Assessment of Agricultural Sector Policies and Climate Change in Malawi – The Nexus between Climate Change Related Policies, Research and Practice

by

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TABLE OF CONTENTS

LIST OF TABLES

LIST OF FIGURES

LIST OF APPENDICES

ACRONYMS AND ABBREVIATIONS

ACPC	African Climate Policy Centre
ADB	African Development Bank
ASWAp	Agriculture Sector Wide Approach
CAADP	Comprehensive African Agricultural Development Programme
CARD	Center for Agricultural Research and Development
CGIAR	Consultative Group on International Agricultural Research
CISANET	Civil Society Agriculture Network
CURE	Coordination Union for the Rehabilitation of the Environment
DARS	Department of Agricultural Research Services
DCAFS	Donor Community on Agriculture and Food Security
FISP	Farm Input Subsidy Programme
FUM	Farmers Union of Malawi
LUANAR	Lilongwe University of Agriculture and Natural Resources
MAP	Malawi Agricultural Policy
MGDS	Malawi Growth and Development Strategy
MPRS	Malawi Poverty Reduction Strategy
NAPA	National Adaptation Programme of Action
NASFAM	National Smallholder Farmers Association of Malawi
NARC	National Agricultural Research Centre
NEP	National Environmental Policy
PABRA	Pan-Africa Bean Research Alliance
RIDP	Rural Infrastructure Development Programme
STAM	Seed Trade Association of Malawi
UNECA	United Nations Economic Commission for Africa

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EXECUTIVE SUMMARY

The United Nations Economic Commission for Africa (UNECA) through the African Climate Policy Centre (ACPC) collaborated with the Lilongwe University of Agriculture and Natural Resources (LUANAR) to conduct an assessment of the agricultural sector policies and climate change in Malawi under the theme "Assessment of Agricultural sector policies and climate change in Malawi – the nexus between climate change related policies, research and practice". The exercise aimed at determining the extent to which the agricultural sector policy integrates with climate related issues to influence agricultural practices in Malawi and also to focus on the effectiveness of the policy to mobilize resources available under various international climate financing activities. The study identified macro and micro economic aspects of the agricultural sector through assessment of the contribution of the agricultural sector to Gross Domestic Product, economic growth, trade and foreign exchange and national food security. The study also determined if Malawi has climate change policy in the agricultural systems and assessed agricultural sector policies whether they have components addressing issues of climate change and how this informs policy development. The team of researchers held consultation meetings with different stakeholders in Malawi. The work commenced with a study launch where over 40 stakeholders from different organizations provided their inputs on the proposal. Then a desk review was conducted for the agricultural and natural resources sector policies, programme strategies and frameworks to ascertain their link to climate change adaptation and mitigation. The research team consulted key and relevant stakeholders including Research institutions, Policy makers through key informant interviews, focus group discussions and an open questionnaire on issues relating to climate change research and agricultural sector policy.

The study found out that the agricultural sector remains the prime driver of the Malawi economy contributing over 80 percent to foreign exchange earnings as well as employing over 80 percent of the country's total workforce. The agricultural sector contributes about 36 per cent of the Gross Domestic Product (GDP) of which more than 70 percent is from the smallholder sub-sector and less than 30 percent is from the estate sub-sector. The main agricultural products grown by smallholder farmers are maize, tobacco, cassava, groundnuts, pulses, sorghum and millet, sweet potatoes and cotton, of which the main agricultural exports are tobacco, tea, sugar, cotton, rice, coffee and pulses. To attain food security, the government has been implementing a farm input subsidy programme (FISP) where resource poor smallholder farmers are accessing fertilizer and hybrid seed at a subsidized price. Interviews suggested that outcome of research is not very influential in informing policy because policy network is greatly controlled by line Ministries (in this case Ministry of Agriculture and Food Security, Ministry of Economic Planning), donor partners and Civil Society organizations. The crucial factors that determine policy include power relations, political context, government bureaucracy and its relationship with development partners. An extreme case of political influence on policy is the farm input subsidy programme which is highly controlled by the President and is becoming highly politicized prior to presidential and general elections. Findings suggest that only 20% of

independent agricultural research outputs would find their way into policy formulation while 24 % of policy research by Civil Society Organisations gets absorbed into policy. Collaboration among Government officials, Civil society organization, agricultural researchers in setting research agenda results in about 48% of the research outcomes informing policy and the uptake is improved if the findings are presented in a simple accessible language. Three categories of influential advocates for influencing policy through agricultural research were identified namely Civil Society organizations (Civil Society Agricultural Network, Malawi Economic Justice Network, Civil Society Network on Climate Change), Parliamentary Committee on Agricultural and Natural Resources and donor partners. The study also notes that crisis and donor pressure is likely to convince government officials to take policy action if research addressed challenges acknowledged by officials, two examples are liberalization of the agricultural sector in the late 1990's and floatation of the local currency in May 2012 as policy agenda supported by World Bank and International Monetary Fund respectively.

Malawi does not have climate change policy in place, but it is currently in its draft form. Most of the agricultural sector policies were formulated years before 2004, very little was known about climate change phenomenon or at least there was not much advocacy and awareness of issues of climate change, as such most of them do not contain issues of climate change. Research has not been explicitly given mandate over Climate Change. Even though this is the case, the agricultural research focuses on addressing climate change issues as a call from the demand of such services. As a result, the government of Malawi developed the National Adaptation Programme of Action (NAPA), and adoption of the ASWAp that incorporate climate change issues. Apart from lacking the components that state explicitly of climate change, most of the policies do not have clear monitoring and evaluation mechanisms, lack capacity in terms of institutions, human and technical support. There is duplication of efforts by several government departments, civil society and non-governmental organisations in the implementation of strategies for climate change adaptation and mitigation because there is no guiding policy that would provide direction. Challenges in agricultural research to inform policy and practice include weak links across researchers, policy makers, practitioners and donor partners, inadequate and limited technical and financial capacity of the agriculture sector, limited logistic support and poor format of dissemination of research messages for policy makers to find useful. There is need for sustainable funding mechanisms for agricultural research to inform policy and good collaboration among researchers, policy makers and donor partners is required to set agricultural research and formulate policy that would mitigate against the impact of climate change. There is need to harmonise all agricultural sector policies to mainstream climate change framework with the intent to influence practice and reduce duplication of efforts in addressing climate change issues.

1.0 INTRODUCTION

1.1 Background

Malawi's economy remains agro-based where the agricultural sector accounts for more than 80 percent of export earnings, contributes 36 percent of gross domestic product (GDP), and provides a livelihood for 85 percent of the population. Smallholder farmers contribute about three-quarters of agricultural production with cropping systems dominated by a maize-based rain-fed cropping system. Agriculture growth accelerated from around 4% in 2004/05 to around 14% in 2006/07 and to around 13% in 2008/09. Within the same period the economy grew by 8.6% in 2007, 9.7% in 2008 and 7.6% in 2009. The availability of food crops from increased agricultural production has contributed to the inflation drop from 22% in 2006 to 7.6 % in 2009/10 (Government of Malawi, 2011).

Malawi has about 3 million hectares of cultivatable agricultural land, but more than 99 per cent of agricultural land remains under rain-fed cultivation. Malawi, like many Southern African countries, is experiencing increasing climate variability which results into poor crop yields or even total crop failure due to drought and floods (CARLA, 2011). The rain-fed nature of smallholder farming makes agricultural production prone to such adverse weather conditions (Government of Malawi, 2010). Since the good performance of the economy is directly linked to performance of the agriculture sector, the national development strategies in Malawi have emphasized the importance of the growth of the agricultural sector in the fight against poverty, since most of the poor are currently engaged in the agricultural sector and mostly involved in subsistence agriculture (Muhome-Matita and Chirwa, 2011). Over-dependence on rain fed agriculture makes the country vulnerable to climate-related shocks culminating in low agricultural production and productivity. For example, the country has been experiencing low agricultural production from 2011 to 2013 due to unreliable rainfall patterns, erratic rains, dry spells, pest and diseases, droughts and floods. This depressed economic growth and development in the country.

Climate change is among other challenges that have emerged to be of great importance to agricultural production. Malawi being an agro-based country has a policy framework that guides agricultural production including other supporting policies. This study was commissioned in order to assess the extent to which these policies integrate strategies to adapt to climate change and mitigation of green houses gases (GHGs). In general, this study finds that Malawi's policy framework is short of a stand-alone climate change policy. A review of the existing agricultural related policy documents shows that most of them were formulated long before climate change became an issue of importance. It is only the recent past from 2004 to date when policy documents that include issues directly addressing climate change. Insights to the policies of the pre-2004 period shows no deliberate inclusion of climate change topics but they still present sections which are indirectly addressing climate change issues.

1.2 Food production and food security

Achieving national food security has been one of the major objectives of agricultural policies adopted since independence. In Malawi, national food security is mainly defined in terms of access to maize, the main staple food. Thus, the country is deemed to be food insecure even if the total food production is above the minimum food requirement, if maize supply is below the minimum food requirement. The nation therefore faces a food crisis if the production and supply of maize falls below the minimum required levels. However, other food crops such as rice and cassava are alternatives to maize in some parts of the country. The liberalization of markets was rapidly becoming discredited amongst the public by the high consumer price of maize and by the conspicuous rents evidently being extracted by private traders. Being dependent on rain fed agriculture maize production is highly vulnerable to climate shocks. Since the early 1990s maize yield had fluctuated between 170 and 220 kg with sharp declines in 1992 and 1994 (World Bank, 2003). As a result many people particularly the rural households could not afford to buy the maize grain and most of these rural households relied on food for work and piece work (ganyu) to earn some money for purchasing food**.**

1.3 Context of the Study

Malawi has been implementing Agricultural Sector Wide Approach (ASWAp) with the aim of increasing agricultural productivity, improving food security, diversifying food production to improve nutrition at household, and increasing household incomes of rural people. The ASWAp is a priority programme in the Malawi Growth and Development Strategy (MGDs) and it is consistent with the Comprehensive African Agricultural Development Programme (CAADP) under New Partnership for Africa's Development (NEPAD). In recent years climate change is emerging as a new challenge in the agricultural sector and initiatives in policy formulation and implementation need to take cognizance of challenges and opportunities that result from the impact of climate change. As such, the agricultural initiatives in policy formulation, review and implementation need to take cognizance of the challenges and opportunities that result from the impact of climate change and climate variability. It is imperative that the agricultural sector policies are appropriately informed by the existing body of knowledge on climate change and variability generated from scientific research. The agricultural policies should enable building of resilience against climate change and climate variability through appropriate adaptation strategies and contribute to mitigation of climate through use of improved and innovative technologies, land use and land management practices. The agricultural policy should influence practice on the ground through, for example, land use and land management practices, supply of agricultural inputs, agricultural product markets, farmer associations and access to credit facilities. Furthermore, the agricultural policy should influence practice on the ground through, for example, improved land use and land management practices, enhanced supply of agricultural inputs, provision of agricultural product markets, formation of farmer associations and enhanced access to credit facilities and other financial services. The United Nations Economic Commission for Africa (UNECA) through the African Climate Policy Centre (ACPC) teamed up

with the Lilongwe University of Agriculture and Natural Resources (LUANAR) to assess the agricultural sector policies and climate change in Malawi. The exercise, under the theme "*Assessment of Agricultural sector policies and climate change in Malawi – the nexus between climate change related policies, research and practice"* was conducted to determine the extent to which the agricultural sector policy integrates with climate related agricultural research to influence agricultural practices in Malawi.

1.4 Objectives

The study had several objectives as outlined below.

1. To identify the macro and micro economic aspects of the agricultural sector through assessment of the contribution of the agricultural sector to Gross Domestic Product (GDP), economic growth, trade and foreign exchange and national food security.

2. To determine if Malawi has climate policy in the agricultural systems and assess if the agricultural policy has components addressing issues of climate change and how this informed policy development.

3. To evaluate the extent to which agricultural research addresses aspects of climate change and climate resilience for the agricultural sector and how the agricultural research influence policy.

4. To assess how agricultural practice and actions by agricultural producers, partners such as Non-Governmental Organisations inform and get influenced by the agricultural policy.

5. To determine if Malawi has a mechansism to address climate change issues that link policy, research and practice.

2.0 METHODOLOGY

To adequately and effectively address the objective of the study, a number of approaches were used that included desk review of various policy documents, consultation meetings, workshop, and face to face interviews with various stakeholders as described below.

2.1 Consultation meetings

Members from the African Climate Policy Centre (ACPC) had consultation meetings with different stakeholders in Malawi to understand the context in which the exercise would be conducted. In their consultation the research team was constituted with two members from

ACPC and four from the Lilongwe University of Agriculture and Natural Resources. A meeting took place at Cross Roads Hotel where briefing of the project was done and tasks were reviewed.

2.2 Study launch workshop

The study was undertaken by a team of four researchers from LUANAR and two members of staff from the African Climate Policy Centre. The exercise commenced with study launch workshop on 15th November, 2012 and was attended by over 40 participants from Government Departments, Non Governmental Organisations, Civil Society and farmers' organisations, the academia, representatives of donor organisations and the media. The objective of the study launch was to get inputs from stakeholders on policy issues that require to be tackled for improvement of the assessment exercise. Specifically, stakeholders at the study launch identified stakeholders for consultations proposed key policy documents for review, discussed the draft study tools and discussed the proposed data sources. A post-workshop consultation were conducted by the research team as a process of finalizing and refining the study tools and prioritizing stakeholders and respondents to be interviewed.

2.3 Desk Review

To identify the macro and micro economic aspects of the agricultural sector, secondary data was used. In particular, secondary data helped to analyse the contribution of the agricultural sector to economic growth, trade and foreign exchange and national food security. The secondary data included Government Policies related to agriculture and environment, policy briefs, reports of studies, workshops, conference proceedings, journal articles, periodicals and internet resource data. The review concentrated on recent documents dating from 2005 to 2012 to provide up to date information of the economic situation in Malawi in relation to agriculture. This review of secondary data aimed at generating an overview picture of the role and contribution of agriculture to the Malawian economy with respect to food security, farmers household income, social welfare, employment, international trade and foreign exchange generation. A comparison of the agriculture sector in Malawi with its neighboring countries was made to give a perspective of the sector in the region. In particular, information on the general economy of Malawi was reviewed narrowing down to the contribution of agriculture to the economy. The review also focused on major crops, livestock and products and its share of national annual budget allocation, improvement of livelihoods as well as their contribution to the economy was documented. This method was chosen because there is a lot of literature that objectively covered related issues and it was the only reliable source of data in the scope of the study. Recent documents were chosen to provide up to date information of the economic situation in Malawi in relation to agriculture. A comprehensive review of secondary data aimed at generating an overview picture of the role and contribution of agriculture to the Malawian economy with respect to food security, farmers household income, social welfare, employment, international trade and foreign exchange

generation. A comparison of the agriculture sector in Malawi with its neighboring countries was made to give a perspective of the sector in the region.

In addition, agricultural related policies and strategies were reviewed to determine if the policies in agriculture have components addressing climate change issues and whether Malawi has climate change policy in the agricultural systems. This led to a review of local and national practices and research covering areas of climate change. Analyses of the sub-sector policies were conducted to reveal how issues of climate change influenced or informed the process of policy development. The set of policies and strategies reviewed in the study included:

- Agricultural Sector Wide Approach
- Malawi National Land Policy
- National Irrigation Policy and Development Strategy
- Food Security Policy
- The National Environmental Policy
- The Crops Production Policy
- Seed Policy
- National Water Policy
- Policy on Livestock in Malawi
- Energy Policy
- National Forestry Policy
- National Forestry Program
- The Malawi Growth and Development Strategy II (MGDS II)
- Malawi's National Adaptation Programmes of Action (NAPA)
- Malawi Poverty Reduction Strategy Paper (MPRSP)

The policies were rated on a scale of 0 to 5 against coverage of climate change issues where 1 to 1.9 is very weak, where policy does not mention anything about climate change; 2 to 2.9 weak does not state explicitly issues of climate change, 3-3.9 moderate, strategies on implementation indicated but does not state monitoring and evaluation; 4 to 4.9 strong, clearly defines objectives, strategies on implementation, funding mechanisms and monitoring and evaluation. The Research Team also reviewed a range of local and national practices and research covering areas of climate change.

2.4 Key informant interviews

The research team conducted key informant interviews with relevant stakeholders from different departments in the Ministry of Agriculture and Food Security, Ministry of Environment and Climate Change Management, other government departments, Non-governmental organisation, Consultative Groups for International Agriculture Research (CGIAR) and donor partners (Appendix I). In addition, the project team had key informant interviews with stakeholders that

are working within areas related to climate change, agricultural production. The team visited six institutions in Southern Malawi and over 20 institutions in Central Malawi (Appendix 3). The thematic approaches used in the focus group discussions mirrored the types of institutions that were visited. These themes were: (1) policy (2) research and development (3) regulatory (4) extension (5) practicing institutions (6) supporting institutions of agriculture policy, research and practice and environment management.

The consultations were at individual and institutional levels. Among the issues discussed with key informants included how the agricultural research policy and how the policy influence the agricultural research with such practices as agroforestry, intercropping, Farm Input Subsidy Programme (FISP), marketing of produce, extension services and financial services. The checklist for institutions had two major areas namely existence of agricultural sector policies related to climate change and systems and partnerships for effective implementation of policies. The first component covered policies developed in line with agricultural production, climate change, policy development process, target beneficiaries, harmonization of different policies, challenges in implementation. The second component focused on system and partnerships, human resource and capacity development, financing mechanism, legal issues and monitoring and evaluation of the effectiveness of the current policies in addressing climate.

2.5 Household interviews

A total of forty-six households were sampled from the two villages namely, Ndindi and Mphunga in Salima district to assess how agricultural practice by agricultural producers or small holder farmers inform ad get influenced by agricultural policy. Salima district was selected because it is one of the five priority districts in Malawi for climate change adaptation and mitigation practices as indicated in the National Adaptation Programme of Action. The villages of Ndindi and Mphunga were selected due to frequent history of droughts and floods. The team assessed and interviewed farmers on different agricultural practices being promoted in relation to climate change, identified promoters of different practices or technologies and documented all observations on how farmers are adapting to climate change and the different coping mechanism used. The team consulted key and relevant stakeholders of the District namely District Agricultural Development Officers (DADO), Irrigation Officer, Agriculture Extension Development Coordinators on information on climate change risks, early warning signals and adaptation and mitigation practices for agriculture and management of natural resources.

3.0 STUDY FINDINGS

3.1 Microeconomic factors and agricultural production

The agricultural sector is identified as the main sector for achieving pro-poor growth. An Integrated Household Survey demonstrated that subsistence agriculture remained the main source of income for the rural poor, accounting for 63.7 percent of total household income (MPRS, 2002). The main agricultural objective in the MPRS is to increase agricultural incomes through access to inputs; technology and extension services; access to domestic and international markets; promotion of irrigation, crop diversification and livestock development. The agricultural sector substantially contributes to poverty reduction both at subsistence and estate level as a source of employment, income from direct crop and livestock sales, foreign exchange as well as raw materials for the manufacturing sector. About 90% of the rural population consists of subsistence farmers who largely depend on agriculture for their livelihoods. As such, subsistence production of cash crops across the country helps in the fight against poverty in rural areas. Tobacco is the main cash crop grown by most smallholder farmers across the country. Other cash crops grown by smallholder farmers include cotton, groundnuts, tea and coffee, although the proportion of farmers that grow these cash crops are far much lower than the proportion cultivating maize (Chirwa *et al*, 2008). In many circumstances, growth in the agricultural sector has been an important ingredient in the formula that connects economic growth to the poor (Timmer, 2005).

3.2 Food Security and livelihood improvement

More than 80% of the population in Malawi being rural and agricultural activities forms the bulk of the livelihood strategies of households, agricultural development policies have dominated the policy arena since independence in 1964 (Chirwa *et al*, 2008). The smallholder and estate sectors support both rural and urban livelihoods. The smallholder subsector is heavily reliant on rain-fed and environment supported agriculture as compared to the estate sub-sector which supplements the natural production factors with other technologies. In essence, Malawi's economy is driven indirectly by the overall climatic conditions which if unfavourable, their effects have far reaching consequences. Poor climatic patterns have in the past led to food shortages, which translate to a chain of hardships on the average Malawian, a country in which already over 50 percent of the population are living below the poverty line. However, the country has the agriculture and related policies that were commissioned to improve the living standards.

According to the Food Security Surveillance system, the food situation in Malawi improved during July 2010-June 2011 compared to the same time in 2009 to 2010. The proportion of total farm families without food from own production from July 2010 to June 2011 varied from 1 per cent to 6 per cent which was lower when compared to the same period in the previous season from July 2009 to June 2010 which was at 1 per cent to 12 per cent. National food availability

remained stable even through the lean season, due to carryover stocks from the 2010 season. For the 2010/11 marketing year, Malawi required 2.5 million metric tons of maize comprising 2.2 million metric tons of maize for food, 41, 047 metric tons for seed, 60,000 metric tons for the Strategic Grain Reserve and 250,000 metric tons for feed and industrial use. This left the country with a food surplus of about 800,000 metric tons. In 2011 and 2012 there was a bumper harvest of about 3.8 million metric tons against national maize grain consumption needs of about 2.6 million metric tons resulting in a surplus. However, the National Food Reserve Agency a government agency responsible for stocking maize had challenges with stored maize where larger percentage rotted and was declared unsuitable for human consumption. The smallholder subsector is heavily reliant on rain-fed and environment supported agriculture as compared to the estate sub-sector which supplements the natural production factors with other technologies. Poor climatic patterns have in the past led to food shortages, which translate to a chain of hardships on the average Malawian.

3.3 Production estimates, weather variability and uptake of FISP

The country faced severe drought in the 2002/2003 crop growing season as such maize supply fell and the prices went up sharply. At household level, recent surveys in 2011 indicate that the average months of food security for rural households from own production in a normal year is between 6 and 7 months. Food supplies in Malawi fluctuated between 1.6 and 1.7 kcal per capita per day from 1996-99 compared to the minimum requirement of 2.2 kcal per capita per day. The increase in food production from 2005 to 2009 has been largely attributed to good weather and the implementation of the agricultural support programmes, including the free ‘starter pack’, the targeted input programme (TIP) and the Farm Input Subsidy Programme.

During 2009/2010 Malawi implemented the FISP for the fifth season and it was aimed at making seeds and fertilizers available to selected poor resource smallholder farmers. However, the year was faced with dry spells in most of the districts that reduced the overall yield. A similar trend has also been observed in the year 2011/2012. There is a critical link between food security and maize inputs availability and the relevance of a policy focus on these key areas in addressing poverty in Malawi. It is in recognition of this fact that the Malawi Government has added a significant emphasis to investment in agriculture as a prerequisite for economic growth and resulted in the successful implementation of the fertilizer subsidy programme. Recent government support towards the smallholder sector through FISP, combined with good rains, led to significant increases in maize production from 1.2 million metric tons in 2005/06 to 3.4 million metric tons in 2009/10 as shown in Figure 1 as a result of shifting from provision of limited households with small ‘starter packs’ from 2000/2 to 2004/05. The figure is indicating the drop in production in 2004/05 with the provision of starter packs to limited households, as opposed to the high production from 2005/2006 onwards due to implementation of the farm input subsidy programme. This means that despite the fact that FISP play a very big role in achieving food security; this is dependent on the weather variability of a particular year. The

renewed emphasis on agricultural sector has transformed Malawi from a net importer to a net exporter of maize and allowed the majority of households to attain food security since 2005/06.

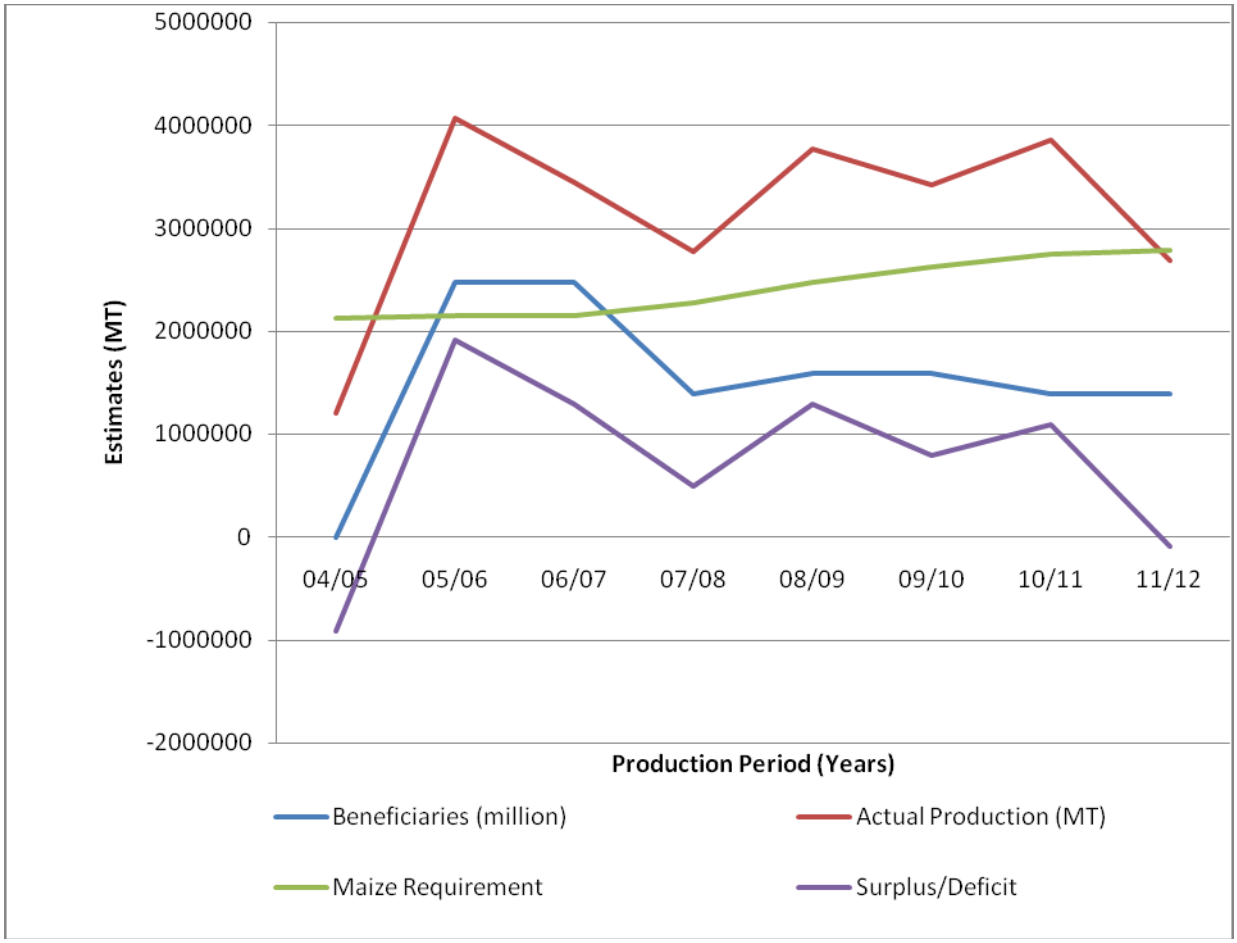


Figure 1: Production estimates of maize as affected by FISP

3.4 Interaction between farm input subsidy and Climate change adaptation

A study by Chibwana and Fischer (2011) indicated that FISP has been successful in moving farm households toward food self-sufficiency. However, they found out that FISP affected land use by increasing the amount of land allocated to maize. The study results showed that the expansion of maize acreage occurred at the expense of other crops (legumes, cassava, and sweet potato), which were allocated 21 percent less land, on average, giving an indication that the objectives of Malawi's agricultural policies, to increase both maize production and crop diversity, may be difficult to achieve under the farm input subsidy programme. By growing a mixture of crops, farmers can reduce potentially negative impacts of weather variability, labor shortages and production needs. Movement towards monocropping dominated by improved varieties of maize might make farm households more vulnerable to climate variability and change. The increase in

maize acreage at the expense of relatively drought-tolerant crops, notably cassava and sweet potato, could exacerbate the impact of drought and reduce opportunities in adapting to climate change.

3.5 Extent on how agricultural research influence policy

The extent to which agricultural research influence policy depends on several factors including the originator of the research output, type of research output and mode of dissemination of the research outputs. Research outputs to inform policy is produced by Government funded National Agricultural Research Centres (NARC), Consultative Group International Agriculture Research (CGIARS), academic institutes, Civil Society. The research outputs are dissemination through reports that are presented at seminars, workshop, and academic channels through papers in journals, policy briefs and dissemination conferences among others. The results shows that on average 22.0% of the independent research by academic institutions, International agricultural research centre would inform policy households while there is 48% chance that research outputs from a collaborative work of Government officials, Civil society organization, agricultural researchers would inform agricultural policy (Figure 2). On the other hand format of dissemination of research outputs was found to be one of the major contributing factors to policy formulation. Most research results from the academic circles goes to those donors who commissioned it or it gets published in international academic journals as data and findings that are difficult to be understood and used by policy makers. Apart from research output provided as data and findings research provided as briefs and arguments for actions has 60% chance of flowing into policy while agricultural research outcomes provided as ideas and criticism permeates into the policy gradually with only 17% chance.

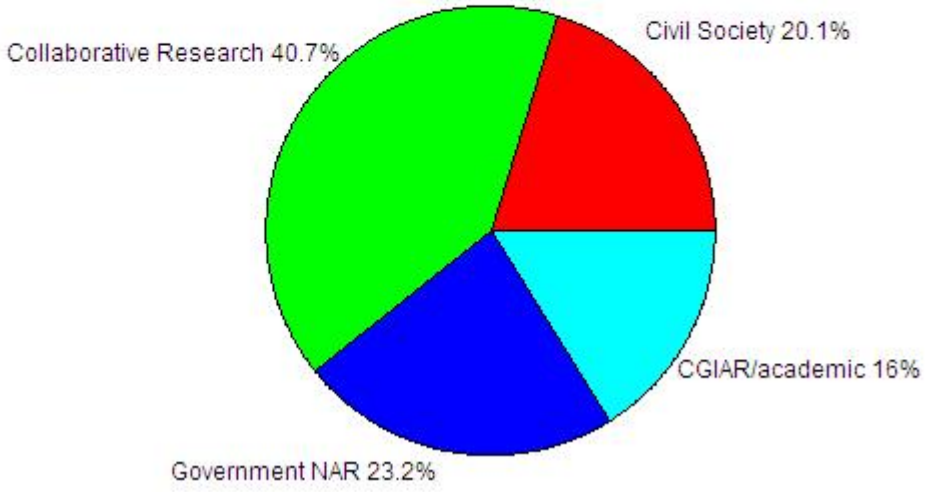


Figure 2: Extent of uptake of agricultural research for policy formulation

As a case study we assessed extent of agricultural research to inform the farm input subsidy programme. Interviews with stakeholders from Non Governmental organizations, Donor partners, agricultural research centres have shown that there has been heated debate over fertilizer subsidies focusing on scope and scale of the FISP, government s' ability to fund and sustainability of the initiative and diminishing diversification of other local crops. Several papers have been published on policy recommendations for example Aberman *et al* 2012; Droppelmann (2013); and other finding suggests that Research by Department of Agricultural Research, Civil society organizations, CGIARs and donor community are key to influencing process of policy development and formulation. Apart from interaction of the three stakeholders organizations the Ministry of Finance and Ministry of Economic Planning are very crucial in getting research results to lead to policy formulation and implementation.

3.6 Macroeconomic and microeconomic aspects of the agricultural sector

The agricultural sector remains the prime driver of the Malawi economy contributing over 80 percent to foreign exchange earnings as well as employing utmost 80 percent of the country's total workforce. Under cultivation are food crops and high value cash crops by the smallholder sub-sector and the estate (commercial) sub-sector respectively representing the two main agricultural sub-sectors in Malawi. The agricultural sector contributes about 36 per cent of the

gross domestic product (GDP) of which more than 70 percent is from the smallholder sub-sector and less than 30 percent is from the estate sub-sector. Mucavele (2012) reported that the main agricultural products grown by smallholder farmers are maize, tobacco, cassava, groundnuts, pulses, sorghum and millet, sweet potatoes and cotton, of which the main agricultural exports are tobacco, tea, sugar, cotton, rice and pulses. Tea, sugar, tobacco and coffee are traditional export products that are largely grown by corporations and large scale farmers (USAID, 2012). Tobacco contributes over 70% of the foreign exchange earnings annually, tea is the second biggest accounting for 8% of export earnings and sugar comes third contributing 6.7 percent (ASWAp, 2010; Pound and Phiri, 2010; Illovo, 2012). Aside from agricultural exports, the other key driver of Malawi's growth is donor aid. Malawi's aid per capita at US$ 68.6 is much higher than other countries in Africa (US$42.1) or Southern Africa (US$44.5) (ADB, 2013). Figure 3 below shows that contribution of agriculture to economic development

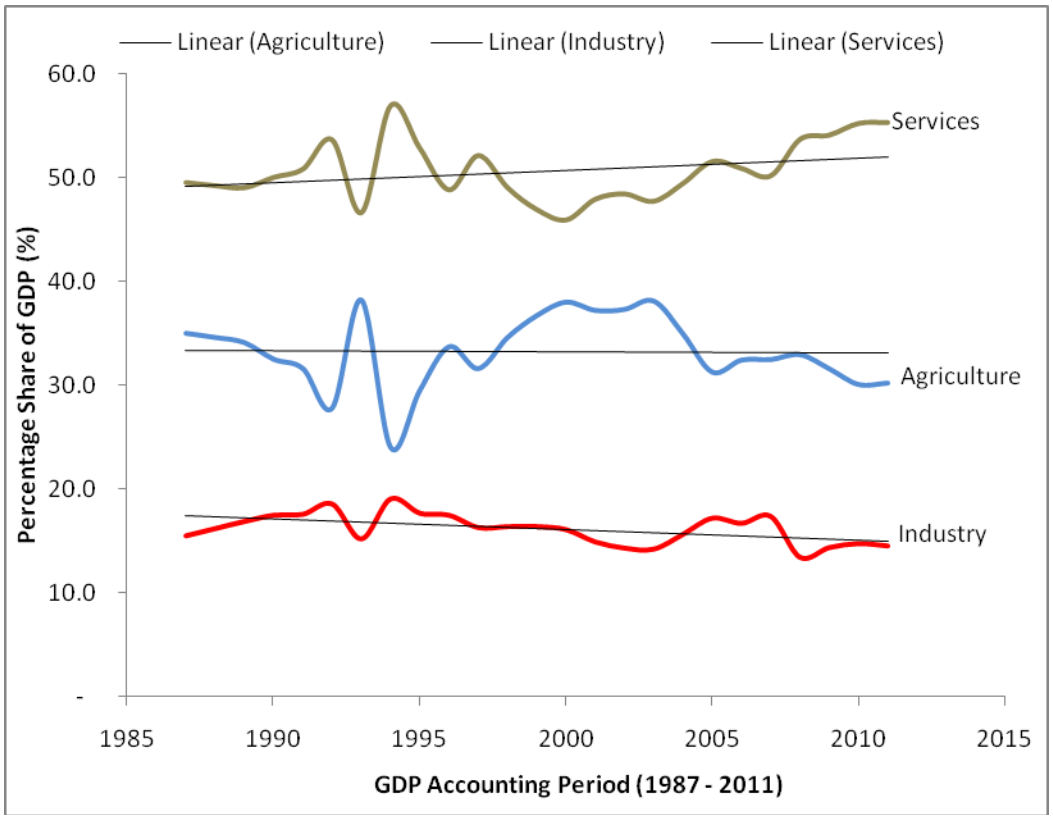
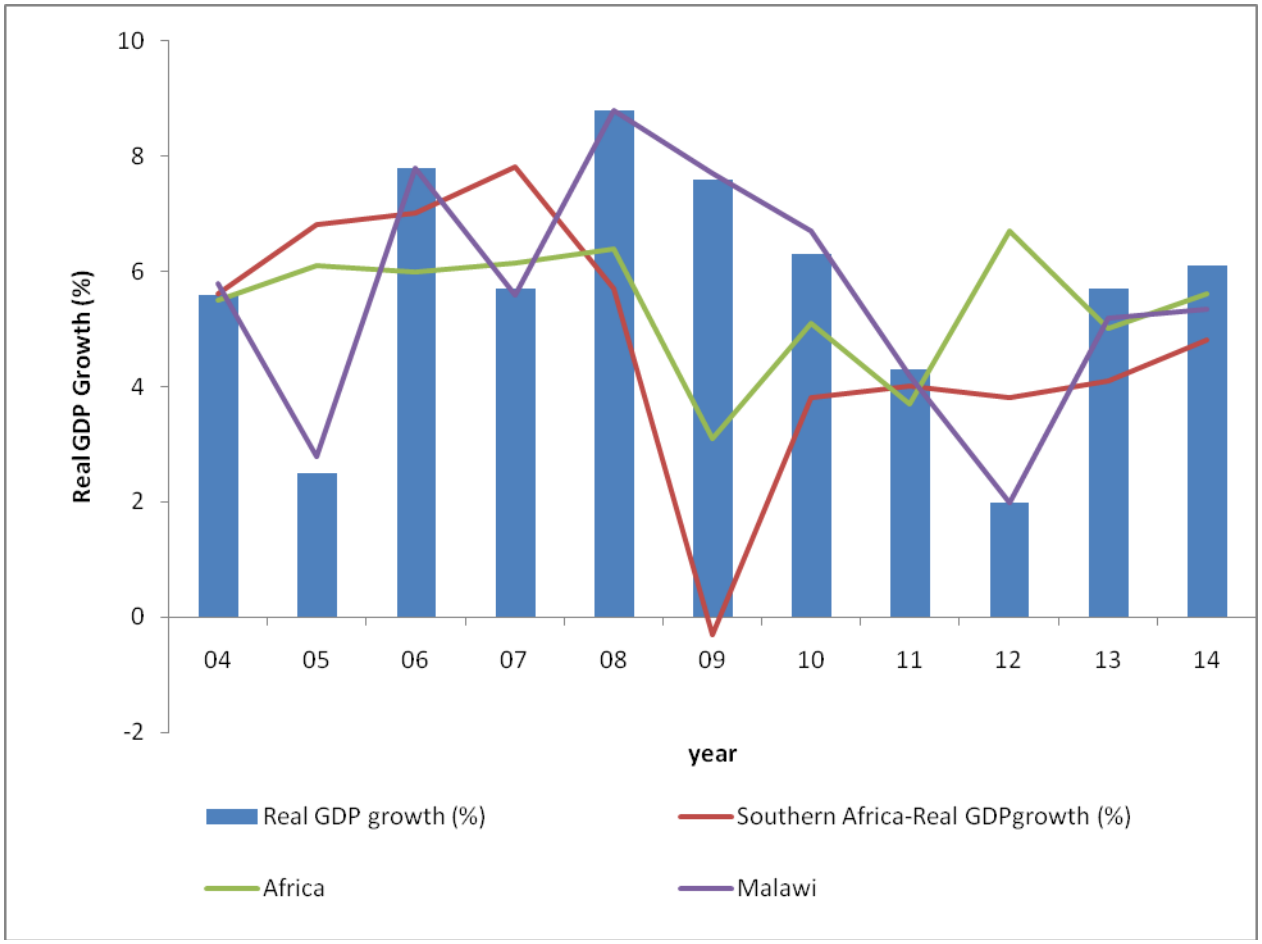


Figure 3: GDP contribution to the Malawi economy over the past years

Agriculture sector being represented by small holder and estate subsectors, fishing, forestry and hunting, directs the movement of the economy with regard to the way other industries such as mining, manufacturing, construction, transportation and electricity; and services such as education, health care, social assistance, arts, entertainment and recreation behave. For instance, in Figure 2, there was a drop in the contribution of the agricultural sector to the GDP 1992 by

about 2.5%, and that resulted to an increase in both the industry sector and the other services of about 0.5% and 1.5% respectively. Similarly in 1993, an increase in the agriculture's share to the nationals GDP resulted into the other sectors dropping the way they contribute to GDP. During the last three years, however, the economy slowed down with real GDP growth declining from 6.5% in 2010 on the back of a poor agricultural season to 4.3% in 2011. A further decline in GDP was projected in 2012 to 1.9% (Figure 3). Due to increased importance of agriculture to economic development, agriculture is key to food security, economic growth and wealth creation stipulated in the Malawi Growth and Development Strategy (MGDS II, 2011 - 2016). However, over the years the real growth of the economy has been variable as shown in Figure 4 below



Adapted from: AfDB Statistics Department, African Economic Outlook- November 2012.

Figure 4: Real GDP growth for Africa as a whole and Malawi between 2004 and 2014

According to the African Economic Outlook (AEO) 2013 report, the agricultural sector is projected to expand by 5.1 percent in response to improved price incentives for tobacco production from exchange rate adjustment and recent policy initiatives to promote contract

farming for commercial crops and expand production for cotton, rice, pulses and legumes. The agricultural sector has been growing at an average rate of 10.7 percent per annum between 2005 to 2010 largely due to the farm input subsidy programme that has been implemented since the 2005/06 season and the good weather conditions that the country has experienced (Muhome-Matita and Chirwa, 2011). In 2010 Malawi registered a real GDP growth of 6.7 percent which partly was facilitated by the Heavily Indebted Poor Countries (HIPC) debt relief, provided the government fiscal space to redirect spending to growth enhancing programs such as the Farm Input Subsidy Program which raised agricultural growth, however the 6.7 percent growth was relatively lower compared to a growth of 8.9 percent achieved in 2009. The less than expected outturn in 2010 was as a result of the scaling down of investment and production especially in the manufacturing, wholesale, retail trade and distribution, transport, and information and communication sectors. In 2011, GDP growth was estimated to have fallen further to 5.8%, hit by the problems with the International Monetary Fund (IMF) Economic Credit Facility (ECF) programme that led to reduced donor inflows, foreign exchange difficulties and shortages of essential commodities such as fuel and inputs for manufacturing. The situation was made worse by disappointing earnings from tobacco, the country's top export earner as agriculture continues to be the main economic activity, while mining and construction have recently begun to account for a larger share.

3.7 The Malawi Economic Recovery Plan

Malawi faced a number of macroeconomic challenges during 2011, the first year of the MGDS II implementation. The challenges included reduced disposable incomes due to poor tobacco revenues, scarcity of foreign exchange, electricity power disruptions. Consequently, economic performance slowed down, and Gross domestic Product (GDP) grew by only 4.3% per cent. The severe shortage of foreign exchange had negative impact on imports of strategic commodities such as fuel and industrial raw material. Although average inflation rate in 2011 remained at a single digit (7.6) the country started experiencing a steady rise in general price levels from early 2012, reflecting a pass through effect from increased petroleum pump prices and continued fuel supply disruptions. The average annual inflation rate for 2012 was 18.4 per cent, the first incidence of double digit inflation since 2006 and has it accelerated to rise to 36% as of mid May, 2013. The inflation coupled by soaring prices of agricultural products for instance the price of maize grain increased from K7,000 per 50 kg bag to K12,000. The agricultural sector is projected to expand by 5.1 percent in response to improved price incentives for tobacco production from exchange rate adjustment and recent policy initiatives to contract farming for commercial crops and expand production of cotton, rice, pulses and legumes. Malawi is now implementing the Economic Recovery Plan. Given the economic challenges Malawi has embraced a set of immediate (within 3 months), short (1 year), and medium term (2 to 5 years) policy reforms aimed at restoring external and internal economic stability.

A. Immediate policies

In May, 2012 Malawi Government adopted the flexible Exchange Rate regime that led to the devaluation of the Malawi Kwacha to country's major trading currencies. There was implementation of a 49 % devaluation of the Malawi Kwacha from MK 167 to MK 250 to the US Dollar and the Kwacha was subsequently floated. There was a steady decrease in the value of the kwacha against the US dollar from K250 in May 2012 to K425 in March 2013. Currently the Malawi Kwacha is appreciating from K425 in March to K340 in May. Other reform measures included freeing up of the exchange rates determined by foreign exchange bureaus; cancellation of requirements for prior approval and pre-vetting of all imports in excess of $50,000; and the reversal of surrender requirements on tobacco dollars. The government of Malawi removed fuel subsidies by adopting the automatic pricing mechanism (APM). Under the Economic Recovery Plan (ERP), government was able to cushion foreign exchange reserves through a series of negotiations with donor partners on such issues as extended credit facility, resolution on issues with millennium Change Corporation.

From consultations with various stakeholders, while the implemented measures have helped the country to stabilize supplies of essential commodities such as medicines and fuel, the measures have tragically affected the lives of many people. For example, the automatic fuel adjustment makes planning and budgeting difficult as there have been frequent price adjustments. The fuel adjustment has been transmitted to the rural people through the sharp increase in food particularly maize thereby making it hard for low income people to purchase food. This again culminated into the working class to demand salary adjustments to meet the increased cost of living. .

B. Short term – 1 year

Social Support Package to cushion the local vulnerable households

- Scaling up Labour Intensive Public Works Programme (LIPW);
- Scaling up Farm Input Subsidy Programme (FISP);
- Scaling up legume seed multiplication, agro forestry and soil conservation, multiplication of cassava cuttings and sweet potato vines and extending village savings club
- Scaling up school meals programme and vitamin A supplementation
- Continuing the Social Cash Transfer Programme

Budget framework: prioritize expenditures to sectors that would enhance economic growth, create employment, and boost production and diversification for the export market for quick foreign exchange generation. The government has made significant strides in improving agricultural productivity through the Farm Inputs Subsidy programme where the policy demonstrates government commitment to support resource poor farmers who responded by stepping up their efforts in farm operations. However, implementing this strategy in the coming growing season will be challenging as require more financial resources which has been allocated from the national budget to support the programme following the devaluation of the Kwacha.

Considering that 40 percent of the national budget is financed by donors, the full implementation of the programme implies increasing taxes to raise adequate resources for implementation. The increased supply of the staple had forced the price down forcing others to opt for buying rather than producing a situation which is currently leading to a slump in the availability of maize.

C. Medium Term Focus

As outlined in the MGDS II where economic growth is being promoted through focus on the following sectors energy development, tourism, mining, agriculture and Transport Infrastructure and Information and Communication Technology

3.8.0 Review of Agricultural Sector Policies

This section provides an assessment of the agricultural related policies on the extent to which they cover issues of climate change and how informed are the policies on climate change. It is worth mentioning that most of the agricultural related policies were developed when issues of climate change were less pertinent and policy makers did not envisage that ten years later climate change will emerge to be an issue that the policies would need to address. Nonetheless, the policies included some principles of climate change adaptation and mitigation. Most of the policies were found to be weak in mainstreaming issues of climate change hence most of the strategies do not directly refer to climate change adaptation and mitigation (Figure 5). The figure was generated following assessment of policy based on rating of 1 to 5 as indicated below:

Table 1: Policy Assessment Criteria with respect to climate change

Score 0-5	**Rating**	**Description**
0-1.9	very weak	does not state anything about climate change
2-2.9	weak	does not state explicitly issues of climate change but some aspects that cover climate change are covered
3-3.9	moderate	clearly defined objectives and strategies on implementation on climate change issues but does not state monitoring and evaluation and funding mechanisms
4-4.9	strong	clearly defined objectives and strategies on implementation, monitoring and evaluation on climate change issues but does not state funding mechanisms
5	very strong	clearly defines objectives, strategies on implementation, funding mechanisms, monitoring and evaluation on climate change

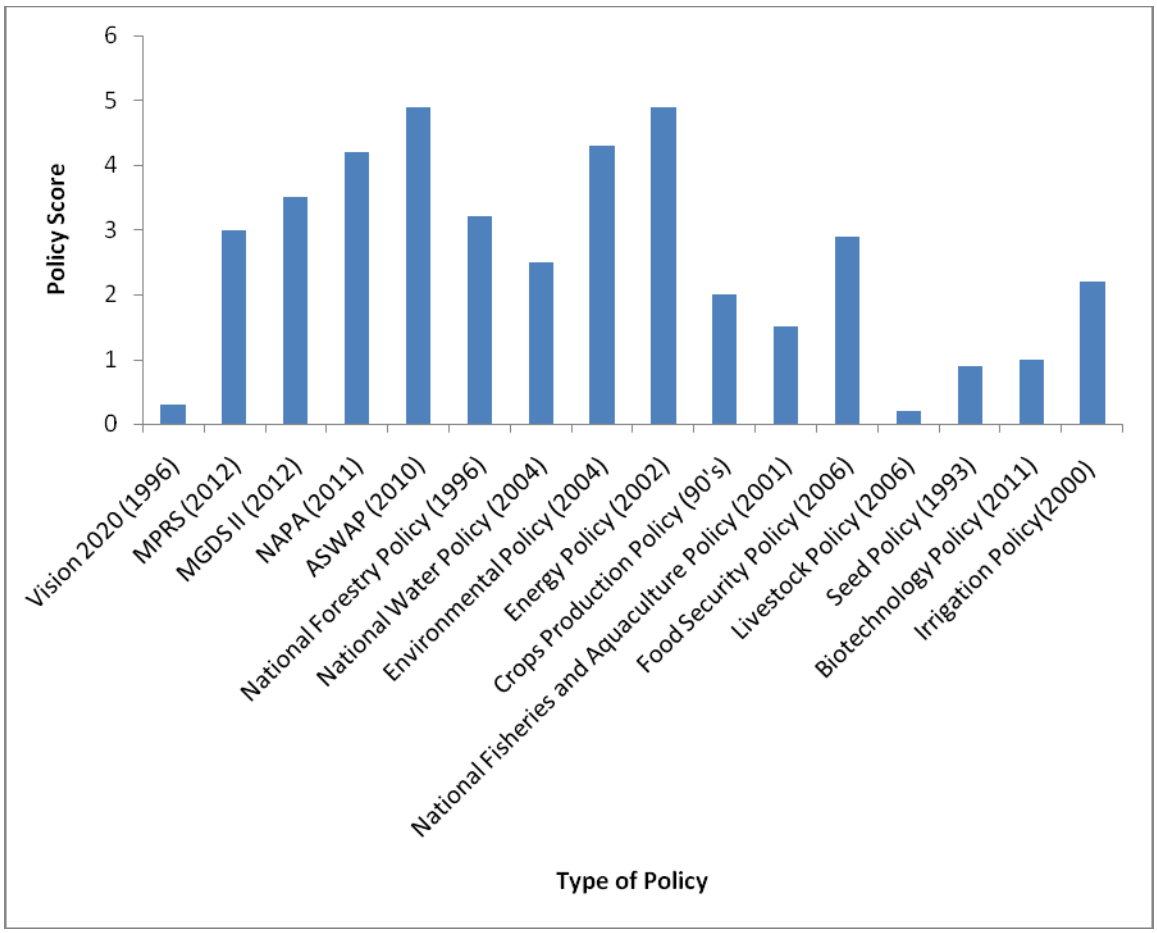


Figure 5: Extent of coverage of climate change issues in agricultural policies

Figure 4 shows the classification of climate change policies depending on their content in the matrix. The figure shows that most policies do not mention anything to do with climate change because were formulated when issues of climate change were not prominent. For instance, in the Vision 2020 that was formulated in 1996 stated that climate change would not have any significant effect or impact on the livelihoods of people in Malawi. However, since 2003, issues of climate change started gaining momentum and such that Malawi as a nation realized of developing some strategies that would help in dealing with the climate change effects. For instance, the National Adaptation Policy of Action (NAPA) formulated 2005 and National Environment Policy was revised had made strong strategies towards adaptation to and mitigation against climate change.

3.8.1 Agricultural Sector Wide Approach and link with research and practice

The Government of Malawi with its development partners formulated the Agriculture Sector Wide Approach (ASWAp) with the aim of increasing agricultural productivity, contributing to 6% growth annually in the agricultural sector, improving food security, diversifying food production to improve nutrition at household level, and increasing agricultural incomes of the rural people. The ASWAp is considered as a priority investment programme in the agricultural sector aimed at operationalizing the priority agricultural elements of the Malawi Growth and Development Strategy (MGDS). The ASWAp document covers issues of climate change in a holistic approach. It recognizes causes of climate change and effects it has on agriculture and climate change is included in the policy as a key constraint to agricultural production. The policy emphasizes on research and research-based interventions as key to addressing climate change and it outlines sustainable productions systems, including crop diversification as some of the measures of mitigating climate variability. Good land management practices and management of post-harvest losses are research areas suggested to complement the Farm Input subsidy Programme towards greater efficiency in resource use. Interventions to mitigate the effects of climate change have been included in the ASWAp by promoting conservation agriculture, vetiver grass contour planting, contour ridging, application of manure, minimum tillage, agro-forestry, box ridges, and use of herbicides (GoM, 2010). The ASWAp promotes increasing water use efficiency and strengthening irrigation. The agricultural practices have implications for Green House Gases (GHG) mitigation and adaptation to climate change.

In general, the agricultural practices that are being promoted by the Department of Agricultural Research Services and different stakeholders are informed by research and consequently these inform policy. For instance through the application of Century Model (Version 4) research study was conducted in Malawi to assess the total cost of mitigation option and total GHG reduction that would arise from a series of mitigation options and several climate change mitigation recommendations were drawn and these recommendations are being implemented as policy:

(i) Improved cultivation methods through the use of zero-tillage or conservation farming

Conservation farming shows that 160 g(carbon)/m^2) could be sequestered using the zero tillage cultivation technique thus increased the carbon pool. Conservation agriculture is now being advocated by several non-governmental organizations such as Total Land Care, Concern Universal, Christian Aid, OXFAM, Catholic Development Commission among others.

(ii) Improved fertiliser and manure management

The efficient management of livestock manure results in a 5.4% reduction in CO2 emissions, giving saving of about US$ 8.71 per ton of CO_2 .Similarly applying just enough fertilizer to meet

the crops' demand would reduce losses through volatilization and the use of integrated soil fertility management strategies,

(iii) improve soil and water management practices, as well as the storage of carbon in the soil, (iv) promote the use of agricultural crop residues to improve soil fertility and reduce the open burning of crop residues,

(v) promote the growing and management of trees species that are carbon sinks, purifiers and useful in carbon sequestration programmes. The World Agroforestry Centre (ICRAF) is collaborating with Department of Agricultural Research and other stakeholders in promotion of growing of fruit trees and nitrogen fixing tree and shrub species. This has seen adoption of a National Agroforestry strategy where different stakeholders are promoting the growing of fertilizer trees such as *Sesbania sesban, Tephrosia vogelli, Faidherbia albida, Leucaena leucocephala* among others.

(vi) promote rain-fed production of rice with intermittent irrigation, (vii) expand the proportion of total land area under the improved fertilizer mitigation option (>200 000 ha) and agro-forestry systems (>6000 ha)

Other interventions include improve early warning systems for droughts and floods as well as disease and insect pest outbreaks such as army worm and red locusts, developing rain water harvesting and storage systems; constructing irrigation dams to ensure availability of water; promoting the growing of drought tolerant crops and management practices; encouraging planting of forest trees and fruit trees in fragile land areas; promoting growing of *Jatropha* trees for production of bio-diesel to reduce air pollution; developing strategies for drought preparedness and accurate crop estimates; protecting fish breeding locations in lakes and rivers that are being degraded by droughts and floods; and supporting soil conservation initiatives and rehabilitation of degraded agricultural land. The government has structures in place to promote adapt interventions to address climate change. However, due to inadequate resource allocation to research, some interventions are adopted without local research implementation and modification to suit the local conditions.

3.8.2 Draft National Agricultural Policy: 2011 – 2016

The Draft National Agricultural Policy (NAP) includes many principles relating to climate change. It is interesting to note that one of the critical factors necessitating the development of the policy is the need to guide the agricultural sector's operations in the face of the different cross-cutting issues that affect productivity of the agricultural sector which, among others, include climate change. The policy recognizes the inadequate capacity to undertake strategic, demand-driven and gender responsive agricultural research in light of topical and emerging issues including

climate change. The policy also recognizes that some areas in Malawi have remained persistently prone to natural hazards exacerbated by the impact of climate change, deforestation and environmental degradation. These include persistent dry spells and/or floods leading to low crop production and food shortages. The Draft National Agricultural Policy provides a multidisciplinary approach to climate change adaptation and mitigation through research, participatory approaches and collaboration. The major gap in the policy is that adaptation and mitigation measures are not addressed in all the provided thematic areas.. Although the policy includes the important aspects of climate change, it should be emphasized that there is need to harmonize all sector policies to have an all-inclusive policy framework that provides uniform and non-conflicting interventions in as far as addressing climate change is concerned. However, the implementation framework for addressing climate change is not supported by a corresponding budget and implementation frameworks.

3.8.3 Malawi National Land Policy 2002

Land is the most basic of all resources available for social and economic development in Malawi as it contains many resources including arable soils, forest, pasture, wildlife habitat and marine ecosystems that are valuable to people. At its formation, the national land policy did not explicitly cover climate change issues. However, in some thematic areas several issues that have a bearing on climate change adaptation are alluded to. In some areas, the policy supports ideas that increase or are more likely to lead to adaptation and mitigation against the impacts of climate change. The policy's objectives and priorities supports enhancement of conservation and community management of local resources, it sought to promote community participation and public awareness at all levels to ensure environmentally sustainable land use practices, and good land stewardship. Considering the environmentally sustainable land use aspects and good land stewardship, the policy fits in the emerging issues of climate change, if indeed awareness on the sustainable agricultural systems is to be done in a consultative and cross-sectoral way. In that way, the same policy can be seen to contribute to climate change adaptation. The land policy mentions sensitization of villagers on collective responsibility for land use planning, land conservation practices, protection of fragile all which point towards climate change adaptation and mitigation.The land policy takes note of the need for afforestation and re-afforestation programmes and highlights the key areas in which efforts have to be concentrated. The policy has through other components included aspects of climate change adaptation and mitigation. The policy does not have strategies to directly address climate change issues but highlights sustainable land use to balance the ecosystem. The policy however has to take credit for the inclusion of the environmental management for sustainable land use and agriculture.

3.8.4 National Irrigation Policy and Development Strategy 2000

Malawi's National Irrigation Policy and Development Strategy has components that address issues of climate change concentrating on adaptation and resilience. The policy, adopted in 2000,

covers the issues in its first three broad objectives. The first objective is to contribute to poverty alleviation by targeting resource poor smallholder farmers for irrigation development to enhance farm incomes and by supplementing the recommended strategies for rain-fed agriculture. By targeting resource poor farmers, the policy objective provides a solution to the groups that are heavily affected by climate change.

The second objective is to increase agriculture production and enhance food security through irrigation. This will ensure undisturbed production during droughts and the dry season. Irrigation serves as a mitigation measure in case of severe drought or unreliable rainfall patterns where agricultural operations are still able to continue with the irrigation support. This is in line with the Greenbelt Initiative which seeks to consolidate gains from other policies by intensifying irrigation farming. The first broad policy strategy is to identify areas with irrigation potential in order to increase land under irrigation. This strategy will ensure that there is progression in increasing reliance on predictable irrigation than rain fed agriculture which is unreliable due to weather variability and climate change. This is one of the components that address issues of climate change where it will cushion the hardships that are being faced by the rural farmers. However, there is no mention of climate change in the National Irrigation Policy and Development Strategy but it addresses issues that enhance climate change adaptation. It also contains themes which are core to climate change resilience and those that support other policies.

3.8.5 Food Security Policy of 2006

The Food Security Policy has an overall goal of improving food security of the population through increasing agricultural productivity as well as diversification of sustainable agricultural growth and development. The Food Security Policy recognizes the existence of the National Environmental Policy and advocates participation of all stakeholders in sound management, conservation and utilization of natural resources and the environment to achieve increased but sustainable productivity and development now and in the future. It also recognizes the adverse effects that natural disasters, such as droughts and floods have had on the country's national food supply situation. These are important points for both disaster risk reduction and climate change adaptation. The policy is silent on climate change adaptation and disaster risk reduction interventions to ensure food security considering that they cause significant challenges to food security. The policy only focuses on ensuring sustainable access to food and food availability which are less likely to be achieved if issues pertaining to climate change are given a blind eye.

3.8.6 The National Environmental Policy 2004

The overall policy goal is the promotion of sustainable social and economic development through the sound management of the environment and natural resources. The overall policy goal of the weather and climate sector 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, increase uptake of early warning weather and climate

data for disaster management. One of the objectives of the National Environmental Policy is to minimize the adverse impact of climate change and variability to reduce air pollution and greenhouse gas emissions. From the review of the guiding principles and the strategies for achieving this objective, one can observe that the policy is oriented towards mitigation and not adaptation. Though the policy relates its guiding principles to other sector policies it overlooks the issue of addressing climate change in the agriculture and related policies. The NEP does not include deliberate aspects that affect sustainable agriculture as it is drawn towards the environment in general.

Although the NEP was adopted in 1996 and revised in 2004 to ensure that sector policies in environment and natural resources are consistent with the principles of sustainable development, it does not harness the contribution that agriculture, fisheries, forestry, energy and water can make to both climate change mitigation and adaptation. Many of the sector policies were formulated before 2004, as such they have not benefitted from the new guidance provided by revised NEP. Other activities are to increase dissemination of weather and climate information for agricultural production, implementation of the Climate Change Convention and increase uptake of weather information by industry. The policy has strategies in place aimed at meeting the obligations of the United Nations Framework Convention on Climate Change (UNFCCC) such as promoting awareness on the Climate Change Conventions. Although this policy is the overall arching policy related to environmental management and how it related to agriculture, it is not explicit in defining how agriculture practices should be handled in the context of the environment. Its main focus is on land use management and avoidance of deforestation in an attempt to manage climate change issues.

3.8.7 The Crops Production Policy undated

Just as the other sector policies, the crops production policy does not mention climate change anywhere. It emphasizes on increasing production per unit area of land in all cultivated crops other than increasing the cultivated area. It prioritizes on research in high yielding varieties and advocates for crop diversification. These principles are also adopted in MGDS II under Agricultural productivity and diversification which is the first point in agriculture and food security as a key priority area. Even though the Crop Production Policy is outdated there is a negative relationship between the Farm Input Subsidy Programme and the Crop Production Policy in that poor resource farmers who access the fertilizer and seed subsidy tend to grow more of hybrid maize seed and reduce on production of food crops. This agrees with findings by Chibwana and Fisher (2011) who reported that farmers allocate 45% more land to improved maize seed and less to traditional crops than farmers who did not receive maize and fertilizer coupons. Thus much as the farm input subsidy programme has led to high maize productivity it may lead to reduction in crop diversification which ought to be promoted in the face of extreme weather variability such as drought and floods.

3.8.8 Seed Policy of 1993

The National Seed Policy was formulated in 1993 and it recognizes the contribution of good quality seed to improved agricultural production and diversification. Through the policy Government created conducive environment for development of the seed industry. Within this policy strong linkages were established between Government activities in research service providers, extension and commercial seed providers. The policy promotes, strengthens and supports the commercial sector while ensuring the needs of the farmers' are satisfactorily met. The Seed Policy has been overtaken by events of introduction of Multiparty Democracy in 1994 that led to the liberalization of the economy including coming in of several participants in the seed sector. This has resulted in several collaborative research with the Department of Agricultural Research with the objective of having their seed released through the Government controlled Technology Release Committee. In this way the practice by different seed stakeholders such as Monsanto, Seed Co., Pannar among others have been informed by policy.

Because the seed policy was formulated way back before issues of climate change were high up in government agenda there are no direct reference to practice related to climate change. However since drought conditions were still being experienced strategies in ensuring seed availability in the event of drought or man-made disasters greatly contributed to adaptation to climate change. The seed policy did not explicitly have any relationship with the Farm Input Subsidy Programme which commenced in 2005. Poor resource farmers were never provided with farm inputs between 1993 to 2004. The seed is very outdated and is being considered for review to include the issues that require attention in the present day.

3.8.9 National Water Policy 2004

The National Water Policy recognizes that Malawi has faced an increasing frequency of water-related disasters in the form of droughts and floods and pollution. The impact of these disasters is reflected in severe socio-economic, cultural disruption and dislocation facing the most vulnerable population of the affected communities. In its strategies under disaster management, it considers formulation of mitigation measures to reduce the impact of climate change and variability as a means of disaster preparedness and management. Being a water policy, it supports the National Irrigation Policy and Development Strategy, the Greenbelt initiative and other sector policies and as such it contributes to climate change adaptation although it does not outline the specific actions pertaining to the same. The Greenbelt Initiative clearly seeks to implement the irrigation policy to address issues of climate change and attain economic development through the agricultural sector. It also recognizes the need for environmental protection, but does not include any aspects of how sustainable land and water management that have a bearing on sustainable agriculture will be achieved.

To some extent the National Water policy addresses some climate change issues indirectly where is proposes incorporation of disaster preparedness and management to cope with climate change

and climate variability to minimize the impact of such changes on the socio-economic status of the nation, however, a report by CEPA (2012) noted that the policy only focuses on conservation and management of water resources. It does not provide for solutions to water crisis as a way of adapting to climate change such as rain water harvesting. Water harvesting in agriculture has the potential of doubling food production, and particularly in cultivation of cash-oriented horticultural crops. Other gaps in the policy include limited guidelines on settlements to reduce impacts of floods while at the same time avoiding degradation of watersheds.

3.8.10 Policy on Livestock in Malawi of 2006`

The policy on livestock in Malawi was adopted in 2006 and as such, one would have expected that the policy includes issues of addressing climate change since it came within the period when climate change became a prominent issue. The policy recognizes climate change as a risk but does not include any strategy or action to address the issue. Going through the policy shows that the policy makers were not informed on the issues pertaining to climate change or they did not conduct thorough consultations during the formulation process. Livestock is one of the key agricultural sectors to adapting to climate change since they are an alternative source of income and food security in cases of crop failure. Variations in weather and climatic conditions may cause adverse conditions for livestock survival. Floods, erratic rains, drought, and other factors may pose threat to the nutrition of the animals as well as come with new diseases.

3.8.11 National Energy Policy 2002

Malawi's energy consumption relies heavily on biomass with households consuming the greater portion of the energy budget. Agriculture is the second largest consumer of energy in Malawi, consuming about 12% of the final energy consumption. In view of this one would expect the energy policy as it relates to agriculture to clearly integrate aspects of climate change in order to allow energy consumption in the agriculture sector to be more sustainable. The energy policy has a clear reference to the UNCED Rio Conference and UNFCCC entered into force in 1994. The Kyoto Protocol of December 1997 formulated to reduce carbon dioxide and sulphur emissions to prevent the depletion of the O-zone layer was ratified by Malawi. So the Energy policy Government of Malawi promote the efficient use of energy resources with minimal adverse effects on the environment and climate change (i) Formulating environmentally benign energy projects that will take advantage of GEF and CDM funding window and (ii) Encourage and promote the use of more efficient energy systems to reduce emissions. The energy policy covers issues of climate change adaptation and mitigation and is very relevant in the agricultural sector development.

3.8.12 National Forestry Policy 1996 and National Forestry Programme 2005

The goal of the National Forest Policy is 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. Promote the establishment of nurseries by communities and individuals and increase the diversity of species; encourage and enhance community and individual marketing of seeds, seedlings and other forest products: and strengthen and maintain regular reward system for tree planting and improve the public information system. Even the National Forestry Programme of 2005 a supplement to the Forest policy does not adequate cover challenges to do with climate change adaptation and mitigation. As much as the policy does not state clearly issues of climate change, it has strategies that might assist in adaptation to climate change such as encouraging sustainable use of forest resources, encouraging tree planting and promoting agroforesty. The National Forestry Programme only focuses on the management of forestry resources involving local communities surrounding protected forest reserves.

3.9 NATIONAL INITIATIVES TOWARDS CLIMATE CHANGE

3.9.1 The Malawi Growth and Development Strategy II

Malawi, just like many developing countries, is vulnerable to effects of climate change. In recognition of this, Government has accorded special attention to climate change in this national development strategy (GoM, 2011). Due to the experience in food insecurity both at national and household level Government has put in place several sectoral and national policies and strategies to avert the food insecurity problem. In 2006, the Government of Malawi (GoM) in conjunction with its development partners developed the Malawi Growth and Development Strategy (MGDS) as a medium term development strategy for achieving Malawi's long term goals. The MGDS aspires to attain the Malawi Vision 2020 which was formulated in the late 1990s and the Millennium Development Goals (MGDs) especially Goal Number One, of halving extreme poverty and hunger by 2015. The MGDS recognizes that 'the prospects for economic growth in the medium- term will continue to be driven by the agriculture sector.'

The main thrust of the MGDS is to create wealth through sustainable economic growth and infrastructure development as a means of achieving poverty reduction. The MGDS is expected to transform the country from being a predominantly importing and consuming economy to a predominantly producing and exporting economy. Sectors have thus aligned sectoral activities to the MGDS framework and have also adopted program-based Sector Wide Approaches (SWAps). A programme based approach (PBA) was agreed in 2006 as a means for implementing priority projects in the agricultural sector and this led to the formulation of the Agriculture Sector Wide Approach (ASWAp). The main features of this approach are: (i) leadership by the host country; (ii) a single comprehensive programme and budget framework; (iii) a formalised process for donor coordination and harmonisation of donor procedures for reporting, budgeting, financial management and procurement; and (iv) increased use of national procedures for programme design, implementation, financial management, planning, monitoring and evaluation.

The Malawi Growth and Development Strategy II includes Climate Change, Natural Resources and Environmental Management as its ninth key priority area. It also recognizes climate change as a major challenge in achieving sustainable economic growth. In agriculture, the MGDS II notes that the major contributing factors affecting productivity in the smallholder farming sub-sector in Malawi is low input use, over-reliance on rain-fed agriculture, inadequate access to agricultural credit, inadequate access to output and input markets, and failures in technology development and transfer. This is further exacerbated by climate change effects such as erratic rains and droughts.

There are well laid out strategies on climate change management in the MGDS II section 9.1 that are very general but are very close to those outlined in the ASWAp framework and that they address climate change in a holistically. MGDS II emphasizes on the need for the country to mainstream climate change mitigation and adaptation measures in all sectors for improved resilience and sustainable development.

3.9.2 Malawi's National Adaptation Programmes of Action (NAPA)

NAPA is a comprehensive climate change strategy of government that clearly outlines issues of climate change and how they ought to be handled. The strategy was developed in 2006 and it clearly outlines strategies for drought preparedness, water harvesting and storage, capacity building in adaptation to climate change and climate change mitigation through development of appropriate technologies including food storage systems and new agriculture practices. NAPA is challenged by capacity both technical and financial in its implementation. The NAPA contains comprehensive strategies to address climate change with specific budgets. However, one notable problem is that the NAPA identified 15 priority and immediate priority needs for adaptation in various sectors. The large number of priority areas makes it difficult to implement due to budgetary constraints and institutional capacity constraint to implement the proposed activities.

It is hoped that as the Malawi Government finalizes the Draft Climate Change policy taking advantage of building on the policy documents such as the Malawi Growth and Development Strategy (MGDS) II, the National Adaptation Programme of Action (NAPA), the National Environmental Policy (NEP), and the National Energy policy as these policy documents could shade light on the challenges to be anticipate so that effective strategies are put in place. Climate change imposes additional costs on development budgets. For example, climate change adaptation measures have not found their way into national budgetary framework; they rely heavily on external assistance mostly implemented by civil society. It is critical to devise sustainable funding mechanisms for climate change adaptation and mitigation by including a share in the national budget to ensure that funding from development partners just complement national budget.

3.9.3 Malawi Poverty Reduction Strategy Paper (MPRSP)

Agricultural research institutions have developed technologies that have not been fully adopted by smallholders because of high costs of technology and inadequate linkages between research and extension. Some of the issues that have been earmarked as strategies to poverty reduction especially concerning agriculture draw much on research that in real effect contribute a lot to climate change mitigation. Areas such as irrigation, crop diversification, improved crop varieties and livestock breeds are research areas stated that address climate change issues. The MPRSP provides for a good approach to delivery of extension services that involves NGOs, private sector and the government extension system. The MPRSP has no mention of climate change but it recognizes that environmental degradation is an issue that needs to be addressed to achieve sustainable development, it is therefore necessary to review the strategies with consideration climate change is a major challenge in the fight against poverty in an agro-based economy like Malawi.

4.0 LINKAGE OF AGRICULTURAL PRACTICES, RESEARCH AND POLICY

4.1 Stakeholders in Climate Change and agricultural research

Several agricultural research studies and practices are being implemented in Malawi to address issues of climate change to improve resilience of small holder farmers to climate change and increase agricultural production. The Malawi Government, private sector, Faith based groups and non-government organisations have responded positively to the effects of climate by involving research in innovations that can address issues of climate change. Department of Agricultural Research and Environmental Affairs Department do conduct research on climate change issues in collaborations with several stakeholders (Table 2).

Table 1: Government Stakeholders in agricultural research on climate change and policies

	Name of Organisation	**Type of organisation**	**Focus area**
1	Agriculture Extension Trust (ARET)	Research Institute	Tobacco Research
2	African Development Bank	Economic Institution	Economic Development
3	Catholic Development Commission In Malawi	Faith-based organisation	Food security
4	Care International	International NGO	Agriculture and natural resources
5	Coordination Union for the Rehabilitation of the Environment	Local NGO	Natural resources and environment
6	Civil Society Network on Agriculture (CISANET)	Network of agric organisation	Agriculture
7	Civil Society Network on Environment & Climate Change	Network for environmentalists	Environment
8	Danish Church Aid	Faith-based organisation	Human rights, food security

9	Evangelical Lutheran Development Programme	Faith-based organisation	Food security
10	European Union	Donor partner	Food security, Natural resources, infrastructure development
11	Food and Agriculture Organisation	United Nation org	Agriculture, environment and natural resources
12	International Institute for Tropical Agriculture (IITA),	CGIAR centre	Tropical crops
13	European Union,	Development Partner	Food security, natural resources and Infrastructure development
14	International Food Research Institute	CGIAR centre	Food security
15	International Centre for Research in Semi Arid Tropics (ICRISAT)	CGIAR centre	Tropical legumess
16	Irish Aid	Donor partner	Food security, natural resources
17	Farmers Union of Malawi	Farmers organisation	Agriculture networking
18	LEAD	Research Environmental Network	Research and training in environmental issues
19	LUANAR (Bunda)	Academic tertiary institution	Agriculture and Natural Resources Teaching and Research
20	National Association of Smallholder Farmers in Malawi	Farmers organisation	Small holder agriculture production
21	Self Help Africa	International NGO	Food security
22	OXFAM	International NGO	Food security, environment
23	Norwegian Embassy through NORAD	Development Partner	Environment
24	Wildlife and Environmental Society of Malawi	Local NGO	Natural Resources
25	World Agroforestry Centre	CGIAR centre	Trees, soil fertility, food security
26	World Bank	Donor	Agriculture, Climate Change, Natural Resources
27	United State Agency for International Development (USAID)	Donor	Food security, natural resources & environment

The Government of Malawi relies on institutional research funded by different organizations to inform agricultural practices because public expenditure on agricultural research and extension is currently low (GoM, 2011). The Lilongwe University of Agriculture and Natural Resources (LUANAR), Universities of Malawi and Mzuzu University are currently running some short courses and conducting some research related to the environment and climate change issues. These include: “Mainstreaming Climate Change Adaptation and Mitigation in Sectoral and National Development Plans and Strategies in Malawi”, Mainstreaming climate change adaptation in agriculture and natural resources, Capacity building in Managing Climate Change in Malawi (CABMACC) at Bunda: testing of ethanol stoves; design of solar thermal systems, development of a wind generator for rural water supply; development of an improved charcoal kiln; development of a portable model biogas plant; and development of a solar refrigerator at the Polytechnic and Chancellor “Strengthening Local Agricultural Innovation Systems in Less

Favoured and High Potential Areas of Tanzania and Malawi to Adapt to the Challenges and Opportunities Arising from Climate Change and Variability". In addition Malawi has collected some data in climate system atmosphere, hydrosphere, biosphere and geosphere from as early 1901 and used it in developing scenarios that would inform agricultural practice and policy. There is no single institution in Malawi that is specifically mandated to conduct climate change research. However, the National Commission for Science and Technology (NCST) is involved in coordinating research activities in Malawi but in most cases research activities related to climate change are conducted by Department of Agricultural Research Services (DARS) in the Ministry of Agriculture and Food Security. Research in climate change systematic observation is mainly carried out by Department of Climate Change and Meteorological Services in the Ministry of Environment and Climate Change Management and supported by the Department of Water Resources (DoWR).

4.2 Department of Agricultural Research Services

The Department of Agricultural Research Services **(**DARS) is the only Government Department whose mandate is to conduct agricultural research in Malawi. Since the Agriculture Sector is highly vulnerable to climate change, some research on climate change-related topics have been conducted, including: (i) crop response and performance under drought and soil-water stress conditions, (ii) breeding crop varieties and cultivars that are tolerant to drought and low soil fertility (especially nitrogen) conditions, and (iii) soil and water conservation measures and practices to control soil erosion, hence the siltation of rivers. The need to conduct climate change research by DARS within the Soil Physics Unit, which has in the past conducted some research on climate-related topics, and has been a repository of climate data from various agricultural sites in the country, is more urgent now that any other time in the past.

Some of the research that is informed by policy include "Developing Appropriate Agricultural Technologies for Mitigating and Adapting to Climate Change in Different Agro-ecological Zones of Malawi" that is coordinated by the Department of Environmental Affairs with collaborators from Water and Irrigation Department and Department of Agricultural Research. Other stakeholders in the project are (i) Department of Water Supply (DoWS), (ii) Local communities in districts affected by floods and droughts; (iii) District Assemblies (DAs), (iv) Department of Energy Affairs (DoEA), (v) Electricity Supply Corporation of Malawi (ESCOM), (ix) Donors partners. The project is aimed at develop appropriate, environmentally-friendly and agricultural technologies to increase crop and livestock productivity among resource poor farming communities through the following:

(i) screening and developing high yielding crop cultivars of cereals (maize and sorghum) and legumes (beans, groundnuts and soybeans) that are tolerant to droughts and low soil fertility,

(ii) developing organic and inorganic fertilizer management strategies that optimize crop yields under limiting soil-water conditions,

(iii) integrating cereals with legume to improve soil fertility through Biological Nitrogen Fixation (BNF),

(iv) developing irrigation water management practices for irrigated winter cropping and supplementary irrigation in summer,

(v) developing soil and water management practices that conserve water,

(vi) developing, calibrating, validating and testing computer simulation models for forecasting crop yields based on soil, weather and crop management factors

4.3 Strengthening Research on GHGs, Mitigation and Adaptation

At a global level, agriculture contributes 20% of the total anthropogenic GHGs emissions, 50% of CH4 emissions from enteric formation and paddy rice cultivation, and 70% of N2 O emissions from artificial fertilizer applications. At regional level, Malawi has the least emissions of GHGs compared with the neighbouring countries of Tanzania, South Africa and Zimbabwe (Table 3)

Table 2: Agricultural greenhouse gas (GHG) emissions in the southern Africa region

	Name of country	Amount of GHG emission (Gg)
1	Malawi	3,750.00
2	Zimbabwe	5,876.00
3	South Africa	21,683.00
4	Tanzania	33,284.00
5	Global	36,300,000.00

Source: **CEEST, 1999**

In an effort to strengthen research in on green house gases (GHGs), Mitigation and Adaptation Ministry of Agriculture is involved in: (a) the introduction of biogas digesters using manure, (b) the production of fertilizer from manure to supplement inorganic fertilizers, and (c) introduction of Bio-fuel crops such as *Jatropha curcas* on commercial basis.

4.4 Agricultural Practices by Stakeholders and Agricultural Policy

The Department of Agricultural Research in the Ministry of Agriculture has critical mass of capacity at professional level to deal with climate change issues and develop technologies that will mitigate climate change impacts but there are a lot of vacancies that is affecting its ability to develop the technologies in line with the demand. This is worsened by the inadequacy of

equipment to be used in the trials. Most of the equipment including those in the laboratory are obsolete and are expensive for the department to replace them. In line with climate change, the Department of Climate Change and Meteorological Services does not have state of the art equipment for production of early warning systems to bring awareness to farmers on eventualities. International agricultural and environmental organizations have supported research that deals with climate change adaptation and mitigation. For instance Food and Agriculture Organisation, World Agroforestry Centre, World Bank, UK Department for International Development (DFID), Unites States Agency for International Development (USAID) supports research work in climate smart agriculture with focus on increasing resilience of farmers to the effect of climate change. Government research benefits from collaboration with different institutions since public expenditure on agricultural research and extension currently very low. This is happening in time when major investments are needed to revitalize the research and extension services if they are to address the challenges faced with climate change among other challenges. A recent national survey revealed that only 13 percent of agricultural households got advice from an agricultural adviser on crop and input management. The inadequate extension services have implications on the extent to which research and technology developed can be disseminated, adopted and efficiently be used by smallholder farmers (Malawi Government, 2011; Chirwa et al, 2008). The government has supported the coming in of the private sector and international organizations to bring interventions that address issues of climate change.

Agriculture practice in the private sector is well supported and follows a good extension network. For example, the seed sector has over time adjusted to the changing needs of the farmer in response to climate change. Extensive research in high yielding crop varieties, early maturing, drought tolerant and disease resistant crops have been conducted resulting in the release of new seed varieties with these favourable traits. Stakeholders in the seed industry have formed an association dubbed Seed Traders Association of Malawi which is responsible for coordinating activities of seed production and marketing. However there is still lack of guiding policy so that issues tackling seed in the face of climate change might be addressed.

4.5 Agricultural practice by farmers

From adaptation practices in both villages, the mostly practiced adaptation in is the planting of trees and grass along river banks. Other practices included practicing irrigation farming, relocation to upland areas, construction of drainage canals and embankments and crop diversification and practicing of conservation agriculture (Figure 6). For Ndindi village, there is need for intensive crop diversification to reduce the effects of drought on households who mostly rely on agriculture as a source of livelihood.

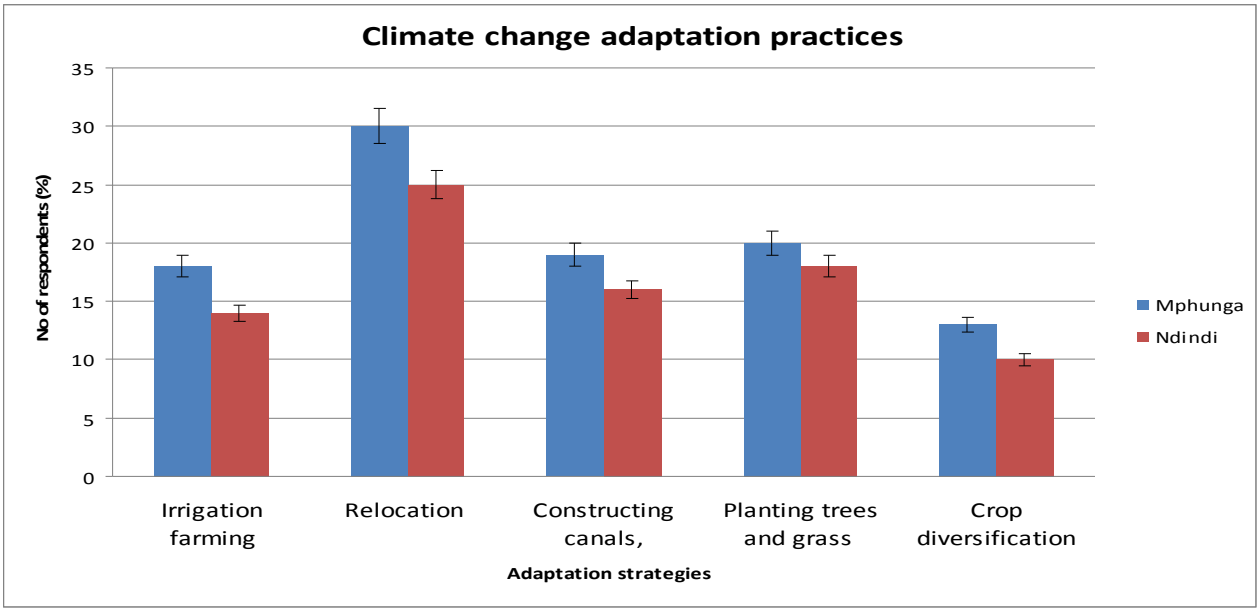


Figure 6: Agriculture practice as adaptation strategies to climate change in two villages in Malawi

Focus group discussions with members of the two communities provided a long list of agricultural practices for climate change namely conservation agriculture, irrigation farming, manure making, rain water harvesting, agroforestry, use of early maturing crop varieties. Regarding the processes through which the practices were introduced, all the respondents indicated that the first step was to conduct awareness meetings to sensitize communities on the practices then demonstration plots were mounted at different Extension Planning Areas (EPAs) in the district for observation. Farmers would then adopt the practices and implement on the agricultural fields. Therefore, from the study, the extent of practices is seen to be informed by research. The practices are promoted by Government departments mainly Land Resources Conservation Department and the Department of Agricultural Research. Non Governmental Organisations such as Concern Universal, Total Land Care, Training Support Programme, OXFAM, World Agroforestry Centre and other NGOs promote most of these agricultural practices. However, as a matter of Government policy most practices have to be demonstrated through research that they deliver such that most technologies are first subjected to the Technology Release Committee in the Department of Agricultural Research Services for evaluation before being released for adoption by the farmers. This therefore necessitates research and multi-location trials to evaluate the practices. This clearly shows that most of the agricultural practices by farmers are emanating from research and are informed by different policies in the agricultural sector.

4.6 Challenges faced by agricultural related institutions in implementing policies

Malawi has several policies that should have articulated climate change issues in relation to agricultural practices. Stakeholder consultative meetings and focus group discussions with farmers revealed that implementation of the various policies and strategies facing several challenges including:

1) Excess vacancies in the Ministry of Agriculture affecting its ability to develop the technologies in line with the demand.
2) Inadequate research facilities including obsolete equipment for provision of weather data.
3) Inadequate funding to meet the national demand of production of technologies that will be useful in adaptation and mitigation against climate change.
4) Rising costs of research inputs including fuel due to high inflation rate. This affects planning and implementation of programmes and consequently delaying the attainment of the set targets during planning.
5) Poor coordination in implementation of programmes especially those related to environment and climate change adaptation.
6) Limited use of evidence and science based information to guide policy and agricultural practice.
7) Competition for resources between climate change adaptation technologies in crop and livestock systems for example while crop officers encourage farmers to leave maize stalks in the field to enhancing soil fertility and conserve soil moisture livestock officers promote use of maize stalk as fodder for livestock production.
8) Failure to incorporate indigenous knowledge from local communities/ farmers into the climate change adaptation and mitigation technologies.

5.0 CONCLUSIONS AND RECOMMENDATIONS

5.1 Conclusions

This study was conducted with the objective of determining the extent to which the agricultural sector policy integrates with climate related agricultural research to influence agricultural practices in Malawi and also to focus on the effectiveness of the policy to mobilize resources available under various international climate financing activities. From the analysis, most of the policies in the agricultural sector do not explicitly cover issues of Climate Change adaptation and mitigation, issues of environment and climate change are just stated in passing. Overall, there are inadequate and ineffective strategies, systems and programmes for adapting to and mitigating against climate change in Malawi especially with regards to agricultural development and food security. Malawi does not have explicit mechanisms that address climate climate change and issues that link policy, research and practice. Strategies to address climate change issues are scattered in different policy documents and there is no proper coordination of implementation of programmes. There are very few specific strategies on climate change adaptation and mitigation which may have been informed by local research and practice. Most of the practices being implemented have been developed elsewhere and adapted to Malawi. The agricultural sector policies related to climate change adaptation and mitigation do not have concrete financial mechanisms and budget allocations for implementation of the different strategies. The national budget allocations do rarely have components to deal with climate change research for agricultural development. For instance, the very good NAPA does not have financing mechanisms to implement the proposed strategies but relies on external support from donor organisations and civil society.

The study has noted the lack of effective mechanisms to coordinate the implementation of the various interventions to address climate change by several government departments, civil society and non-governmental organisations to address climate change adaptation and mitigation. There is an inherent weak link between researchers and policy makers such that unless there is active lobbying that involves donor partners, Civil Society, Department of Agricultural Research important research work does not find its way into the policy making process.

Agricultural practice by producers, partners like civil society, non-governmental organizations is greatly influenced by the type of organization promoting specific agricultural practice where collaborative implementation of practice among Government technocrats, Non-governmental organizations and Scientists result in greater impact and acceptability of practice and lead to policy. The agricultural sector policies and natural resource management policies are closely linked. However, issues of climate change adaptation and mitigation have not been well articulated. It is the wish of the researchers that the draft Climate Change Policy will harmonise the issues covered in the different sector policies. There is need to harmonise the agricultural

sector policies with any policies dealing within climate change for the effective in implementation of strategies.

Most of the agricultural sector policies reviewed over 80 percent are formulated reviewed between 1993 and 2006. During this period very little was known about climate change phenomenon or at least there was not much advocacy and awareness of issues if climate change. As a consequence formulators of the agriculture related policies by then did not include issues of climate change hence why most of our policies under review lack mainstreaming of climate change issues. There is moderate linkage between research, innovation and application in practice. However most research activities are donor driven which bring challenges in sustainability and further implementation of evidence based research work after donor support ceases.

5.2 Recommendations

1) Government should mainstream issues of climate change adaptation and mitigation into agricultural sector policies and policies must be informed by current research taking into account the views and concerns of farmers as the ultimate beneficiaries. There is urgent need to review and harmonise agricultural policies and programmes and formulate a sector based policy that will bridge the gaps in the related policies

2) The best practices emanating from efforts of research institutions should be integrated into the agriculture practice by involving the Agricultural Extension to develop messages for implementation of best practices to harness agricultural productivity and opportunities for farmers and consumers.

3) Stakeholders in the Ministry of Agriculture, CGIARS, academic institutions and donor partners should strengthen their links and cooperation to undertake quality relevant research that should inform policy.

4) Since most of the agricultural sector policies have been reviewed are older than six years or just about clocking six years they are due for review and therefore during this process climate change issues should well be integrated and mainstreamed including key aspects such as developing early warning systems, capacity building of key institutions and personnel, developing drought and flood recovery programs and strategies within the policy will be critical in making Malawi ready for eventualities of climate change and variability.

5) Government must endeavour to maintain a healthy relationship with donor partners by creating conducing environment such as practice good governance, accountability in implementation of agriculture sector policies to meet different obligations.

6) Government projects should finalise the formulation and launch the National Climate change Policy for effective implementation of strategies related to adaptation and mitigation that affect the agricultural and related sectors.

7) There is strong need to review some of the policies to include issues on climate change alternatively the climate change policy under development should cover strategies focussing on adaptation and mitigation in the agricultural related issues as the agricultural sector is heavily impacted by climate change.

8) The Draft National Agricultural Policy should act like a reference to other agricultural sector policies as they are being implemented take advantage of cross cutting issues such as climate change.

9) Government has to show its commitment to research and extension by allocating adequate financial and material resources to research institutes to improve on adoption of innovations that are socially acceptable and address the needs of the users.

10) Government must ensure that donor projects and financial support to the agriculture sector have identified strategies, entry points into programmes in a given time and ensure sustainability of project activities by adequate capacity building of local personnel.

11) The agriculture sector should be capacitated both in human, equipment and logistical resources to strengthen research and extension services to promote agricultural practices that improve climate change resilience.

6.0 BIBLIOGRAPHY

Aberman N .L, Johnson M, Droppelmann K, Schiffer E, Birner R, Gaff P (2012). Mapping the Contemporary Fertilizer Policy Landscape in Malawi. IFPRI. Development Strategy and Governance Division.

Africa Development Bank (2013). Malawi Country Strategy paper 2013 to 2016

Centre for Environmental Policy and Advocacy (CEPA), (2012). Policy Framework for Climate Change Adaptation and Disaster Risk Reduction in Malawi: A Review of Key Policies and Legislation.

Chibwana C and Fisher, M. (2011) Cropland allocation effects on agricultural input subsidies in Malawi. World Development 4(1): 124-133

Chirwa, W., Kumwenda I., Jumbe C., Chilonda, P., and Minde, I. (2008). Agricultural Growth and Poverty Reductionin Malawi: Past Performance andRecent Trends. ReSAKSS Working Paper No.8

Conroy, Annie. C., Malcolm J. Blackie, Allan Whiteside, Justine C Malewezi and Jeffrey D Sacks. (2007) POVERTY, AIDS and HUNGER – Breaking the poverty trap in Malawi. Palgrave, Macmillan

Douillet, M., (2012).Trade and agricultural policies in Malawi: Not all policy reform is equally good for the poor.

Droppelmann K., Mapila M.A.T, Mazunda J, Thangata P. Yauney J (2012). Who talks to whom in African Agricultural Research Information Networks? The Malawi Case. IFPRI Development Strategy and Governance Division

Government of Malawi, Ministry of Agriculture and Food Security, The Agriculture Sector Wide Approach (ASWAp), Malawi's prioritised and harmonised Agricultural Development Agenda, Lilongwe, 2010.

Government of Malawi (2011), Annual Economic Report 2011, Ministry of Development Planning and Cooperation

Government of Malawi (GoM) (2011), Malawi Growth and Development Strategy II: 2011 - 2016, Lilongwe, Malawi: Ministry of Development Planning and Cooperation.

Mucavele F. G., (2012). True Contribution of Agriculture to EconomicGrowth and Poverty Reduction: Malawi, Mozambique and Zambia Synthesis Report

Muhome-Matita, M., and Chirwa E. W., (2011). Agricultural Growth and Poverty in RuralMalawi Final Report. AERC Collaborative Research Project on Understanding the Links between Growth and Poverty in Africa.

NSO (2005) Integrated Household Survey 2004 – 2005, Zomba: National Statistical Office

Phiri, A. and Pound, B. (2010). Longitudinal Impact Assessment Study of Fair trade Certified Tea Producers and Workers in Malawi.

Timmer, C. P. (2005) 'Agriculture and Pro-Poor Growth: An Asian Perspective' Working Paper Number 63, Centre for Global Development, Washington, DC.

USAID Country Profile (2012).Malawi - Property Rights and Resource Governance

World Bank (2003) Malawi Country Economic Memorandum: Policies for Accelerating Growth, Washington DC: World Bank

APPENDIX 1: SELECTED INSTITUTIONS VISITED

No.	Name of Institution	Contacts
1.	Food & Agriculture Organisation	Box Lilongwe
2.	International Food Policy Research Institute (IFPRI)	Box 3466, Lilongwe
3.	International Institute for Tropical Agriculture	Box Lilongwe
4.	Centre for Environmental Policy and Advocacy (CEPA)	Box 1057 Blantyre
5.	Ministry of Agriculture Headquarters	P.O. Box 30134, Lilongwe 3
6.	National Commission for Science & Technology	Lingadzi House, P O Box 30745 Lilongwe 3.
7.	IRLAD Project	P.O. Box 1188, LILONGWE
8.	Rural Infrastructure Development Manager (RIDP)	P.O. Box 1071, LILONGWE
9.	ANAMARC	P / B 107, Lilongwe
10.	World Bank,	P.O. Box 30557,LILONGWE 3
11.	Civil Society Agriculture Network (CISANET)	P.O. 203, LILONGWE
12.	Farmers Union of Malawi	P.O. Box 30457, LILONGWE
13.	Irish Aid, Irish Embassy	
14.	Zodiak Radio Station	
15.	Center for Public Research & Analysis International Development Policy,	P.O. Box 31845,LILONGWE 3
16.	Land Resource Centre Natural Resource Management	P.O. Box 30291,LILONGWE 3
17.	Concern Universal	P.O. Box 1535, BLANTYRE
18.	Evangelical Association of Malawi	P.O. Box 30296, LILONGWE
19.	Extension and Rural Development	Bunda College, P.O. Box 219,LILONGWE
20.	Ministry of Agriculture and Food Security	
21.	Policy and Development – Smallholder Farming	P.O. Box 30716, LILONGWE 3
22.	Department of Natural Resources Management	Bunda College, P.O. Box 219 Lilongwe
23.	ICRAF World Agroforestry Centre	P.O. Box 30798, Lilongwe 3, Malawi
24.	Nation News Paper	
25.	Bunda Extension Department	Bunda College, P.O. Box 219 Lilongwe
26.	Department of Agricultural Research	Chitedze Research Station,

		Lilongwe
27.	Training Support Programme	
28.	Environmental Affairs Department	Lingadzi House, Private Bag 394, Lilongwe 3
29.	Forestry Department, Nkhalango House	Nkhalango House, Lilongwe 3
30.	Forestry Research Institute of Malawi	Box 278 Zomba
31.	Agricultural Development Division ADD	Blantyre ADD, P.O. Box Blantyre
32.	Land Resources Department	
33.	Energy Department, Lilongwe	
34.	Fisheries Department	
35.	Forest Research Institute of Malawi	P.O Box 270 Zomba, Malawi

APPENDIX 2: CHECKLIST FOR KEY INFORMANT INTERVIEWS – GOVERNMENT INSTITUTION

INTERVIEW GUIDE: PUBLIC INSTITUTIONS

Assessment of agricultural sector policies and climate change in Malawi – the nexus between climate change related policies, research and practice

Background information

Name of interviewee:	Date of interview:
Position of interviewee:	Name of Interviewer:
Interviewee's institutions:	Interviewee's ID no.:

Thank you so much for meeting with me today. My name is [name]. The African Climate Policy Centre (ACPC), based in Addis Ababa, Ethiopia and the Lilongwe University of Agricultural and Natural Resources, (Malawi), are conducting a study *to map out and assess the adequacy of current climate change-related agricultural policies and how such policies enhance or impede agricultural research and development and the adoption of appropriate agricultural practices on the ground* in Malawi. As part of this study, we are talking to a range of stakeholders including policy makers, program managers, donors, Civil Society Organizations (CSOs) in order to gain an in depth understanding of the nexus between climate change-related agricultural policies, research and practice, identify key challenges in the policy discourse, and make recommendations for improving the formulation of agricultural policies in the wake of climate change in the country.

I have requested an interview with you because we believe that in your position as [position/job title] in [name of office], you will provide useful perspectives and insights on these issues, and I look forward to learning from you today. I have some guiding questions, but want you to feel free to talk about anything you think is important for us to know. I will be taking notes as we talk to be sure I don't miss anything. Is that right?

Before we get started, I just want to emphasize that everything we talk about today is confidential. No one will have access to the notes I am taking except for those of us working on the project. When we write up our report, we will not use the name of any interviewees so that no one can be identified. Also, if at any point during the interview you would like to stop, or if there are any questions you would rather not answer, just let me know - that's fine. Is there anything you'd like to ask me at this point? [Answer any questions regarding the interview].

Please, let me know if it is fine for us to proceed with the interview.

YES_____ NO_____

A. WORK ON AGRICULTURAL RELATED CLIMATE CHANGE POLICIES

1) What are the policies which are currently in place that address issues of climate change? List the policies.
2) Which of these policies were developed in line with the aim of addressing climate change? Please give details.
3) What prompted the need for these policies to be developed?
4) How were these policies developed? Give details of the process which was done to come up with the policy.
5) Who are the stakeholders involved in developing the policies? List role played by stakeholders in developing the policies.
6) Do these policies fit in with the national and sectoral development frameworks? Give details.
7) How were target groups (beneficiaries) involved in developing these policies?
8) How long did the process of developing each of the policies take?
9) Was there any need to have any legislation on the policy before it was put in place? Have Acts been passed by Parliament?
10) What specific strategies are contained in the policies to address climate change?
11) How was the ministry/department involved in the monitoring the implementation and monitoring of the policies?
12) What are the impacts of the policies on the target groups?
13) How has this impact contributed to the target group (beneficiaries) and the nation as a whole?
14) Is there been any need to review these policies to address the current climate change challenges?
15) What linkages have these policies had with other sectors policies which contribute to addressing climate change?
16) What challenges have you been facing as the ministry implementing these policies?
17) As the implementing ministry, are you satisfied with how programmes in line with the policies have been implemented to meet the intended goals? Give details for your response.

PART B: TITLE OF ADAPTATION INITIATIVE/ACTION

Does any action or measure exist in your area with regard to adaptation to climate change impacts? If yes, please add the following more detailed information, for each of these actions or measures. Summary description (what is the adaptation action/initiative?)

Objective of the measure	Brief description of adaptation initiative	
Relevant subsector		Demand management (e.g., regulation, metering, education)
		Supply management (e.g., irrigation, leakage, new capacity)
		River flood risk management (e.g. planning, infrastructure, early warning)
		Water quality (e.g. regulation, abstraction quotas)

		Hydrological cycle management (e.g., hydropower, dams, inland shipping)
		Other (e.g. fisheries, recreation, conservation)
Administrative and management scale	national, district, area specific	
Geographical location	Where is the adaptation initiative taking place?	

1. Adapting institution(s) (who is involved?)

Institution	Name of organization/government department, etc.
Ownership	Public, private or non-governmental organization (NGO)
Key stakeholders	Public/private sector organizations, communities, individuals

2. Adaptation process (how does adaptation take place?)

Type of adaptation		(i) Building adaptive capacity (e.g. research, mapping and modelling impacts and vulnerability, risk assessments, planning/strategy development, developing and participating in networks, awareness-raising, training)
		(ii) Policy – including new/revised legislation, bills, Acts of Parliament, etc.
		(iii) Operational – physical or managerial implementation of adaptation measure(s)
Purpose	Is climate change adaptation the main objective (i.e. intentional) or an unplanned side-effect of a different initiative?	

Triggers and drivers	What stimulated the adaptation initiative? (E.g., weather event, policy/legislation, research results, risk assessment, cost-benefit analysis)
Decision-making process	Who makes the decision to adapt? Who decides how to adapt? What, if any, criteria are used to evaluate and prioritize adaptation options? What roles do stakeholders play?
Key information sources	What are the key information sources for informing decision-making?
Funding sources	What financing mechanism is used? Who is paying for the initiative – are those who benefit from measures involved in the financing (e.g. charges)?
Obstacles	Which obstacles were met during the planning or implementation process?

3. Evaluation of Adaptation

PART C: Further information

4. The following table provides a decision framework on climate variability and climate change. Please indicate the type of climate information you use or would like to use for which type of decisions.

Type of decision	• Climate		• Weather
	Long term (10–50 years)	Medium term (6–9 months)	Short term (0–10 days)
	Decadal changes	Seasonal Forecasts	Real time
Strategy/policy			
Planning			
Operational			

D. SYSTEMS AND PARTNERSHIPS

Planning

1) How is planning for Climate Change undertaken?
2) What are the organizations that you collaborate with in research and practice
3) To what extent are people in the agricultural sector departments involved?
4) To what extent do professionals and key stakeholders in agriculture get involved in developing climate change policies and strategies and vice versa?

Staffing, Human Resource and Capacity Development

1) What is the level of technical capacity in climate change work and agricultural research?
2) What are the training needs in climate change?
3) Does training on Climate Change integrate role of agriculture and food security?

Funding/Budgetary Support/Partnerships

1) Who are the main funders of climate change in Malawi?
2) What activities do they fund? (i) To the government (ii) CSOs (iii) Private sector

Logistics and Supplies

1) What are the main challenges in obtaining and distributing supplies for addressing agriculture and food security issues e.g. farm inputs?
2) What is being done to address these challenges in climate change response?
3) What is the extent of uptake of research practice implemented by the different organizations (i) Government Researchers (ii) Civil Society (iii) CGIAR Centre (iV) Collaboration of the three

Monitoring and Evaluation (M&E)

1) How do you measure your process and outcome indicators in climate change network?
2) How is the reporting done?
3) What challenges do you face in monitoring and evaluation climate change work?
4) What about monitoring and evaluation of population change issues?

If the public institution works on both agricultural development and food security and climate change:

1) How do you integrate the M&E systems and indicators for agricultural development and climate change?
2) What challenges are you facing on this?

Legislative/Legal Issues

1) Is there a legal framework governing climate change in Malawi?
2) How has the law changed things?
3) Are there contentious issues in relation to Climate Change?

Partnerships

1) What are the keys roles that NGOs play in climate change issues, especially, in agriculture and food security?
2) What about the private sector?
3) How can these roles be enhanced?

FEEDBACK AND DISSEMINATION

1) In disseminating public agricultural research what are the channels of dissemination used by your institution.
2) Which channels of dissemination of research are effective in influencing practice
3) Would you be interested in giving feedback to the draft of our report on this project?
4) What advice would you give us in order to make this report most useful?
5) Probes: specific issues to highlight
6) Phrasing of the report
7) Key people to target [e.g. send the report to]

CONCLUDING REMARKS

I just have some final questions for you: given your knowledge and experience as a [position/job title] in the [name of office], what is your overall impression of the adequacy and effectiveness of policies and strategies, systems and programs for climate change in Malawi especially with regards to agricultural development and food security?

Please provide key recommendations that would help improve work on: Climate change; Agricultural policies, research and practice; and Integrations of the two issues.

Finally, remember, you're the expert and I am the learner – given my interest in understanding climate change, are there any important issues that I have not asked you about Climate Change? Do you have any questions for me?

CONTACTS AND REPORTS

Are there any relevant reports of work that your organization has supported on Climate change and Agricultural development? Please, give provide copies of the reports or give details on how I can access them.

That covers the things I wanted to ask. Is there anything you would like to add?
Thank you so much for your time. I've really learned a lot from you today and I really appreciate your insights.

University of Malawi

Bunda College of Agriculture

APPENDIX 3: AN INVENTORY OF AGRICULTURAL PRACTICES BY FARMERS AND HOW THEY INFLUENCE AGRICULTURAL POLICY IN MALAWI

The main objective of the tool is to collect information from relevant stakeholders on how agricultural practice and actions by agricultural producers, partners such as Non-Governmental Organisations inform and get influenced by the agricultural policy

MODULE 1: IDENTIFICATION

101 Name of District _____

102 Name of respondent and their positions

103 Type of agricultural practice for climate change_____

104 Sector in which technology is used Code: |____|1= Agriculture, 2= Forestry, 3= Natural Resources Management/Environment

105 Date of interview |___|___||___|D / M / Y

106 Name of Enumerator_____

MODULE 2: AGRICULTURAL PRACTICE/TECHNOLOGY INTRODUCTION

201 Who introduced the agricultural practice to reduce effect of climate change?

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_____
_____
_____

202 Where was the technology or agricultural practice developed?

_____
_____

203 What were the processes of technology introduction

_____
_____
_____

MODUEL 3: AGRICULTUREAL PRACTICE DESCRIPTION

301 How is the agricultural practice/technology utilized?

_____
_____

302 Where is the practice/technology utilized? _____

303 Who is utilizing the technology?

_____
_____
_____

304 How long has the agricultural practice been used?

_____

305 How effective is the agricultural practice/technology?

_____
_____

MODULE 4: MATERIALS, SUPPORT AND BACKUP SERVICES

401 What are the materials required for agricultural practice implementation?

_____
_____
_____

402 What are the associated costs?

_____
_____

403 Who provided the financial support?

_____

404 Are there backup services?

_____
_____

405 What was the contribution to the development of the practices (involvement)?

_____
_____
_____

406 Has the technology been commercialized?

_____
_____
_____

407 What are the benefits of the technology when used as commercial products?

_____
_____

408 Who are the clients?

_____
_____

MODULE 5: DISSEMINATION AND OUTREACH

501 How do get the information on the agricultural practice_____

502 How do you as farmers know about the agricultural practice (i) Fellow farmers (ii) Agricultural Extension Workers (iii) NGO workers (iv) From the radio

_____
_____

503 What are the challenges associated with adoption of practices related to climate change in agriculture

_____
_____

MODULE 6: TECHNOLOGY/PRACTICE AND CLIMATE CHANGE ADAPTATION/MITIGATION

601 What was the main purpose for the development/introduction/adoption of the practice?

_____
_____

602 Are there any immediate environmental concerns regarding the use of agricultural practice for adapation to climate change?

_____
_____
_____

603 Are there any immediate social/cultural concerns regarding the use of the agricultural practices?

_____
_____
_____

604 What has been done to address the concerns mentioned above?

_____
_____

APPENDIX 4: MATRIX SHOWING REVIEW OF AGRICULTURAL SECTOR POLICIES IN VIEW OF ISSUES OF CLIMATE CHANGE

Name of Policy and Timeframe	Review				Assessment		
	Policy Objectives in terms of climate change	**Specific strategies to address climate change**	**Target group**	**Implementing & collaborating agencies**	**Gaps in the policy in addressing climate change**	**Issues that inhibit the implementation of CC strategies**	**Remarks (comments on the relevance on the policy in tackling climate change**
National Development policies							
MPRSP 2012	Expanding and strengthening access to agricultural inputs. Improving research and extension services. Introducing smallholder friendly technologies. Reducing land shortage and degradation. Increasing investment in irrigation. Developing farmer co-operatives and associations.	Increasing farmers' access to credit even to the non-creditworthy. Strengthening extension delivery services. Implementation of new extension policy. Dissemination of appropriate agricultural statistics including weather. Strengthening research efforts in crops and animal production. Advocating systemic approach to technology development, problem identification, and promotion and utilization. promoting irrigation systems and research Draining and reclaiming wetlands for agricultural use environmentally sustainable.	Poor farmers Agricultural research institutions. Estate sector. NGOs	District Assemblies Sector Ministries National Statistical Office Malawi Association of Local Government Authorities Parliamentary committees. CONGOMA National Economic Council (Poverty Analysis Section). Donors. Civil society. Researchers. Media.	Does not directly allude to issues of climate change.	Lack of proper monitoring and evaluation strategies.	CC related issues addressed but not explicitly. Policy classification in terms of CC: Moderate.

MGDS II	The goal is to enhance resilience to climate change risks and impacts.	- Improving weather and climate monitoring, prediction systems, and information and knowledge management systems; - Promoting dissemination of climate change information for early warning, preparedness and response; - Developing and harmonizing climate change related strategies, policies and legislation; - Mainstreaming climate change issues in sectoral policies, plans and programmes; - Promoting climate change related education, training, awareness and capacity building; - Enhancing implementation of climate change mitigation and adaptation programmes; - Implementing a comprehensive national climate change investment plan; - Enhancing cross sectoral co-ordination of climate change programmes; - Enhancing legal and regulatory framework on climate change; and	All sectors of economic development in Malawi	- Government Sectoral Ministries; - NGOs; - Multilateral Organizations; - Donor Partners	Lack of institutional mechanism to coordinate climate change issues across economic sectors	Inadequate institutional mechanism for effective implementation	Very relevant but weak in coordination of climate change issues

Promote community participation and public awareness to ensure environmentally sustainable land use practices, and good land stewardship.	Villagers civic educated on collective responsibility for land use planning, environmental monitoring and enforcement of land use policies. Measures taken to protect areas not suitable for normal forms of development and which require conservation. Steps to exploit alternative sources of energy to minimize the depletion of forests and woodlands. Forestation programs in highly degraded areas. Covenants in most leasehold for growing tobacco also include keeping at least 10% of the land as a woodlot.	Estate sector. District and town assemblies. Private sector. Rural and Urban communities. Tourism industry. Smallholder farmers. Mining sector	Sector ministries. NGOs (Total Land Care). Farming communities. Donors. District. Development and Planning Committee responsible for land use monitoring.	Policy not explicit in CC.	Security of tenure on an equitable basis without thorough scrutiny.	Policy provides room for mainstreaming climate change. Not explicit on climate change issue. Policy classification in terms of CC: Moderate.	Promote community participation and public awareness to ensure environmentally sustainable land use practices, and good land stewardship.

NAPA 2006	Main streaming of CC adaptation in 8 sectors	• Community storage for seed and food • Adapted crop varieties Drought preparedness strategies • Climate change mitigation technologies • Water harvesting & flood mitigation • Early warning systems	Women, children, the elderly and most vulnerable groups in rural communities	MoECC collaborating with sector ministries	Source of financing mechanisms have not been articulated in addition capacity building and sustainability not clearly laid out	Poverty, illiteracy and poor health of targeted population Lack of technical capacity of implementing personnel	Very strong likage with CC and has adequate response mechanisms towards CC mitigation
Sectoral policies							
ASWAp 2010-2014	To increase agricultural productivity in all agricultural commodities	-Increase food security through increased maize productivity, crop loss reduction and diversification. -Sustainable management of natural resources. -Improvement of research that is market oriented	Smallholder farmers	MoAFS, Dept of Land Resource Mgt, Min of Irrigation, DARTS, NGO's, parastatals, farmers organizations	Guidelines on implementation of strategies for sustainable management of natural resources for different programme implementers on CC strategies.	Community empowerment not explicit in terms of CC.	The policy is strong in targeting climate change.
National Forest policy 1996	Applying & evaluating environmental policies, plans & legislation	Promote conservation plans well understood by all partners	NGOS, local communities	Forest dept & Sector Ministries, NGOs, local communities	Climate change and agriculture not directly tackled	Inadequate capacity of dept Finance Political fear loss of popularity	Outdated need issues of carbon trade and markets Policy classification in terms of CC: weak

National Agriculture Policy							
National Water Policy	Sustainable and integrated water resources management	Strengthening efforts towards water resources conservation, harvesting and protection in an integrated manner	- All people in Malawi, - Entrepreneurs	Government (MoAD, MoA, MoECCD); NGOs; Private Sector; Water Resources Boards; Local Government; Water Utilities	Policy does not address climate change directly and systematically	Misalignment of the policy with regards to climate change issues	The policy is relevant but very weak in mainstreaming climate change
Environmental Policy 2004	Promote the utilization of sustainable, clean environment	Promote sustainable land use management and agriculture practice Provide economic incentives to individuals and industries for sustainable utilization of env.	General public, industries and rural communities	MoECC along with sectoral ministries	Climate change aspects in the policy mainly relate to deforestation and not agriculture practices parse	Lack of technical expertise of implementation agency and financial bottleneck	No strong monitoring and evaluation mechanism of CC as well as no early warning systems with response system for adverse CC conditions
Subsector policy							
Crops Production Policy	Technology transfer. Crop diversification. Processing and Preservation of food crops.	Identification of suitable varieties. Replacement of low yielding varieties with high yielding ones.	Smallholder farmers	None	Not explicit in CC	Outdated	Outdated and needs updating Policy classification in terms of CC: weak
National Fisheries Policy	To distribute exte nsion messages on fisheries and on environmental issues to sensitise the fishing communities	Identify and address relevant environmental issues	Artisanal fishermen, fish farmers, beach village committees, NGOs,	Fisheries Department, Fisheries Advisory board, NGOs,	Not focused on climate change issues	Lack of mainstreaming in Climate change	Needs revision to mainstream Climate change Policy classification in terms of CC: Moderate

Food Security Policy	Food production and distribution methods be environmentally friendly and sustainable	- Facilitate investments in rainwater harvesting and water management; - Promote land conservation and Environmental Impact Assessment; - Prevent water, soil and air pollution from agro-chemicals	All people in Malawi	- Food and Nutrition Security Joint Task Force (MoA, OPC); - FNSC Technical Secretariat; - MVAC (Government Ministries, Multilateral Organizations (UNDP, FAO, UNICEF, WFP); NGOs	Policy does emphasize on mechanism to address climate change issues	Misalignment of the policy with regards to climate change issues	The policy is very relevant albeit its failure to mainstream climate change
Livestock Policy	None	None	None		There are no policy sections addressing CC		Very weak in addressing climate change.
Irrigation Policy	Supplementing rain-fed agriculture, Crop diversification and extending the crop growing season	Develop and manage irrigation schemes Research in irrigation to promote use of appropriate technologies	Resource poor smallholder farmers, women and children	Sector Ministries Water Resources Board National Committee on Irrigation and Drainage NGOs Farming Communities Donors	Policy not explicit in CC Large-scale irrigation farmers not considered	Inadequate human, financial and institutional capacity Inadequate research in CC related irrigation technologies	Policy does not mention explicitly issues related to CC Policy classification in terms of CC: weak The policy is relevant but weak in mainstreaming climate change issues

Seed Policy 1993-	Crop diversification, Promotion of improved varieties that are demand driven	Not explicit	Smallholder farmers	DARTS, SSMS, Dept of Extension Services, NGO's, ADMARC, Bunda College	-Policy does not mention anything on climate change. -commercial farmers not considered.	-Seed production research has not been explicitly given mandate over CC. -No monitoring and implementation framework on issues to do with CC -No human and financial capacity in terms of CC.	The policy an important tool in CC issues but is not relevant in terms of CC. -Needs review to mainstream CC issues
Biotechnology Policy 2008	Promote agriculture production through the utilization of modern biotechnology	There no direct strategies of addressing CC	Farmers , consumers	National Commission for science and Technology along with sector ministers	The policy doesn't mention anything regarding CC or make reference to any CC interventions	Limited human resources Poor infrastructure Lack of funding	No direct reference to CC but indirectly mention