, over-exploitation, mismanagement, environmental degradation and pollution. Water resources improvements and catchment management including water harvesting should therefore aim at minimizing the impact of external forces on the water resources systems, advocating pollution control and ensuring

¹⁸ Personal Communication with Dr. Kamperewera, Deputy Director EAD

efficient use of the available water. The international community has also adopted principles of equitable allocation of shared water resources and their management. The result of this has been the formulation of a number of initiatives to address these issues. Some of these initiatives are New Partnership for Africa's Development (NEPAD), United Nations Conference on Environmental Development (UNCED), the Dublin Principles on Integrated Water Resources Management (1992), World Summit on Sustainable Development (WSSD) 2002, Southern African Development Community (SADC) Protocol on Shared Watercourses, and the World Water Forum III (2003) and the Government of the Republic of Malawi recognizes these initiatives.

In relation to climate change, the water policy recognizes the importance of disaster risk management in the sector. The water-related disasters occur in the in the form of drought, floods and pollution. The impact of the disasters is reflected in severe socio-economic, cultural disruption and dislocation of vulnerable populations. Floods mostly affect districts along the Lake Shore (e.g. Salima, Karonga, Nkhosachota and Mangochi) and Low lying areas (e.g. Chikhwawa and Nsanje) and mountainous areas (Phalombe and Mulanje). On the other hand droughts affect semi arid districts of Balaka, Chikhwawa, Nsanje, Neno, and Mwanza. Most local governments in affected areas do not have adequate contingency plans or capacity to mitigate the impact of the water-related disasters.

The Ministry of Water Development and Irrigation therefore formulated the National Water Policy (2004) to address these issues and also, to strengthen and harmonize issues of water resources management and utilization in order to guide the country in the sustainable use of water. Among its strategies the policy ensures that the relevant institutions are provided with adequate information on floods and drought; and formulation mitigation measures to reduce the impact of climate change and variability as a means of disaster preparedness and management; but also promoting coordination with other institutions on disaster management (**Table 2.8**). The *Water Works Act (1995) & Water Resources Act (1999)* introduced the commercialization and decentralization of urban and peri-urban water supply to parastatal water boards established under its provisions. It laid down a legal framework for implementing the 1994 Policy. The Act made provisions for the control, conservation, apportionment and use of the water resources of Malawi and for purposes incidental thereto and connected therewith.

Our field visits suggested that water harvesting is a viable adaptation option especially in areas susceptible to droughts (Box 2). Water harvesting has the potential to reduce water demand thereby preserving the water. However, there is need to increase local knowledge about water harvesting and irrigation systems so that farmers can reduce their dependency on rain water for irrigation and increase their crop production. There must be an effort to identify techniques for using rivers and streams more effectively. It is crucial that the focus of any initiative should not just be creating a hunger-free community, but also promoting enterprise within the community.

Table 2.8**The National Water Policy with policy gaps in relation climate change.****2.3.7 Fisheries Sector**

Malawi is endowed with many water bodies which include Lake Malawi, Lake Chiuta, Lake Chilwa, Lake Kazuni and major rivers such as Shire River, North and South Rukuru, Linthipe, Bua and Songwe River. They provide viable habitats for fish and other aquatic

Policy	Policy Goals	Policy Objectives	Gaps in relation to Climate change
Water policy (2005)	<p>To promote sustainable management and utilization of water resources, in order to provide water of acceptable quality and of sufficient quantities, and ensure availability of efficient and effective water and sanitation services that satisfy the basic requirements of every Malawian and for the enhancement of the country's natural ecosystems.</p> <p>To establish preparedness and contingency plans for water-related disasters and emergencies as an integral part of water resources management.</p>	<p>To achieve sustainable and integrated water resources development, conservation and management that provides equitable access and use of water to all individuals and entrepreneurs.</p> <p>To ensure the existence of strategic and contingency water resources development and management plans that guarantee availability of water in cases of droughts, floods and population pressures.</p> <p>To ensure that all person have convenient access to sufficient quantities of water of acceptable quality and the associated water-related public health and sanitation services at any time and within convenient distance.</p> <p>To promote the empowerment of user communities to own, manage and invest in water resources development.</p> <p>To promote public and private sector participation in water resources management, development supply, and conservation.</p> <p>To participate in the enactment and implementation of local, regional and international obligations and agreements with regard to exploitation and management of water resources taking due regard of national integrity, security and sovereignty.</p> <p>To facilitate and initiate scientific investigations and research in the occurrence, development, utilization of water resources and disposal of wastewater in order to use the information for sustainable exploitation of water resources.</p> <p>To promote and advocate water and sanitation services' pricing and charging systems that recognize water as both a social and economic good in order to institute cost recovery principles.</p> <p>To promote user-friendly technologies to enable easy access to water and sanitation services by all manner of people.</p> <p>To improve assessment of impact of water-related disasters and undertake effective response to prevent mortality and reduce morbidity and suffering among affected communities;</p> <p>To ensure timely provision of potable water and sanitation for vulnerable communities especially children and women during water-related disasters;</p> <p>To provide basic requirements of potable water supply to all affected areas;</p> <p>To ensure availability of relevant information to the public and neighboring riparian states on floods and drought.</p>	<p>The Policy has provisions for adaptation to climate change but the Act does not reflect the current issues.</p> <p>The policy does not provide for water works treatment plants which can be used for water recycling as an adaptation measure for water shortages that may arise from droughts.</p> <p>There are limited guideline on settlements to reduce the impacts of floods while at the same time avoiding degradation of watersheds</p> <p>Exploitation of ground water resources is increasingly becoming important adaptation measure but at same time can affect ground water aquifers which can lead to sinking of the earth.</p> <p>Limited strategies to create awareness about climate change in the water sector and safer adaptation strategies.</p>

species particularly under normal climatic and environmental conditions.

Fish resources are very important to the people of Malawi as they contribute to good nutrition, food security and social economic development. Moreover, fisheries provide

employment, directly in fishing and indirectly in marketing, distribution, inputs supply and other activities. Despite this importance, the fisheries sector faces a number of threats that includes overexploitation of aquatic resources, pollution, habitat degradation and impacts of climate change (drought).

In terms of vulnerability to climate change, it is reported that the fisheries sector will be affected by changes in mean temperature and wind speed which may increase by year 2100, while the rainfall over the Lake will show declining trend. Increase in wind speed, especially the cooler and the denser south easterly flow, may increase the upwelling effect on Lake Malawi and other water bodies and will adversely affect fish production. The decrease in rainfall may affect the Lake levels which also adversely affect fish production (GoM 2003)¹⁹.

The policy provides for a goal and a number of objectives (**Table 2.9**). Notably, promotion of community involvement, institutional capacity, research and dissemination, monitoring and control of overexploitation are relevant to development of climate change adaptation measures in fisheries management. The table below signals policy gaps in relation to adaptation to climate change.

¹⁹ Government of Malawi, 2003, Initial National Communication to the UNFCCC

Table 2.9**The National Fisheries Policy with policy gaps in relation to climate change.**

Policy	Policy Goal	Policy Objectives	Gaps in relation to climate change
Fisheries Policy (2001) and Fisheries conservation and management Act (1997)	To maximize the sustainable yield from the national waters of Malawi and man-made water bodies. Secondary objectives are to improve the efficiency of exploitation, processing and marketing of quality fish products, promote investment in the fishing industry, rural fish farming units and exploit all opportunities to expand existing and develop new aquatic resources. Particular care will be taken to protect endemic fish fauna, not only because these are scientific and educational assets, but also because they represent a major economic resource.	<p>To monitor and, where appropriate, control the exploitation of fish, directing and regulating production within sustainable limits for each fishery, and using the law to safeguard the resources from any other threat.</p> <p>To undertake a programme of research in order to identify and quantify under-utilized fish resources, particularly those in the offshore waters of Lake Malawi</p> <p>To disseminate to those concerned, the results of research and development to improve fisheries management, fishing, fish handling and processing techniques;</p> <p>To foster greater community involvement in resource management to improve the effectiveness and appropriateness of management initiatives;</p> <p>To promote fish production from smallholder and large fish farming operations;</p> <p>To develop the institutional capacity of the Fisheries sector;</p> <p>To prohibit the introduction of live exotic fish species unless and until scientific evidence justifies otherwise.</p>	<p>Despite identification of vulnerable fish species the policy does not provide for measures for adaptation.</p> <p>There is competing use of wetlands i.e. fish habitat and farming. However farming is destroying the habits for fish. These could have been complementary uses to enhance adaptation strategies for both fisheries and agriculture sector.</p> <p>Increased construction of dams is a recipe for soil disturbance and hence increased release of CO₂ from the soils. However the policy provides no measures to control these activities.</p> <p>The interaction between the impacts of climate change (i.e. fluctuating water levels) and water resource degradation (pollution) which lead to declining fish diversity and productivity are increasingly becoming too complex to be addressed by these policy objectives</p>

2.3.8 The Health Sector

The Health sector has a number of specific policies that relate to climate change. These policies are guided by the draft National Health Policy (2009). The specific policies include the Draft National Environmental Health Policy (2010) and the Draft National Health Care and Waste Management Policy (2010).

The draft Health Policy (2009) goal is to improve the health status of all the people of Malawi by reducing the risk of ill health and occurrence of premature deaths. The **Overall Policy Objectives /Strategies that relate to environment and hence climate change are to**

- Develop sound and cost-effective interventions that ensure personal protection from communicable diseases and address their environmental determinants

- Develop a reliable surveillance system for preparedness and response to epidemics.
- Strengthen the capacity of the health sector to respond to the health consequences of emergencies and disasters.

The Ministry of Health in its **Draft National Environmental Health Policy** has defined Environmental Health as the management of environmental factors (physical, biological, chemical) in order to prevent diseases. This entails the management of drinking water, sanitary disposal of human excreta, the use, handling and disposal of harmful chemical substances, radiation protection, notifiable diseases, pest and vector control, control of environmental pollution, appropriate and safe waste management practices, occupational health and safety services, port health, pest control, food hygiene and safety practices, housing and infrastructure settlements and personal hygiene.

The Environmental Health Policy has the following goal: to detect, prevent and control the occurrence of diseases and hazards resulting from environmental factors such as food, water, air, and soil and work environment. The Overall Policy Objectives include: i) to increase the coverage of environmental health interventions in Malawi; ii) to increase public awareness of environmental health issues in Malawi; iii) to improve epidemiological surveillance on environmental health related issues, diseases and conditions; iv) to improve legislation and regulations on environmental health determinants such as air, food, water; v) to improve coordination and collaboration between various stakeholders in the implementation of environmental health interventions; vi) to increase the development and deployment of human resources for environmental health services at all levels; vii) to improve relevant structures at various levels to coordinate the implementation of environmental health activities and viii) to improve monitoring and evaluation systems and research development. The priority areas that require attention and intervention to promote environmental health services include: i) Food safety and hygiene; ii) Health and Safety; iii) Disease prevention and control and v) Water, Sanitation and hygiene.

The Health and Safety policy theme goal is to protect the workers and the general public from hazardous environmental factors and disasters and The Water, Sanitation and Hygiene policy theme has the goal of improving water quality, sanitation and hygiene at community, public and business institutions. Some of the strategies include Government shall promote the availability of sanitary facilities for management of solid and liquid wastes at all levels (households, institutions, community) and Government shall ensure provision of liquid and solid waste management facilities.

In addition to raising issues of liquid and solid waste management facilities, the health sector has specifically developed a National Health Care and Waste Management (2010). In its draft form the policy has raised a number of issues on waste management (**Table 3.10**).

Table 3.10

The Draft National Health Care and Waste Management Policy with policy gaps in relation to climate change

The Health Sector Policies and Implications for Adaptation and Mitigation

The health sector policies do not specifically mention climate change issues; however they address issues of the environment i.e. waste management and DRR which are climate change related. The Ministry has also made efforts to adapt to climate change impacts which result because of floods, e.g. initiatives on control of Malaria, Bilharzia, Diarrhea and Cholera. It conducts campaigns on awareness of the dangers of these diseases and remedies to avoid deaths. The Ministry of Health is also aware of the re emergence of certain diseases due to weather and climate variability e.g. typhoid in Neno district. The district normally experiences cold weather but the re emergence of the disease indicates that the climate is changing and efforts are underway to adapt to this change.

In terms of mitigation measures, the Ministry is redesigning incinerators in all health centres.

Draft National Health Care and Waste Management (2010)	<p>To attain a safer and cleaner environment.</p> <p>To segregate and collect wastes for proper management</p> <p>To provide appropriate and secure HCW storage facilities</p> <p>To transport HCW in a safe and hygienic manner</p> <p>To reduce risks associated with handling, and disposal of HCW.</p> <p>To minimize amount of HCW generated from health facilities</p> <p>To reduce risks of accidents and spillage during health care waste management</p>	<p>To integrate HCWM as a major component of environmental health services.</p> <p>To promote the principles of integrated HCWM measures through inter-sector and community participation and improved co-ordination within the MOH and with relevant government agencies and other stakeholders.</p> <p>To allocate adequate financial, material and human resources.</p> <p>To harmonize sector policies with HCWM policy in order to promote effective implementation of HCWM at all levels.</p> <p>To enhance capacity building of health care workers on HCWM.</p> <p>To create public awareness and education on the HCWM.</p> <p>To promote public private partnership in HCWM.</p> <p>To monitor the implementation of HCWM</p> <p>To develop operational guidelines for HCWM</p>	<p>The policy does not provide for mechanisms to control GHG emissions from waste and smoke from incinerators. These emit CH₄ and CO₂.</p> <p>The EAD is responsible for monitoring compliance and enforcement of environmental laws and regulations from various sectors including in health facilities, and advocacy for good environmental practices and waste recycling. However, EAD has limited capacity.</p> <p>Environmental management is general having limited links with climate change. Hence there is need for specific climate related strategies in the policy.</p>
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It is also replacing old incinerators with electrical incinerators in all major hospitals in the country not only as a health care waste management measure but also a mitigation measure.

The efforts being made by the Ministry of Health in Malawi are in line with examples from elsewhere (Box 7).

BOX 7. Recycling and Waste: An Example from Brazil

Brazil has a tradition of recycling with recovery levels for many materials matching or exceeding those in industrialized countries. Some 95% of all aluminium cans and 55% of all polyethylene bottles are recycled. About half of all paper and glass is recovered. Recycling in Brazil generates a value of almost US\$ 2 billion and avoids 10 million tons of greenhouse gas emissions.⁸⁴ In spite of this achievement recyclable material worth about US\$ 5 billion goes to landfill. Full recycling would be worth 0.3% of GDP.

Waste management and recycling sector employ over 500,000 people in Brazil, mostly as individual waste pickers in informal jobs with low and very unstable incomes and poor working conditions. At the initiative of local governments, some 60,000 recycling workers have been organized into cooperatives or associations and work in formal employment and service contracts. Their income is more than two times higher than that of individual waste pickers, lifting families out of poverty.

The National Solid Waste Policy (PNRS) – established by law on 2 August 2010 – aims to build on this potential. It provides for the collection, final disposal and treatment of urban, hazardous and industrial waste in Brazil. The PNRS is the result of a broad consensus based on social dialogue involving the government, the production sector, stakeholders in waste management and academia.

2.3.9 Mines and Minerals Sector

The policy has been developed with the aim of inducing and guiding sustainable mineral development in the country. Malawi wants to develop the existing potential of the mining sector as outlined in the Malawi Economic Growth Strategy. The development of the mineral sector is considered as one of the main keys for (a) the diversification of the country's economy, (b) economic growth and (c) sustainable development. Since the sector is an integral part of the national economy, the policy should be consistent with the overall Government's policies. This requires that appropriate frameworks for investment in this sector must be established. Consequently, during the development of the policy, there has been a wide recognition of the need to attract investors for the sector to grow, while delivering tangible social and economic benefits to the people of Malawi.

The policy document is the product of extensive consultations with a wide range of stakeholders including mining industry, government departments, academic institutions, local assemblies, civil society, mining associations, parastatal organizations, traditional leaders, donors and bilateral agencies. The policy defines the developmental and supportive role of the Government for this sector. It recognizes the role of Government as regulator, and the role of the private sector as player in fulfilling the main objectives to enable the sustainable development of the mineral sector. Therefore, this policy reflects principles, issues and aspirations of stakeholders (**Table 3.11**)

Table 3.11**The Mines and Minerals Policy with policy gaps in relation to climate change*****Mines and Minerals Policy and Implications for Adaptation and Mitigation***

According to the results of the 1990 and 1994 inventories the GHG emissions from the energy and industrial processes and product use sectors were smaller, however recently there has been opening up of limestone processing plants in Balaka, cement manufacturing in Kasungu, and uranium mining at Kayerekera in Karonga, and the prospects of opening a bauxite mine on Mount Mulanje, which may significantly increase the country's levels of GHG emissions in the future. There is need to think about mitigation measures that embrace the "green economy" concept in the sector as pathways to sustainable development.

2.3.10 Meteorology Sector and its Policies

Policy	Policy goal	Policy objectives	Gaps
The Mines and Minerals Policy	<p>To contribute to economic growth, development and poverty reduction</p> <p>To guide sustainable development of the mineral sector in an orderly manner.</p>	<p>To attract investment in the mining sector;</p> <p>To formalize and improve small-scale mining;</p> <p>To contribute to self sufficiency in mineral products and increase foreign exchange earnings;</p> <p>To promote measures that protect the environment;</p> <p>To create employment opportunities;</p> <p>To foster economic diversification; and</p> <p>To incorporate social dimensions and empower women in mining.</p>	<p>The policy does not provide for mechanisms to control GHG emissions from waste and smoke from incinerators. These emit CH₄ and CO₂.</p> <p>The EAD is responsible for monitoring compliance and enforcement of environmental laws and regulations from various sectors including in health facilities, and advocacy for good environmental practices and waste recycling. However, EAD has limited capacity.</p> <p>Environmental management is general having limited links with climate change. Hence there is need for specific climate related strategies in the policy.</p>

The meteorological issues are the mandate of the Department of Climate Change and Meteorological Services (DoCCMS). The functions of DoCCMS are i) to establish and maintain a well equipped network of meteorological stations so as to ensure that meteorological data and information is reliable, up to date and of high quality; ii) to monitor, analyse and predict weather and climate. The thrust of this objective is to ensure that the weather forecast is produced for early warning purposes. This information is vital for advisory in disaster management; iii) to provide weather and climate data and information for various socio-economic sectors such as Aviation, Agriculture, Water, Marine, Construction Industry, Insurance, Tourism, Health, Sports And Recreation and iv) to carry out research and development that would improve quality of weather and climate data and information for the

general public. The main focus is to carry out research for all aspects of meteorology *inter alia* general public through the mass media.

The DoCCMS have developed two policies to guide its functions and these are the Meteorological Data Policy (2001) and the Draft National Meteorological Policy (2010).

The Meteorological Data Policy (2001) goal is to ensure efficient and cost effective methodical collection, quality control, storage, inventory, protection, ownership, exchange, responsibility for, usage of and access to DoCCMS weather and climate data, within the framework of various national and international agreements. The Overall Policy Objectives are to: i) ensure that DoCCMS is the sole custodian of meteorological data and information ii) ensure that meteorological data is collected, classified and safely stored; iii) ensure accessibility and timely dissemination of meteorological data to users; iv) ensure compliance on data use and exchange; v) ensure that all meteorological data is quality controlled in accordance with WMO standards and formats; vi) ensure that DoCCMS recovers cost on cost recoverable data; vii) ensure that there is proper storage and archiving and viii) ensure data security.

The Draft National Meteorological Policy (2010) goal is to monitor and understand Malawi's weather and climate and provide meteorological services in support of Malawi's national needs and international obligations for sustainable development. The specific policy goals are translated into the following objectives:

- a) To provide an efficient and effective system for the making, collection and distribution of meteorological data and information at national and international levels;
- b) To provide accurate weather information for efficient operation of air transport.
- c) To minimize the social and economic impacts of natural disasters through prediction and warning systems;
- d) To contribute to increased production of food and fibre through effective application of meteorological data and information;
- e) To provide accurate weather and climate information for the efficient planning, management and operation of commerce and industry;
- f) To conduct research with the object of improving the understanding of weather processes affecting the country;
- g) To develop and maintain an effective training programme for a responsive staff structure able to provide meteorological services;
- h) To promote measures for reducing and reversing the degradation of the environment including aspects of climate change;
- i) To contribute to the strengthening of international meteorological cooperation since weather transcends national boundaries and affects all people.
- j) To contribute, through effective application of meteorological data and services, to the efficient use of energy sources, especially those that would help reduce the rate of increase of greenhouse gases in the atmosphere.
- k) To contribute, through effective application of meteorological data and services at national and international levels, to the accurate assessment of water resources to the efficient use of water for the increasing national population.
- l) To ensure that the general community better understands the value of, and is better assisted to benefit from, the basic public information, forecast and warning services provided by Meteorological Services.

From the two policies in the DoCCMS, it can be noted that all areas have been adequately addressed in relation to weather and climate change. The DoCCMS therefore needs to ensure effective implementation of the policy in line with the proposed climate change policy.

2.3.11 Science, Technology and Innovation Sector

Malawi developed and approved the first National Science and Technology Policy (NSTP) in 1991 and was revised in 2002. Despite approval, the policy has not been fully implemented largely due to the lack of an implementation plan and an uncoordinated pluralistic approach to Science, Technology and Innovation (STI). At the time of reviewing the NSTP in 2002, the development approach by government was based on the Malawi Poverty Reduction Strategy which expired in 2005 and was replaced by the MGDS which emphasizes wealth creation and economic growth. The need to revise the NSTP, hereafter referred to as STI Policy, was therefore intended to re-align focus and approaches to the MGDS and to international instruments to which Malawi is a party, including the SADC Protocol on Science, Technology and Innovation; and the African Union (AU) Consolidated Plan of Action (CPA) for Science and Technology. It further sought to address critical gaps in the integration of STI into national planning and budgetary allocation, issues of capacity building, and coordination.

The STI Policy (2009) goal is to attain sustainable economic growth that is driven by science, technology and innovation and its objective is to provide guidance and support for the development and application of STI. The STI Policy (2009) has 14 priority areas and priority area 13 is on climate change and environment. The goal of the thematic area is to ensure sound environmental management in order to mitigate against climate change, specifically, ensuring; i) availability of appropriate technologies to adapt and mitigate against effects of climate change; ii) capacity development in climate monitoring and early warning; iii) In-depth understanding and awareness of the impacts of climate change; and iv) contribution to mainstreaming climate change, particularly adaptation, in national development.

From the foregoing, it is clear that the Science and technology sector has embraced climate change issues in its policy and what remains is to implement in relation to the proposed Climate change policy.

2.4 Analysis of Programs and Development Strategies

2.4.1 The Vision 2020

Over the past decade, the Vision 2020 launched in 2000 has been an overarching policy framework guiding the long-term development ambition for Malawi. It emphasizes long-term strategic thinking, shared vision and visionary leadership, participation by the population, strategic management and national learning. The Vision 2020 states that “by the year 2020 Malawi as a God fearing nation, will be secure, democratically mature, environmentally sustainable, self-reliant with equal opportunities for and active participation by all, having social services, vibrant cultural and religious values and a technologically driven middle-income economy”. While the Vision 2020 has remained the overarching strategy charting development goals along the policy of sustainable development, critical strategic issues of adaptation to climate change have not been emphasized. This is the situation because at the time of conceiving the Vision 2020 the issue of climate change had not yet received a wide public attention. Nevertheless the Vision 2020 is strategic useful as it envisages the long-term ambition of achieving sustainable development. This creates a great opportunity to embrace strategies that would allow addressing climate change.

2.4.2 Food Security and Sustainable Rural Livelihoods

Malawi is party to several regional and international initiatives to address climate change. Subsequently, the agriculture and food security sector has received considerable attention in response to climate change. At policy and program level, Malawi has developed the Agricultural Development Program (ADP) which emphasizes on Sustainable Land use Management (SLM). SLM represents a conceptual and operational framework that promotes food security and rural development which sustains natural resources and ecosystems. At the African Continental level, SLM also features prominently in the Comprehensive Africa Agriculture Development Program (CAADP). In addition to that, TerrAfrica platform has been developed at continental level to facilitate coalition building, knowledge development and investment in SLM.

At projects level, there are a number of specific projects and initiatives that have included aspects of climate change adaptation responses. Examples of these projects and initiatives include and not limited to; (i) the Irrigation, Rural Livelihoods and Agricultural Development project (IRLAD) which is supporting irrigation, community rainwater harvesting schemes and catchment conservation; (ii) the Second National Water Development Project (NWDP 2) which is updating the country’s hydrological information and conducting economic analyses of required infrastructure platforms such as small dams; (iii) FAO supported initiative aimed at developing and using geospatial and other GIS data to inform investments in land management practices that strengthen resilience to climate change related risk.

2.4.3 Malawi Growth and Development Strategy

The Malawi Government developed a Malawi Growth and Development Strategy I for the period 2006 to 2011. This was a medium-term strategy for reducing poverty and achieving growth-led economic development and achieving the Millennium Development Goals. The strategy had nine priority areas within priorities. One of the nine priorities within priorities was *Managing Climate Change, Natural Resources and Environment*.

The MGDS II covering the period 2011 to 2015 will retain climate change as one of the key priorities. However, it must be noted that the elevation of climate change amongst the nine priorities amongst priorities of Government is yet to be matched with action in terms of implementation of specific programmes supported by national budgetary allocations. In 2009, Government of Malawi completed the formulation of a strategic framework for responding to climate change²⁰. It aims at making Malawi better able to plan for and respond to the challenges that climate change poses for sustainable economic development and national food security. At this stage it is difficult to ascertain the effectiveness of this framework as implementation has just started.

2.4.4 National Adaptations Program of Action (NAPA)

The NAPA was developed recognizing that the affected majority are least resilient to cope with the impacts of climate change and its adverse effects. The NAPA identified five priority areas and these are:

- a) Improving community resilience to climate change through the development of sustainable rural livelihoods,
- b) Improving agricultural production under erratic rains and changing climatic conditions,
- c) Restoring forests in the Upper and Lower Shire Valleys and other catchments to reduce siltation and associated water flow problems,
- d) Improving Malawi's preparedness to cope with droughts and floods, and
- e) Improving climate monitoring to enhance Malawi's early warning capability and decision making and sustainable utilization of Lake Malawi and lakeshore areas resources.

A thorough scrutiny of the NAPA priorities suggests that very little attention is given on climate change mitigation goals.

2.4.5 Poverty and Environment Initiative (PEI)

The *Malawi Poverty and Environment initiative (MPEI)* has been embarked on with the aim of enhancing the contribution of the sustainable management of natural resources to poverty reduction, pro-poor economic growth and achievement of the MDGs. Thus, while achieving

²⁰ National Programme for Managing Climate Change in Malawi, Ministry of Development Planning and Cooperation and Ministry of Natural Resources, Energy and Environment;

these goals the MPEI is closely linked to concerns over climate change. MPEI coordinates with disaster risk reduction, sustainable land management and climate change initiatives. Nevertheless, the MPEI does not clearly draw comprehensive strategies on CCA and mitigation.

2.4.6 The National Forestry Programme

The Government of Malawi launched the Tree Planting and Management for Carbon Sequestration and other Ecosystems Services in January 2007. The overall objective of the programme is to increase the area under forest cover in Malawi in order to enhance carbon sequestration and other ecosystem services that may contribute to the reduction of green house gases in particular, and carbon dioxide in the atmosphere. Under the programme Government will identify potential local and international buyers of carbon and the funds generated from carbon sales will be utilized for reforestation and other programmes on environment. Monetary incentives are provided to farmers, an equivalent of US\$130.00 per hectare per year. However there have been challenges in identifying farmers who can be able to allocate enough land, typically 1 to 5 hectares of land for forest. Moreover, Government of Malawi has not yet been able to identify the carbon buyers. Reforestation and afforestation are some of the measures that would mitigate the impact of climate change. It is envisaged that these measures will lead to an increase in carbon uptake by forests.

In addition, there are other carbon financed projects in Malawi such as Clinton-Hunter Foundation initiatives on carbon trading with local communities in central Malawi. However the major observation is that there are significant local capacity constraints in carbon accounting and auditing. As a result most of these interventions involve a lot of middle-men eventually reducing the benefits accruing to the local communities. Intensification and diversification of farm production, as well as promoting small scale irrigation and water harvesting; (v) Flemish Government sponsored projects which focus on conservation agriculture and water harvesting practices; and, Farm Income Diversification Programme (FIDP) with financial support from the European Union whose specific program purpose is to increase food security and income levels of rural households, while ensuring sustainable use of soil and water resources, by encouraging agribusiness development and improved marketing of agricultural products in selected communities.

2.4.7 Disaster Risk Reduction

The Government with support from developing partners is implementing a number of Disaster Risk Reduction activities whose aim is to mitigate the effects of Climate Change. The coordinating agency for DRR, the Department of Disaster Management Affairs (DoDMA), has with support from the UNDP and the World Bank's Global Facility for Disaster Risk Reduction (GFDRR) carried out a number of studies whose aim is to inform programming of DRR interventions. The studies include an assessment of the macroeconomic impacts of floods and droughts, a hydrological assessment of causes and impacts of floods, and a socio-economic analysis of the impacts of floods. The UNDP is also supporting DoDMA to implement a DRR Project which intends to achieve the following objectives:

1. Support disaster risk reduction legal and institutional systems through sensitization activities and the development of a DRR ‘Road Map’ based on local application of the Hyogo Framework of Action.
2. Strengthen the recovery, preparedness and contingency planning process in selected vulnerable districts.
3. Provide training and develop capacity, particularly with regards to the coordination of response, preparedness and mitigation activities,
4. Analyze climate change related impacts and develop Climate Change Risk Management Strategy.

Recognizing the impact of climate change on the agricultural sector, the Government is also engaged in interventions to improve food security and economic growth of the smallholder agricultural sector. These interventions include: Rainwater Harvesting using technical assistance from the World Bank’s TFSSD Climate Change Trust and the Weather – Indexed Insurance Scheme.

2.5 Policy and/or Institutional Arrangements and Constraints

Institutional arrangements for the management of climate change impacts at the national level have so far been inappropriate and inadequate, resulting in lack of coordination and synergy in supporting vulnerable communities. Although Government 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 both of which are within the Ministry of Natural Resources, Energy and Environment.

A number of donors supporting climate change activities in Malawi are now directly working with the Ministry of Development Planning and Cooperation. There is misunderstanding about the roles of various ministries on coordination of climate change activities. This could be clarified by institutional arrangements mechanisms which another consultancy has looked into. This notwithstanding, Environmental Affairs Department remains the National Focal Point under the UNFCCC and Government added the responsibility of climate change to the previous Department of Meteorological Services without a clear mandate and support resources. These institutional arrangements has resulted in conflicts of institutional mandates, raised inter-institutional tension and threatens to derail a structured responses and interventions to climate change, especially at community levels. In addition to the foregoing inadequacies in institutional arrangements, there is a proliferation of players in climate change who include civil society organizations, private companies such as multinational seed companies and others, all who independently disseminate often conflicting messages on climate change to communities and the general public.

In terms of mandate over environmental regulation and control, the National Environmental Policy-2004 (NEP) stipulates that Environmental Affairs Department (EAD) is a coordinating body or institution to operationalize the Environmental Appeals Tribunal in the context of interpretation and enforcement of environmental legislation, regulation and standards. Ideally, this arrangement places the institution to be the centre of control. However, the fact that the institution is a Malawi Government entity compromises enforcement of environmental legislation, regulation especially when dealing with its fellow government institutions. For example, one of the guiding principles of the National Environmental Policy-2004 (NEP) on Air Quality is to control localized air pollution especially in urban environment. However, most polluters are government institutions, for example, district and central hospitals, prisons (sewerage blockage and air pollution); the Agriculture sector (chemical pollution); city assemblies' garbage from market places and bus depots. The EAD fails to take these institutions to legal task since they are also government departments. This ambiguity constrains the EAD from enforcing environmental legislation, regulation and standards adequately.

2.6 Case Studies

2.6.1 International Case studies

Case Study 1: Hurricane Mitch, 1998

Natural disasters are not unusual in Central America; in 1974, Hurricane Fifi killed 8 000 people in Honduras and caused significant economic devastation throughout the region (EM-DAT, 2004). The region is particularly beset by natural disasters that occur cyclically, including windstorms, earthquakes and volcanic eruptions. Even against this backdrop, however, Hurricane Mitch, the last and most powerful storm of the 1998 season, had unusually severe effects. The storm formed off of Jamaica in late October 1998, and began moving slowly towards the west, intensifying until it was classified a tropical storm. Then, Mitch began to move northwest toward Nicaragua. By 26 October, Hurricane Mitch was classified a category-5 hurricane on the Saffir-Simpson scale¹¹, making it one of the most intense hurricanes in the Caribbean in the last two centuries. Winds registered sustained velocities of 288 km per hour, gusting to 340 kilometers per hour. From a point north of the Honduran coast, the hurricane changed trajectory and began to move slowly in a south-easterly direction, crossing through Honduras on its way to El Salvador. For five days following its landfall, Mitch generated torrential downpours, causing rivers to overflow and leading to huge floods.

Economic Losses

Initial reports estimated massive losses in agriculture: 30 per cent of coffee production and 80 per cent of the maize crop in El Salvador; 50 per cent of the export crop of bananas in Guatemala; 70 per cent of all agricultural production in Honduras, 50 per cent of all agricultural production in Nicaragua (EM-DAT, 2004). There was massive destruction of infrastructure: half of the roads in Honduras, 2 500 km of highway in Nicaragua. The United

Nations Economic Commission for Latin America and the Caribbean would estimate direct and indirect material losses at about \$6.0 billion, of which two thirds occurred in the primary sector (CEPAL, 1999).

Heterogeneity of Impacts

Despite the generalized loss of life, injury, and economic damages of Hurricane Mitch, one of its most interesting features is its uneven impact across the affected countries. Costa Rica, and Panama, which lay more or less in the periphery of the storm's impact, the effect of Mitch on the remaining four countries was quite varied. Of course the reasons for this heterogeneity in the impact of an essentially identical shock are two: different countries were exposed to the hurricane in slightly different ways (depending on its path, essentially), and different countries had differing underlying vulnerability to a hurricane. The association is not perfect: Honduras is marginally less poor than Nicaragua, but suffered more, largely because the hurricane made landfall in the former country, and ripped across its length on its way to El Salvador. Nevertheless, there is a suggestive pattern: poorer countries fare worse when exposed to a similar shock.

One of the characteristics that separated Honduras and Nicaragua from their neighbors, in addition to their deeper poverty, is the extent of environmental degradation there, which predated the hurricane. Much of Mitch's impact in Honduras and Nicaragua was not attributable to wind damage, but to the large number of floods, flash floods, landslides and debris flows triggered by the hurricane. These derived, in turn, from the effects of environmental degradation that occurred over several decades. Environmental degradation was likely catalyzed by the 1997 El Niño event, which caused drought and fires. This complex interaction of poverty, climate induced environmental damage, and a hurricane shock, was further complicated by weaknesses in early warning and disaster preparedness that led to large losses of life.

Relief Efforts

Morris and Wodon (2003) analyse the impact of disaster aid following Hurricane Mitch in Honduras. In broad brush strokes, they find that aid was reasonably well targeted to victims of the hurricane, but tiny (on the order of \$10 per household) compared to asset losses. Poorer households and those who suffered larger losses were more likely to receive aid. Looking more closely at the targeting, they find that relief amounts appeared to be linked more closely to losses incurred than to pre-disaster asset levels. In part this reflects that the in-kind transfers that predominated (food, clothing and medicine) were needed in similar quantities by all households, even though their proportional losses might have differed substantially. In particular, among the poorest households that received aid, the value of mean relief was larger than the mean asset loss. Nevertheless, among the poorest households, including those that did not receive aid, the mean relief received was only about one-fifth of the asset loss.

Key Policy Lessons

Dayton-Johnson draws a number of policy lessons from the two cases narrated above. The lessons are as follows:

Natural disasters considered here involved natural hazards that, while not at all unexpected, would strain the capacity of most societies. Nevertheless, in the days and months following the tragedies, analysts would argue that some pre-existing conditions Central America led to an outcome that was worse than it need have been. That is, the human and economic consequences of the disaster were not solely a function of natural phenomena. The review of the events provided above furnishes evidence of this. Environmental degradation associated with human settlement patterns led to widespread flooding in Central America, and floods caused greater devastation than the high winds of the hurricane itself. The failure to monitor and enforce adequately building codes and other regulation meant that buildings (and the people inside them) were far more vulnerable.

The immediate conclusion is that human actions, whether taken by households, firms, communities or governments, have a substantial effect on the consequences of physical events like windstorms or earthquakes; that is, human actions can make societies more vulnerable. The corollary of this statement, of course, is that judicious human action, including public policy, can reduce the negative consequences of disasters. Thus, intelligent development policy that avoids environmentally precarious siting of farms (as in Honduras) will reduce society's vulnerability.

The lessons drawn here augur well with our findings from the field visits especially in Karonga where floods have perpetually occurred for the past few years. Our observation had shown that while communities are settled in naturally flood susceptible areas, the frequency of floods have increased due to accelerated environmental degradation. Moreover, Karonga Township has been located in very low lying areas where floods have been a major problem. A revisit of the town planning system would help policy makers reduce future impacts of floods in Karonga.

Case Study 2: Efficient Stoves Dissemination Policy in Kenya

Sub-Saharan Africa countries, except South Africa, still depend heavily on wood to meet their basic energy needs. The share of fuel wood is estimated to be 61%-86% of primary energy consumption, with a major part (74%- 97%) consumed by households. Fuel wood is also used to a significant extent in many of these countries in cottage industries such as bread baking, metal smelting operations, and brick kilns. The management of fuel wood resources and demand is a major issue to be accounted for in energy policies and strategies in Africa.

Furthermore, fuel wood production has been identified as one of the causes of forest degradation and deforestation in many African nations, in particular in regions surrounding large towns (e.g., N'Djamena in Chad). Indeed, the most important share of total wood removal is due to fuel wood consumption, which represents around 92% of total consumption. African wood consumption, contributes to GHG emissions. Fuel wood use is

therefore a major local and global environmental issue in Africa, and should be fully integrated into forestry management and environmental protection policies.

In Kenya, wood fuel is the dominant primary energy source for most households and small industrial establishments. This was confirmed by a 2000 energy survey, which indicated that biomass accounted for more than 68% of Kenya's total direct primary energy consumption. The survey also revealed that 89% of rural households relied on fuel wood, while 82% of the urban households relied on charcoal for their energy needs.

In Kenya, a lot of effort has gone into the promotion of fast-growing energy trees for the supply of fuel wood. In 2000, 84% of the fuel wood consumed in rural households was supplied from these farms, as opposed to 47% in the 80s. In 2007, 85% of the households could access fuel wood at close proximity to their homes – within a 4km radius. However, as a consequence of continuous urbanization, a change in the use of wood for fuel wood and charcoal is taking place. Charcoal will play a more important role in the achievement of the sustainable development objectives of the country.

In this context, a demand-side, energy-efficiency program was needed to reduce the negative impact of the growing charcoal demand. Sessional Paper No. 4 of 2004 on Energy in Kenya, which constitutes the government policy on energy, recognizes that fuel wood will continue to be a primary source of energy for years to come. As a consequence, it lays out strategies and policies for biomass development and exploitation, including the promotion of energy-efficient stoves and study and research for additional efficiency improvement of the stoves.

Objective of the Policy

The policy aims to promote the dissemination of energy efficient stoves, mainly through Research and Development activities that increase the efficiency of stoves and lower their price, thereby facilitating access to urban and rural poor populations. The aim is to increase the adoption of charcoal stoves from 47% to 100% by 2020. Parliament passed the Energy Act No.12 in 2006. Section 6 (p) of this Act gives power to the Energy Regulatory Commission. Under the Act, the Commission is empowered to make proposals to the Minister on regulations that are necessary for the energy sector, particularly for charcoal.

What policy instruments were used to achieve the objective?

Research and Development activities are the main policy instruments used for the promotion of high-quality, energy-efficient and low-cost stoves. The research activities also encompass the development of appropriate distribution strategies for the stoves. Indeed, the Kenyan Ceramic Efficient Stove is the result of research on stove design, materials, and production processes for the purpose of increasing quality and decreasing costs. The program was initiated in the 1970s and continued through the 1980s with support from GTZ of Germany. In Kenya, commercial energy-efficient stove production and dissemination is not directly subsidized. Initially, stoves were expensive (~\$15/stove) and quality assurance and control was not established for the production process. As a consequence, the stoves were not attractive to the poorer part of the population. The studies and research initiated since the early 80s, the experience accumulated by the manufacturers, and the competition that has been generated have led to innovations in materials and production processes and, ultimately, to better quality stoves, more choices, and lower costs.

The Kenyan efficient stove can now be purchased in a variety of sizes and styles. Prices have decreased to roughly \$1-\$324. This has opened the market for these stoves. More than 13,000 energy efficient stoves are sold each month in Kenya and there are more than 700,000 energy efficient stoves in use in the country. As a consequence, there are now more than 200 businesses of different sizes, legal entities, or informal sectors that are involved in this production activity. The Kenyan ceramic efficient stove is used in more than 50% of the households in urban area, and more than 15% in rural area. The charcoal savings of the energy-efficient stoves reduce the energy-related expenditures of users that are generally low income populations.

2.6.2 Local Case study

Case Study 1: Conservation Agriculture

The Ministry of Agriculture and Food Security through the Land Resources and Conservation Department (LRCD) in collaboration with NGO's has embarked on promoting Conservation Agriculture which include the following technologies, maximum groundcover/ minimum tillage and crop rotation that will help reduce the impact of Climate Change on agricultural production. Other technologies such as Soil and Water Conservation; Soil Fertility Improvement; Rainwater Harvesting Agro forestry and Compost use are also promoted. These technologies are considered as adaptation measures to climate change impacts on agriculture.



Maximum groundcover/minimum tillage

These technologies are practiced across the country, but for the purpose of this report, experiences with these technologies have focused on Agriculture Development Divisions which experience frequent droughts, dry spells and floods. These are Shire Valley Agriculture Development Division (SLADD) comprising of Chikwawa and Nsanje districts; Blantyre Agriculture Development Division (BLADD) comprising of Mulanje, Mwanza, Neno and other districts and Karonga Agriculture Development Division (KRADD) comprising of Karonga and Chitipa districts. The emphasis will be on SLADD with examples from the two ADDs.

The climatic conditions for these ADDs are similar in nature. SVADD is characterised by: Low and erratic rainfall ranging from 400 – 800mm per annum; the annual rainfall amounts are constant, but there is rainfall variability over time. Dry spells of several weeks in duration are common during the rainy season, mostly experienced between the month of January and February. Flooding also occurs during the rainy season and affects agricultural and other infrastructural development. In terms of temperature, SLADD boasts very high temperatures with a mean monthly range of 25-30 °C.

Lowest temperatures are experienced in June (average minimum and maximum temperatures for the valley are 13.4°C and 27.4 °C, respectively. Highest temperatures are in October they can reach up to 37.5 °C. These temperatures are the highest in Malawi (GOM, 1999).

In KRADD, temperatures are hot during day and warm to hot at night. The mean rainfall recorded for 2010/2011 growing season was 1229.4 mm in 55 rainy days compared to 988.5mm in 46 rainy days, in 2009/2010 growing season. Heavy rains were experienced during the month of February, March and April which resulted into floods in almost all the Extension Planning Areas (EPAs) of the ADD. The most hit EPAs were Mpata and Kaporo South in Karonga district.

In BLADD all the seven districts have of late experienced erratic rains (usually fewer precipitation days, extended dry spells, and hail storms).

Technologies Promoted for Climate Change Adaptation in the Agriculture Sector

Soil and Water Conservation (SWC) Measures: 2010-2011 season

Soil and Water Conservation measures minimize problems of soil erosion, declining soil fertility, siltation of irrigation schemes, dams and rivers and flooding. The SWC measures practiced in SVADD include; contour ridging, Vetivar grass planting, gully control and stream bank protection. In 2010/2011 growing season a total number of 3,227 farmers were involved in contour ridging. See Plate 1.



Contour ridges in Lulwe, Nyachilenda EPA in Nsanje district

Vetivar grass planting was practiced by 1,215 farmers in 2010/2011 growing season. However, the dry spell experienced between mid January and February hindered the practice. Gully control has been practiced by a number of farm families of up to 476. The soil and water conservation measures are practiced in hilly areas where farmers experience high levels of soil erosion in the Thyolo-Chikwawa and Nsanje escarpment. In KRADD Vetivar grass was planted and helped in gully reclamation; Soil erosion control and maize performed well during dry spells as seen in plate 2

Plate 2: Vetiver hedgerow in a field for Sukuti CA group, Wiliro Section, Mpata EPA, Karonga district



Soil Fertility Improvement (SFI) Technologies: 2010-2011 Season

Two practices were considered under SFI technologies in the SLADD and KRADD. These included Agroforestry and Manure making and application. In SLADD the uptake of the technology was lower than expected due lack of adequate water as a result of the prolonged dry spell and composting materials as a result of grazing Livestock. The department is considering launching manure making in irrigation sites where water is not a problem.

In SVADD farmers testified that the use of manure helped them to realize better yields during dry spells. In Mpatsa EPA in Nsanje district, the positive impacts of manure making on maize during a dry spell were evident. Farmers with adjacent fields narrated different stories on the benefits of manure making. The farmers who did not apply manure, their maize wilted and did not harvest anything from their farms. The pictures in plate 3 and 4 below tell the whole story.

Maize applied with compost manure



Maize with no compost manure applied



Farmers are also practicing agroforestry in the SVADD. A study on determination of factors that influence the adoption of Agroforestry carried out between 2004 and 2009 showed that the number of farmers participating Agroforestry is not increasing over time. The area planted to agroforestry trees for successive five years is more or less constant (25-40 ha) -showing that some farmers are either *not expanding* the area or are *abandoning* agroforestry. It can therefore be concluded that there is no increased and sustained adoption of agroforestry in Shire Valley. This was also the case during the field visits, in Dalo and Mpatasa EPA, in the SVADD, where no single farmer narrated undertaking agroforestry practices.

Rainwater harvesting (RWH) Technologies: 2010-2011 Season

There are three activities promoted under rainwater harvesting in SVADD. These include Tank construction (both underground and above ground tanks); Swale construction and pit planting. In Dalo EPA, farmers have experienced droughts and dry spells since 2006. These problems have resulted in rivers drying up and have exacerbated water problems for humans, animals and for agriculture. To lessen the problems, Malawi Environmental and Endowment Trust (MEET) sponsored materials to construct rainwater harvesting structures (tanks). IRLAD has also provided materials for construction of tanks and the tanks are effectively being used. The problem with tank construction is that most farmers cannot afford to procure materials i.e. cement for building structures.

Plate 5: Rainwater Harvesting and crop choice



Plate 6 and 7: Vegetable production by Drip Irrigation and Swale utilisation, Nsanje



2.7 Drawing Lessons from Case Studies

Policy on Floods

The international case studies provide several examples of policies that can reduce vulnerability and increase resilience among the most affected people. Regulations that govern development should seek to avoid construction of homes and industrial sites in areas subject to risk of earthquake or flooding; failing that, such regulations should encourage (with subsidies and other incentives, if necessary) buildings and settlements more likely to withstand such hazards. Rural-development policies should provide incentives for households to engage in farming and settlement behavior that does not increase the rural sector's vulnerability to hazards (e.g. deforestation). Furthermore, these policies should encourage urban and rural development that will permit the timely delivery of post-disaster aid (by avoiding entirely unregulated and chaotic "irregular" urban settlement, for example). Finally, such regulations must be effectively monitored and enforced. Whether the resources necessitated by such policies are generated domestically or are financed by foreign aid, their effective implementation will require location-specific knowledge that can only be provided by domestic policy-makers in concert with their constituents.

Integration of CCA and DRR

Development of national adaptation strategies represents an important opportunity to integrate climate change risks and climate change adaptation, as has been achieved elsewhere (UNDP, 2010). Integration of disaster risk reduction and climate change adaptation brings together individuals working in the fields of socio-economic development, humanitarian assistance, climate risk management and disaster risk reduction. There is an urgent need to develop a common language and understanding between these groups. Effective communication is a prerequisite to coordination and harmonization. One impediment is the way in which weather and climate change information is packaged, delivered and presented. Often it is not immediately usable in everyday decision-making that shapes the lives, livelihoods and responses of ordinary people to climate extremes, variability and change.

Farming Policy Options

As the impacts of climate change intensify, smallholder farmers in the country are increasingly adopting Conservation Agriculture (e.g. maximum groundcover/minimum tillage) to reduce the vulnerability of agricultural systems and the rural communities that depend on them for their livelihood to climate change or climate variability. Rainfall variability is a major constraint. However, the effects of variable rainfall are often exacerbated by local environmental degradation. Therefore, curbing land degradation can play an important role in mitigating the negative impacts of climate change. Agro-forestry systems not only provide a great opportunity for sequestering carbon, and hence helping to mitigate climate change, but they also enhance the adaptive capacity of smallholder farmers. However, these CA technologies/practices need to be assessed more effectively to provide comprehensive guidelines for wide use. Composite manure is integral to conservation agriculture but the practice has the potential to contribute to CH₄ emissions if not properly used. There is therefore need for more research to provide recommended ways of organic manure use.

C. SYNTHESIS OF THE FINDINGS, CONCLUSIONS AND RECOMMENDATIONS

3.0 Introduction

This chapter assembles key findings on the policy analyses and draws general and sector-specific recommendations and conclusions. The Chapter analyses three possibilities of addressing climate change policy gaps. These include the development of a standalone policy, bridging sectoral policy gaps or currently undertaking both.

3.1 Key Gaps in Climate Change Related Policies and Laws

Finding # 1: 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.

Malawi has numerous policies such as the National Environmental Policy (2004), the National Water Policy (2005), the National Energy Policy (2003) and the Draft Agriculture Policy (2010), supported by legal frameworks including the EMA (1996), The Forestry Act (1996), Water Act, Energy Act and the Disaster Preparedness and Relief Act (DPRA) (1991). There are also national strategies such as the Malawi, Development and Growth Strategy (MDGS), the National Strategy for Sustainable Development (NSSD), and the National Adaptation Programme of Action (NAPA). Except for the NAPA, these documents however, do not necessarily focus on climate change mitigation and adaptation policies although indirectly they support these goals. The legal frameworks do not provide enforcement mechanisms for abatement of greenhouse emissions. Similarly, measures for adaptation to climate change have been given a very brief attention despite the need for a comprehensive strategy.

Finding # 2: There are clear differences being drawn between CCA and Disaster Risk Reduction (DRR) in the country. Yet, these two fields have the potential to benefit if policies combined them to address natural disasters in general and those related climate change in particular.

The DPRA was enacted in the wake of the flush floods in Phalombe (i.e. the Phalombe disaster). The DPRA provides some framework for disaster management. The key provisions relate to the institutional framework for dealing with disasters such as floods, disease, food crisis and others. The DPRA however focuses on relief and does not deal with adaptation issues for sustainable management of climate change in general although disasters in particular are the key focus. Moreover, the DPRA was enacted without any policy guidance. The Government of Malawi together with stakeholders is currently in the process of developing a National Disaster Risk Management Policy. This should provide the opportunity to provide input into the process based on experience working on community-based adaptation and disaster risk management programmes over the years. Combining the two into

a single long-term policy framework would provide greater benefits by preventing duplication of efforts.

Finding # 3: Almost all legal, policy and sectoral development frameworks reviewed here engage very limited research in the process of integration of climate change.

The study shows that the policies and legislation do not have provision that encourage research on Climate change mitigation and adaptation, yet there are existing knowledge gaps necessary for effective response to climate change. While research on climate change is generally expensive the benefits over time cannot be questioned. Management of climate change by its nature ought to be adaptive depending on emerging challenges. This requires continuous knowledge generation to support decision making.

Finding # 4: Climate change impacts will be significant on communities, including the natural resources they own and rely on; however, while the NAPA is well-informed and well-intentioned the ability of government to reduce the vulnerability of communities still remains limited.

Our field visits in natural disaster prone areas gathered the understanding that drought and floods pose a growing threat to the poor communities (especially children and women) living in these areas. These shocks, in addition to causing deaths and injuries, give rise to long-lasting damage, as buildings, homes and infrastructure are destroyed and scarce resources are diverted to coping with reconstruction. Despite the frequent occurrence of floods in many districts of the country the response to floods has remained ad-hoc and short-term providing largely reliefs. Except for the relief after disasters, vulnerable communities lack the necessary capacity to deal with these events for the long-term benefits.

Finding #5: While there are limited efforts directed towards addressing climate change within public sector policies, there is apparent lack of coordination resulting in duplication of efforts and disharmony. Policies that are formulated without considering the cross-links can unintentionally undermine the effectiveness of public sector policies and programs because of unaddressed conflicts between the strategies.

Observations 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.

Finding # 6: The development of policies, strategies and programmes in Malawi is largely driven by objectives tailored to reduce poverty, trigger economic growth and ensure food security. However, activities carried out to meet these goals can also unintentionally promote GHG emissions

Our field observations supported by the literature review suggest that the development of national and sectoral policies in Malawi is largely driven by three major policy goals - the motivation to reduce poverty, economic growth and food security. Indirectly, activities involved to achieve these goals serve as important adaptation measures to reduce vulnerability of the poor masses. However, activities meant to achieve one goal can also unintentionally contribute to GHG emissions. Two examples may suffice to support this conclusion. First, conservation agriculture (CA) is now being adopted as a means to achieve soil and water conservation thereby cushioning the limitation in crop soil moisture during periods of dry spells. In addition, the use of manure is one of the activities involved in CA. However, application of manure if not properly managed can promote the CH₄ emission.

The second example relates to activities intended to achieve food security. Because the availability residual moisture, *dimba* and river bank cultivation are increasingly employed as strategies to increase crop production. Eventually, these activities erode the stability of the river banks making them susceptible to flooding. *Dimba* cultivation is increasingly reducing the potential for these areas to act as carbon sinks. Thus, the policy of ensuring food security can be achieved at the expense of reducing the opportunity for mitigation goals. These observations suggest the need for an integrated climate change policy.

3.2 Policy Recommendations

This section draws some policy recommendations from the findings of the review, local and international case studies. The recommendations are classified into two categories – sector specific and general recommendations. The sector specific recommendations are provided for the attention of the responsible government departments while the general recommendations will be useful in the development of an integrated climate change policy. Some of the recommendations will require critical evaluation to test for their applicability within specific contexts.

The policy recommendations described here are among many that could reduce the potential risks of climate change for the country. This is not meant to be an exhaustive list, but one that is suggestive of what can be done to prepare for climate change. Policy makers in the country should evaluate these options based on the degree to which they may help address known climate variability and other current concerns as well as the degree to which they will ease potential burdens on future generations.

3.2.1 Selected Sectors Specific Recommendations

3.2.1.1 The Agriculture sector

Recommendation 1: There are many activities in agriculture that are aimed at adaptation to the changing production environment. For example, proper manure management can help mitigate GHG emissions, but researchers continue to debate and investigate what form of management is best. Government and various stakeholders need to invest into research and

development (R &D) to provide further knowledge as regards the optimal way manure should be used.

Recommendation 2: Smallholder farmers are increasingly adopting fast-maturing crop varieties bred at research stations at the expense of local varieties. This should provide a wake-up call for all concerned. Fast-maturing varieties provide a short-term solution to hunger, but potential losses from the crop gene pool should not be underestimated. We recommend that traditional crops and their wild relatives should be protected.

Recommendation 3: Government should support research institutions to continue developing new crop types and enhance seed banks. Seed banks that maintain a variety of seed types provide an opportunity for farmers to diversify, allowing them to both counter the threat of climate change and develop a profitable specialization. Development of more and better heat- and drought-resistant crops will help fulfill current and future country food demand by enabling production in marginal areas to expand. Improvements will be critical because the country population continues to increase, with or without climate change.

Recommendation 5: Through agricultural extension service, the government of Malawi should be advising farmers to grow drought resistant food crops such as cassava, millet, sorghum. Smallholder farmers should avoid monoculture rather plant a variety of heat- and drought-resistant crops.

Recommendation 6: Promote agricultural drought management. Encourage management practices that recognize drought as part of a highly variable climate, rather than treating drought as a natural disaster. The DCCMS should provide farmers with information on climatic conditions. The Department of Extension Services should provide incentives to adopt sound practices of drought management relying on drought relief should be discouraged. This type of policy is particularly useful if farm disaster relief and other government subsidies distort the market and encourage overly risky expansion of farming into marginal lands.

3.2.1.2 The Water Sector

Malawi has been endowed with many water resources. Important among them are the river ecosystems. However these ecosystems are increasingly being degraded thereby affecting the water quality and quantity.

Recommendation 1: The Department of Water Development and Irrigation should promote river basin planning and coordination of the major rivers in the country. Comprehensive planning across a river basin may allow coordinated solutions to problems of water quality and water supply; for example, enhanced coordination of facility system operations or expansion of the conjunctive use of groundwater and surface water can improve water yields, which can help to alleviate droughts. Planning can also help to address the effects of population, economic growth, and changes in the supply of and demand for water.

3.2.1.3 The Forestry Sector

Recommendation 1: The forest sector should review the policy to include current issues of climate change. Specifically, the new policy should highlight strategies for biodiversity conservation, control of emissions from unplanned bush fires and illegal charcoal production.

Recommendation 2: The forest sector should promote strategies for dissemination of climate change information on mitigation, adaptation specific to the sector.

Recommendation 3: The Forest Research Institute of Malawi should invest in climate change research and dissemination, to increase the local understanding of the impacts of temperature and rainfall on forests.

3.2.1.4 The Parks and Wildlife Sector

There are many adaptation measures to adapt to climate change under this sector. *Nyala* species are most vulnerable to the impacts of climate change arising mainly from decreased precipitation and increased temperatures. Mkanda (1996) suggested a number of policy options for adaptation. However, vulnerability of the wildlife resources is magnified by the human pressure placed on the resources. The following recommendations are made specific to the *nyala* and others can generally be applied:

Recommendation 1: The Department of National Parks and Wildlife (DNPW) should provide additional water points in PAs where the animal species are highly vulnerable to the impacts of climate change especially in the drought prone regions such as the Lower Shire (Lengwe NP). This is important to avoid congestion of animals on limited water holes which will lead to localized habitat degradation.

Recommendation 2: *Nyala* translocation should only be encouraged when adequate research has been done to ensure their survival in the new habitat but also maintaining a minimum viable population within Lengwe. Otherwise continued *nyala* translocation might leave a population of *nyala* which cannot be reproductively and genetically viable.

Recommendation 3: To maintain the ecosystem role of serving as carbon sinks the DNPW should promote a policy of fire management to protect the ecosystems contained in the PAs. This in turn should create the opportunity for good habitat and natural adaptation processes.

Recommendation 4: Natural ecosystems have the inherent ability to adapt to changes in the ecosystems. However, this ability is eroded due to human pressure on the resources arising from illegal activities such as poaching and uncontrolled fires. The DNPW should increase its capacity to deal with illegal activities by both implementing the current policy on Collaborative Management and strengthening law enforcement.

Recommendation 5: The knowledge about the impacts of climate change on wildlife resources and the park and wildlife reserves remain incomplete. The DNPW should strengthen research units in all PAs to continue monitoring and evaluation of various activities in order to provide management with sound information for decision making.

Adaptive management in response to climate change should be strengthened as one of the policy options.

3.2.2 General Recommendations

Recommendation #1: An integrated climate change policy that recognizes the multiple dimensions and cross-cutting nature of climate change should be formulated by harmonizing all policies and programmes and bridging all gaps in sector policies as articulated in this study. The policy response would require addressing the sector policy gaps while at the same time providing a holistic climate change policy framework for the whole country.

This recommendation has been arrived at having considered the opportunities and challenges of three possible responses to the policy gaps i.e. a standalone climate change policy; Sector-based Policies with Gaps Bridged and Both Standalone and Sector-based Policies with Gaps Bridged (**table 3.1**). The policy responses were discussed at a stakeholder's consultation workshop where the findings of the study were presented.

Table 3.1: Comparison of three possible policy responses to climate change in Malawi.

	Standalone Climate Change Policy	Sector-based Policy with Gaps Bridged	Both Stand alone and Sector-based Policy with Gaps Bridged
Opportunities	<ul style="list-style-type: none"> ○ Easy for mitigation ○ Issues of Climate Change can be tackled in a holistic approach ○ Sourcing Funding for integrated programmes and activities can be easier ○ Easy to address cross cutting issues ○ Minimizes conflicting measures 	<p>The potential to address relevant and critical issues to the sector</p> <p>High impact arising from focused intervention</p>	<p>More flexible in solving conflicts at sector level</p> <p>The overall policy will provide for guiding principles while the sector policies will provide for implementation procedures</p>
Challenges	<ul style="list-style-type: none"> ○ Serious concerns over ownership ○ Monitoring places additional challenge ○ Matters of research difficult to coordinate ○ The tendency to focus on generic issues and usually poverty related ○ Difficult to coordinate implementation due to conflict of interest 	<p>Sourcing funds at sector level can be very challenging</p> <p>Tendency to concentrate on routine activities (business as usual)</p>	<p>More impact in combining the two. While you are doing things at the national level, things also move at local level</p> <p>Synergies are enhanced. Provisions made at National level articulated in detail in the Sector policies</p> <p>Harmonization is easier</p>

The integrated policy should articulate new policy instruments. A combination of policy instruments may work better in practice than reliance on a single instrument. **Box 3.1** proposes the scope of the possible instruments to address some of the mitigation policy gaps.

Box 3.1: Proposed policy instruments to abridge adaptation and mitigation policy gaps

Regulations and Standards: The policy will need to specify abatement technologies (technology standard) or minimum requirements for pollution output (performance standard) to reduce emissions.

Taxes and Charges: A levy imposed on each unit of undesirable activity by a source will have to be introduced.

Tradable Permits: Also known as marketable permits or cap-and-trade systems. This instrument establishes a limit on aggregate emissions by specified sources, requires each source to hold permits equal to its actual emissions, and allows permits to be traded among sources.

Voluntary Agreements: An agreement between a government authority and one or more private parties to achieve environmental objectives or to improve environmental performance beyond compliance to regulated obligations. Not all voluntary agreements are truly voluntary; some include rewards and/or penalties associated with joining or achieving commitments.

Financial Incentives: Direct payments, tax reductions, price supports, or the equivalent from a government to an entity for implementing a practice or performing a specified action.

Information Instruments: Required public disclosure of environmentally related information, generally by industry to consumers. This includes labeling programs and rating and certification.

Research and Development (R&D): Direct government spending and investment to generate innovation on mitigation, or physical and social infrastructure to reduce emissions. This includes prizes and incentives for technological advances.

Non-Climate Policies: Other policies not specifically directed at emissions reduction but that may have significant climate-related effects.

Source: (adapted from IPCC, 2007)

Deciding which policy instruments will be suitable within the national context will need an evaluation process. The IPCC (2007) proposed four principal criteria for evaluating environmental policy instruments and these can be applicable as Malawi formulates the policy.

- a. Environmental effectiveness – the extent to which a policy meets its intended environmental objective or realizes positive environmental outcomes.
- b. Cost-effectiveness – the extent to which the policy can achieve its objectives at a minimum cost to society.
- c. Distributional considerations – the incidence or distributional consequences of a policy, which includes dimensions such as fairness and equity, although there are others.
- d. Institutional feasibility – the extent to which a policy instrument is likely to be viewed as legitimate, gain acceptance, adopted and implemented.

Recommendation 2: The mandate of the DCCMS is to monitor, predict and provide information on weather and climate that would contribute towards the socio-economic development of the country. This mandate can only be achieved with comprehensive policy

guidelines that take into account the multi-sectoral nature of climate change. The policy should further be supported by a legal framework to strengthen the department's mandate.

Recommendation 3: There is a need for the formulation of a comprehensive climate change policy integrating DRR and CCA which share commonalities in purpose in that they aim to reduce the vulnerability of societies to hazards by improving the ability to better anticipate, resist and recover from their impact. DRR provides many tried and tested tools for addressing risk. Adaptation efforts at national and more local levels can be enhanced when these tools are combined with knowledge of climate change. Many of the experiences gained by the disaster management community over the years can usefully inform the development of climate-related policy.

Recommendation 4: Government should ensure that the assessment studies on the impacts of climate change and relevant scientific institutions are well funded, that they act on the advice with informed decision making, and that hazards remain on the agenda at all times. Short-, medium- and long-term action is required to help reduce the current and future risks and vulnerabilities of different groups and communities. This action requires strengthened capacities, greater awareness and information, better targeted and more effective policies, and increased financing.

Recommendation 5: Government and institutions must build on their technical capacity to assist various groups of the society in adapting to climate change, by disseminating appropriate information to empower them to be prepared and vigilant.

Recommendation 6: We recommend that responsible departments and sectors should further decentralize the response to climate change mitigation and adaptation measures. Projects can only address the real concerns of the people when there is a full understanding of the local situation. In addition, communities and individuals are best placed to identify and address their problems and challenges, and are often the best catalysts for change. We have observed that collective action can better be harnessed at the district level.

General Conclusion

The policy framework for many different policies regarding specific aspects of the protection and management of natural resources exist but they mostly remain single sector and single institution initiatives which do not take account of the cross-sectoral nature of climate change. The nature of climate change impacts in Malawi necessitates that adaptation, mitigation and DRR activities need to be linked across the full range of time frames, spatial scales and sectors. To do this, an integrated policy that recognizes the multiple dimensions and cross-cutting nature of climate change should be formulated by harmonizing all policies and programmes and bridging all the gaps articulated in this study. The integrated policy should articulate new policy instruments combining all instruments which may work better in practice than reliance on a single instrument.

Thus, there is a clear recognition for the need of an overall policy that would harmonize the different sector policies, arbitrate conflicts and provide guidance in management of climate. Importantly, climate-wise development policy is needed to manage the conflicting demands that adaptation and mitigation place upon limited or costly resources such as land, water, and energy. Various sectoral policies need to address gaps that have been identified. Policy actions will be required to protect people from shocks such as floods and droughts or help them adjust to changing circumstances. An opportunity emerges: as climate change makes development more complex, it also creates a much needed momentum for reforms to achieve long-pursued, critical policy goals such as sustainable land and water resource management and strategic approaches to long-term health and environmental threats.

Subsequently, comprehensive national strategy is required to complement with the climate change policy, to bring about development that is sensitive to climate change. Effective planning can both help make development resilient to the impacts of climate change and help policymakers identify opportunities to harness development benefits from lowering emissions. In agriculture despite a small budget, land resources conservation has managed to promote the adoption of various improved land management practices such as improved soil fertility practices through compost manure use and agro-forestry; soil and water conservation practices but on a small scale. These technologies are important adaptation measures in the agriculture sector. However, more attention is required to address practices that encourage carbon emissions and pollution in general.

In Malawi, such planning requires the support of international finance, technology transfer and capacity building. Identifying national priorities for climate compatible development that combines adaptation and low emissions development objectives, while meeting the requirements of international support frameworks, involves balancing upward and downward accountability.

