



**ASSESSING THE INSTITUTIONAL CAPACITY TO ADAPT TO CLIMATE
CHANGE: A CASE STUDY IN THE ETHIOPIAN AGRICULTURE SECTOR**

BY

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Declaration

I, the undersigned, declare that this is my original work, has never been presented in this or any other University, and that all the resources and materials used for the dissertation, have been fully acknowledged.

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This is to certify that the thesis prepared by Dawit Tedlla entitled Assessing The Institutional Capacity to Adapt To Climate Change: A Case Study In The Ethiopian Agriculture Sector: submitted in partial fulfillment of Degree of Master of Art in Environment and Sustainable Development complies with the regulations of the University and meets the standards with respect to originality and quality.

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Contents

ABSTRACT.....	ix
CHAPTER ONE.....	1
1. INTRODUCTION.....	1
1.1 Background of the Study.....	1
1.2 Statement of the Problem.....	2
1.3 Objective of the Study.....	4
1.3.1 General Objective.....	4
1.3.2 Specific objectives.....	4
1.4 Significance of the Study.....	4
1.5 Scope and Limitation of the Study.....	4
1.6 Organization of the Study.....	5
CHAPTER TWO.....	6
2. LITERATURE REVIEW.....	6
2.1 Climate Change Adaptation.....	6
2.2 Climate Adaptation and Agriculture.....	8
2.3 Impact of Climate Change in Ethiopian Agriculture.....	10
2.4 Institutional Capacities to Adapt Climate Change in the Agriculture Sector.....	12
2.5 Institutional Capacity to Plan and Integrate Climate Change Adaptation in to National Policy Framework.....	14
2.6 Mainstreaming Climate Change Adaptation in Agriculture.....	15
2.7 Institutional linkages and Involvements of Stake holders in Agriculture for Climate Change Adaptation.....	17
2.8 Institutional Capacity in Knowledge and Information Management for Climate Change Adaptation.....	20
2.9 Monitoring and Evaluation Climate Change Adaptation in Agriculture Institutions.....	21
2.10 Institutional Capacity to Implement Climate Change Adaptation in the Agriculture.....	22
2.11 Conceptual Framework.....	23
CHAPTER THREE.....	27

3. METHODOLOGY	27
3.1 Description of the Study Organizations	27
3.2 Population and Sampling	29
3.3 Study Tools and Method of Data Collection	30
3.4 Data Type and Sources	30
3.4.1 Semi-Structured Questionnaires	31
3.4.2 Interview	31
3.5 Data Analysis and Presentation	32
CHAPTER FOUR.....	33
4. RESULTS AND DISCUSSION	33
4.1 Data Presentation and Analysis	33
4.2 Characteristics of the respondents	33
4.3 Institutional Capacity to Plan to Adapt Climate Change in the Agriculture sector	35
4.4 Ethiopian Climate Resilient Green Economy Strategy.....	37
4.5 Ethiopian National Adaptation Plan	39
4.6 Institutional capacity to engage stakeholders for climate change adaptation in the agriculture sector	42
4.7. Institutional Capacity for Information Collocation and Data Management To Adapt To Climate Change In The Agriculture Sector	45
4.8 Institutional capacity to monitor and evaluate progress for climate change adaptation in the agriculture sector.....	47
4.9 Institutional Capacity to Mainstream Climate Change Adaptation in the Agriculture.....	49
4.10 Institutional capacity to implement climate change adaptation in the agriculture.....	52
4.11 Institutional Capacity to Adapt to Climate Change	54
CHAPTER FIVE	57
4. CONCLUSION AND RECOMMENDATIONS	57
4.1 conclusion	57
Recommendations.....	57

References.....	59
Annex.....	64
Questionnaire.....	64

List of Tables

<i>Table 1: Demographic characteristics of the respondents</i>	33
<i>Table 2 : Institutional capacity to plan to adapt climate change in the agriculture.....</i>	35
<i>Table 3 : Institutional capacity to engage stakeholders for climate change adaptation in the agriculture sector.....</i>	44
<i>Table 4: Institutional capacity for information colocation and data management to adapt to climate change in the agriculture sector 46</i>	
<i>Table 5: Institutional capacity to monitor and evaluate progress for climate change adaptation in the agriculture sector.....</i>	48
<i>Table 6: Institutional capacity to mainstream climate change adaptation in the agriculture.....</i>	51
<i>Table 7: Institutional capacity to implement climate change adaptation in the agriculture.....</i>	53
<i>Table 8: Institutional capacity to adapt to climate change</i>	56

List of Figures

<i>Figure 1: Conceptual Framework.....</i>	26
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ABBREVATIONS

ATA	Agricultural Transformation Agency
CC	Climate Change
CCA	Climate Change Adaptation
CRGE	Climate Resilient Green Economy
CRS	Climate Resilience Strategy
EFCCC	Environment, Forest and Climate Change Commission
EIAR	Ethiopian Institute of Agricultural Research
ENAP	Ethiopian National Adaptation plan
GCCIC	Global Climate Change Institutional Capacity Assessment
GES	Economy Strategy
IPCC	Intergovernmental Panel on Climate Change
MoA	Ministry of Agriculture
NAP	National Adaptation Plan
NAPA	National Adaptation plan of Action
NGOs	Non-Governmental Organizations
NMA	Ethiopia's National Meteorological Agency
OPM	Office of Prime Minister
PSNP	Productive Safety Net Program
SLMP	Sustainable Land Management Program
TASS	Tracking Adaptation in the Agriculture Sector

ABSTRACT

Ethiopia's low level of economic development with its heavy dependence on rain-fed agriculture, which is the sector most vulnerable to climate change make the country susceptible to the adverse effects of climate change.

Institutional capacity is an important element for climate change adaptation (CCA) and the development of such capacity is a great challenge in a Least Developed Country like Ethiopia where resources are limited. An important first step to increasing capacity is via an understanding of the level of existing capacity; future priorities can then be subsequently identified. The main objective of this research paper is to assess the institutional capacity to mainstream and adapt effects climate change in the agriculture sector. This Agricultural institution is selected as an entry point or a lens to look through in order to limit the scope and assess the impact of institutional capacity for climate change adaptation and sustainable development. Five elements of capacity were investigated in this research: (1) planning and integrate climate change Adaptation in to national policy Framework, (2) cooperation and coordination of stakeholders, (3) availability and quality of information, monitoring and evaluating the progress on adaptation to climate change, (4) the capacity to Mainstreaming climate change adaptation and (5) the capacity to implement climate change adaptation plans and actions in the agriculture sector .

The data in this research were collected through questioners and interviews with a wide range of government and non-government informants across this agricultural institutions (MOA, ATA , MEFCC and EAIR)in which the research mainly focused .The questionnaires were developed to be filled by the participating institutions climate change adaptation experts and the in-depth interview questioners were developed to conduct in-depth interview with the officials and with heads of the teams of the participating institutions. This research paper had use the Tracking Adaptation in The Agriculture Sector (TASS) tool to assess adaptive institutional capacity in the agriculture sector.

The assessment indicates that Climate change is highly affecting the agriculture sector, to cope up with this the government of Ethiopia gives special emphasis for the agriculture sector and Develops policies and strategies to adapt climate change in the agriculture sector, it also works to strengthen the institutional capacity of the agricultural institutions in this study the study also shows this institution have moderate capacity to adapt the effect of climate change.

Hence, it is recommended that the agricultural institutions should give due attention to mainstream climate change adaptation in existing structures and policy frameworks and plans , improve the planning climate change adaptation , information collection and monitoring and evaluation and improve capacity to implement trough continuous capacity building activities and by developing institutional capacity and active engagements of the stake holders including women's and the marginalized community.

Keywords: Assessment, Institutional Capacity, Adaptation, Climate Change, Agriculture, Planning, Monitoring, Evaluation and Implementation.

CHAPTER ONE

1. INTRODUCTION

1.1 Background of the Study

Climate change refers to a change in the state of the climate that can be identified by changes in the mean and/or the variability of its properties and that persists for an extended period, typically decades or longer (IPCC, 2018). Climate change may be due to natural internal processes or external forcing such as modulations of the solar cycles, volcanic eruptions and persistent anthropogenic changes in the composition of the atmosphere or in land use. UNFCCC, (2017), defines climate change as a change of climate which is attributed directly or indirectly to human activity that alters the composition of the global atmosphere and which is in addition to natural climate variability observed over comparable time periods.

Climate change is predicted to have major adverse consequences for the world's ecosystems and societies. Although a global phenomenon, the severity of the adverse effects of climate change will differ significantly across regions, countries and socioeconomic groups. Africa is one of the most vulnerable continents to climate change and climate variability, a situation aggravated by the interaction of 'multiple stresses', occurring at various levels, and low adaptive capacity (Boko, 2007). And Ethiopia is often cited as one of the most vulnerable across different sectors, and with the least capacity to respond and adapt.

Agriculture is among the sectors severely affected by the impacts of climate change. This is compounded by the fact agricultural production in Ethiopia is dominated by small-scale subsistence farmers, and is mainly rain-fed, thus highly exposed to climate variability and extremes. As a result, the sector suffers greatly from the risks associated with high rainfall variability. Long- term records indicate that there have been severe and repeated rainfall failures resulting in severe food/feed insecurity, including famines, on the Ethiopian population due to significant loss of crops and livestock (EPCC, 2015). The frequency and severity of these natural shocks has increased in recent years needless to say, such shocks result not only in hardships to human and animal populations but also thwart seriously economic development efforts.

In the face of immediate threats that climate change is posing across the globe, the situation is expected to be aggravated in coming decades in the country unless effective coping mechanisms are put in place. Ethiopia's National Meteorological Agency (NMA) identifies drought and flood as the major hazards in the future as well, with potential negative impacts on agriculture and food security without effective adaptation, there is likely to be a decrease in the total area suitable for crop production in the country (EPCC, 2015).

1.2 Statement of the Problem

As well mentioned above, Ethiopia is suffering from climate variability and extreme events, and future climate change poses a major development challenge. In order to identify and implement appropriate adaptation strategies at national and local level, it is important to understand the nature of climate change impacts and institutional capacity to adapt the impact of climate change.

Adaptation is generally defined as necessary adjustments to enhance a system's capacity so that it can cope better with climate stresses in the long term (Dany, 2015). UNFCCC (2006) makes an important note that adaptation is not a new intervention, but rather a continuation of ongoing processes, and should be occurring across all socio-economic sectors. So, having an understanding of, and building on existing knowledge, skills, and networks to strengthen adaptation to climate change helps to ensure that adaptation activities are appropriate and sustainable. The negative impacts of climate change are likely to weaken the planning and implementation of all development and administrative functions of all levels of government. Therefore, unless adaptation to the impending changes is incorporated into the planning and implementation of the functions of each institution, the accomplishment of its adaptation action is likely to be compromised (Adger, 2003). Several case studies show that social factors like institutions, perceptions and social capital strongly affect social capacities to adapt to climate change. Together with economic and technological development they are important for building social capacities.

Capacity can be considered the enabling environment within which individuals and organizations can interact to implement adaptation. Institutional capacity has been described as an ability to mobilize existing institutions to address new policy issues, such as climate change (Willems,

2004). As such, a lack of institutional capacity can inhibit the realization of policy objectives. It also indicates, if the gap between existing and required capacity for any adaptation action is too large, the realization of that action becomes impossible (Dandey, 2015). Less attention has been given to the concept of adaptive capacity, compared with the related concepts of vulnerability and resilience, due to the latent nature of the concept and difficulties associated with assessing it (Engles, 2011). Engle, (2011) further argues that there are even fewer studies that have assessed capacity in practice.

An understanding of the level of existing capacities gives a better idea of priority capacity-building actions to be undertaken, so an assessment of capacity gaps and needs is useful for efforts to reduce vulnerability to climate change. Some studies have empirically shown the importance of institutions for the capacity of social systems to adapt to climate change (Brooks et al., 2005; Grothmann et al., 2009; Tol and Yohe, 2007). There are also studies that have shown the importance of institutional factors for natural hazard management and disaster risk reduction (DRR) (e.g. Carey et al., 2012; Djalante et al., 2012). An assessment of current capacities is needed to determine the extent of the capacity gap between current capacity and the capacity required for specific policy options and to capacitate institutions to adapt the effects of climate change (Desmond et al., 2011). An understanding of the level of existing capacities gives a better idea of priority capacity-building actions to be undertaken, so an assessment of capacity gaps and needs is useful for efforts to reduce vulnerability to climate change (Dany, 2015).

This study consider institutional capacity for adaptation to climate change at the national level with specific focus on the agriculture sector. The study examines four areas of institutional capacity, namely capacity to mainstream climate change adaptation; cooperation and coordination amongst stakeholders; availability and quality of information on vulnerability and adaptation to climate change; and level of understanding of climate change adaptation and current policy frameworks for climate change adaptation in the Agriculture sector. the study take the MoA and its affiliated institutions ATA and EIAR as case studies since these institutions are responsible for the implementation and formulation of policies, strategies and adaptation actions related to agriculture, livestock and fisheries. In addition, it will interrogate the institutional capacity of EFCCC , an institution mandated to oversee climate change-related

programs and projects as well as coordinate climate change adaptation activities at the federal level, from different vantage of points.

1.3 Objective of the Study.

1.3.1 General Objective

The main objective of this study to assess Ethiopia's institutional capacity in adapting the effects of climate change in the agriculture sector.

1.3. 2 Specific objectives

- To assess existing policy frameworks, including climate change strategies and policies as well as adaptation plans that support the institutional role and engagement on climate change adaptation.
- To assess institutional capacity in adapting the effects of climate change in the sector *vis a vis* planning, mainstreaming, stakeholder's involvement and collaboration, knowledge and information management as well as monitoring and evaluation progress.
- To assess institutional capacities of the institutions to implement climate change adaptation in the agriculture sector.

1.4 Significance of the Study

It is important to assess the extent to which national efforts have resulted in integrating climate change adaptation into development policy or enhanced institutional capabilities to respond to climate change in the agriculture sector and this research paper will be serve as a base for feature researches and assessments. In addition, it may provide significant contribution to local and national government, NGOs and other bilateral donors in an effort to minimize the impact of climate change and improve the adaptive capacity of the agriculture sector and institutions.

1.5 Scope and Limitation of the Study

The study focuses on the institutional capacity to adapt climate change in selected institutions. It is acknowledged that there are a number of factors identified in the literature that were not investigated in this study. In addition, there are methodological limitations associated with the study's reliance on informants' own observations and perceptions of capacity reflecting a

particular challenge associated with researching adaptive capacity. Future research should incorporate other stakeholders, especially community stakeholders, evaluations of the efficiency and effectiveness of organizations and the perceived success by which adaptation actions are implemented.

1.6 Organization of the Study

This research paper consists five chapters. The first chapter deals with background of the study, statement of the problem, objective of the study, significance of the study and scope of the study. The second chapter comprises of theoretical and empirical review of different literature which the researcher believes it helps in dealing with data analysis and presentation. The third chapter deals with the methodology of the study. The fourth chapter focuses on data presentation and analysis. Last chapter had conclusion and recommendation.

CHAPTER TWO

2. LITERATURE REVIEW

2.1 Climate Change Adaptation

The Intergovernmental Panel on Climate Change (IPCC) defines climate change as ‘any change in climate overtime, whether due to natural variability or as a result of human activity’ but it goes on to point to human activity as the main cause of the rise in CO₂ levels since the Industrial Revolution (UNFCCC, 2011). Climate change itself is not a new phenomenon, but the anticipated rate and scale of change are now projected to increase to levels that will make autonomous adaptation difficult (Smit, 2006). The. Adaptation refers to adjustments in ecological, social, or economic systems in response to actual or expected climatic stimuli and their effects or impacts. It refers to changes in processes, practices, and structures to moderate potential damages or to benefit from opportunities associated with climate change (UNFCCC, 2018). The 2015 Paris Agreement promotes climate change adaptation as one of its key goals by enhancing adaptive capacity, strengthening resilience and reducing vulnerability to climate change, with a view to contributing to sustainable development (UNFCCC, 2015a).

Adaptation actions aim to moderate or prevent the impacts of climate drivers and risks by reducing the vulnerability, reinforcing the adaptive capacity, and enhancing the resilience of production systems and communities to climatic variability or change (UNFCCC, 2007). Adaptive capacity encompasses two dimensions: the capacity to manage or moderate climate risks (including extreme climatic events), and the capacity to gradually respond to longer-term climate changes (Smit, 2006). The potential impact of climate change upon a system is determined by the degree of the system’s exposure and vulnerability to climate change; the vulnerability of a system in turn depends on its adaptive capacity (McCarthy, 2002). Together, exposure and sensitivity determine the potential impacts of climate variability and change.

The potential impact of climate change upon a system is determined by the degree of the system’s exposure and vulnerability to climate change; the vulnerability of a system in turn depends on its adaptive capacity. Together, exposure and sensitivity determine the potential impacts of climate variability and change. On the other hand, adaptive capacity refers to a system’s ability to adjust to climate change and thus moderate potential damages, exploit

opportunities, or cope with consequences. Key determinants of adaptive capacity include knowledge, technology, institutions, and economy (FAO, 2017). Adaptation is a process through which societies make themselves better able to cope with an uncertain future. Adapting to climate change entails taking the right measures to reduce the negative effects of climate change (or exploit the positive ones) by making the appropriate adjustments and changes. A key component of climate adaptation involves building resilience, where resilience is the capacity of a system to tolerate disturbance without collapsing into a qualitatively different state that is controlled by a different set of processes: a resilient system can withstand shocks and rebuild itself when necessary (FAO, 2003). Multiple causes and effects of CC, and the interrelatedness of many of these, imply that technical fixes are insufficient: social, economic, cultural, institutional and political responses are also required. Key determinants of adaptive capacity include knowledge, technology, institutions, and economy. Effective adaptation actions require strong institutional and technical capacities, inter-organizational networking and cooperation with clearly defined roles and responsibilities, and firm policy commitments. The development of successful agricultural adaptation strategies calls for a high level of cooperation and information-sharing (of scientific knowledge, and of best practices and experiences in adaptation planning, policymaking and implementation) among various actors (Amaru, 2013).

This is particularly true given that the secondary changes induced by climate change are expected to undermine the ability of people and ecosystems to cope with, and recover from, extreme climate events and other natural hazards (IPCC, 2007). Effective adaptation strategies and actions should aim to secure well-being in the face of climate variability, climate change and a wide variety of difficult to predict biophysical and social contingencies. In pursuing this aim, climate adaptation should focus on support for the decision-making and capacity building processes that shape social learning, technology transfer, and innovation and development pathways. Adaptation is most relevant when it influences decisions that exist irrespective of climate change, but which have longer-term consequences (Stainforth et al., 2007). Adaptation is also needed at all levels of administration, from the local level up to the national one.

2.2 Climate Adaptation and Agriculture

An extensive literature has developed on the impacts of climate change on agriculture, with the earliest focusing primarily on the vulnerability of the sector. The general message to emerge from this literature is that the degree of vulnerability of the agricultural sector to climate change is contingent on a wide range of local environmental and management factors (Pradeep Kurukulasuriya, 2003). Agricultural losses can result from climatic variability and the increased frequency of extreme events such as droughts and floods or changes in precipitation and temperature variance. As Kurukulasuriya (2003), outlined in a higher frequency of droughts is likely to increase pressure on water supplies for numerous reasons ranging from plant transpiration to allocation. In contrast, increases in rainfall intensity in other regions can lead to higher rates of soil erosion, leaching of agricultural chemicals, and runoff that carries.

Agricultural production is vulnerable to climate variability, and climate change associated with increases in temperature, increases in CO₂, and changing patterns of rainfall may lead to a considerable decline in crop production (IPCC, 2014). Also, extreme weather events such as droughts, extreme heat waves, and heavy rainfall leading to floods have increased in past decades (Mall, 2017). The expected variability of temperature, precipitation, atmospheric carbon content, and extreme events are forecast to have profound effects on plant growth and yields, crops, soils, insects, weeds, diseases, livestock, and water availability in Africa.

The impacts of climate change on livestock are likely to be felt from an increased severity and frequency of drought. Deterioration of pastures during droughts, and periods of over-grazing can result in poor health and death of livestock, which impacts food and livelihood security of those who own livestock. In times of water scarcity, when livestock are forced to use the same water resources as humans, diseases are transferred between humans and animals and vice versa. Where livestock practices alter local vegetation cover, this in turn affects local climate. Enhancing crop production to meet rising demands owing to the increasing population, against the background of the threats of climate change, is a challenging task (Mall, 2017).

Climate adaptations are local conditions such as soil content, type of crop that is grown, extent of knowledge and awareness of expected changes in climate, type and objectives of the

management regimes prevalent in agriculture (that is, maximizing output or revenues, and so on), the extent of support from government and other external (private) agencies, and the ability of key stakeholders (at the national, local, and household level) to undertake the necessary remedial steps to address climate concerns (Kurukulasuriya, 2003).

In a sense, the increased uncertainty of climate effects represents an additional problem that farmers have to address, poor soil quality, financial constraints, and lack of access to markets can constrain agricultural productivity to begin with, regardless of climate effects. Climate change thus represents an additional burden that for farmers translates into production risks associated with crop yields, probabilities of extreme events, timing of field operations, and timing of investments in new technologies (Pradeep Kurukulasuriya, 2003). Climate change exerts multiple stresses on the biophysical as well as the social and institutional environments that underpin agricultural production. Some of the induced changes are expected to be abrupt, while others involve gradual shifts in temperature, vegetation cover and species distributions (Mall, 2017).

Climate change adaptation aims to mitigate and develop appropriate coping measures to address the negative impacts of climate change on agriculture. Most agricultural systems have a measure of in-built adaptation capacity but the current rapid rate of climate change will impose new and potentially overwhelming pressures on existing adaptation capacity (Ziervogel, 2008). This is particularly true given that the secondary changes induced by climate change are expected to undermine the ability of people and ecosystems to cope with, and recover from, extreme climate events and other natural hazards (IPCC, 2007).

Effective adaptation strategies and actions should aim to secure well-being in the face of climate variability, climate change and a wide variety of difficult to predict biophysical and social contingencies. In pursuing this aim, climate adaptation should focus on support for the decision-making and capacity building processes that shape social learning, technology transfer, innovation and development pathways. Adaptation is most relevant when it influences decisions that exist irrespective of climate change, but which have longer-term consequences (Stainforth et al., 2007). Although adaptation does not completely prevent the adverse impacts of climate change, it can reduce those impacts and take advantage of opportunities to achieve positive outcomes.

2.3 Impact of Climate Change in Ethiopian Agriculture

Climate change causes wide-ranging Impact on the environment, and on socio-economic and related sectors, including water resources, agriculture and food security, human health, terrestrial cause including shifts in crop growing seasons which affects food security. Temperature increases will potentially severely increase rates of extinction for many habitats and species (UNFCCC, 2007).

Like many other developing countries of the world, Ethiopia is also experiencing climate change and its impacts. Model predictions for Ethiopia indicate not only a substantial increase in mean temperatures and an increase in rainfall variability but also a higher frequency of extreme events such as flooding and drought (Hanna et al., 2017). The country's geographical location within the tropics and extremes of topography in combination with the low adaptive capacity of the people and their resources result in a high degree of vulnerability to the adverse impacts of climate change (EPCC, 2015). A strong link has been observed between climate variations and the overall performance of the country's economy, mainly due to the direct impacts of unreliable weather on agriculture and the links to other sectors of the economy.

Historic weather variability, extreme events and hazards result in lost agricultural output, lower export earnings and reduced foreign direct investment, which have a substantial negative impact on economic growth, particularly for agriculture and forestry, and poverty. Severe losses in agricultural crops, livestock, and rural infrastructures resulting from drought and floods have also food security implications in Ethiopia (Asaminew, 2013). Climate risks in Ethiopia are linked to high rainfall variability between years, seasons and regions, yearly variation around mean rainfall levels of 25% is normal, and can increase to 50% in some regions. (Gebremicheal, 2014). The impacts of hazards related to current weather variability and extremes has already prevailed in the country, since the country's main-stay and/or economy are based on agriculture, climate change could negatively affect agriculture. Thus, it will ultimately reduce GDP by 3-10% by 2025 and by 2050, the negative impacts of climate change, under an extreme scenario of higher temperatures and increased intensity and frequency of extreme events, could cost Ethiopia 10% or more of its GDP (Asaminew, 2013).

Agriculture is the backbone of the Ethiopian economy and this sector determines the growth of all other sectors and consequently, the whole national economy. On average, crop production makes up 60% of the sector's outputs, whereas livestock accounts for 27 percent and other areas contribute 13 percent of the total agricultural value added (MOA, 2017). The sector is dominated by Small-scale farmers, who practice rain-fed mixed farming by employing traditional technology, adopting low inputs and low output production systems. Ethiopia is one of the countries more vulnerable to climate related hazards, which include drought, floods, heavy rains, strong winds, frost, heat waves (high temperatures), etc.

The major and almost the exclusive livelihood activities of the rural Ethiopia are crop production, livestock rearing, natural resource extraction, and only less than small percentage engaged in off-farm activities. Hence, given the inherent link of these livelihood activities to natural resources, they are largely at the mercy of uncertainties driven by climate change, including extreme events such as flooding and drought. The distribution of impacts of climate change will vary as both the ability to respond to impacts and resources with which to do so vary across nations and sectors (Pradeep and Shane, 2003).

Studies indicate that Ethiopia in the coming year will face a decrease in agricultural production due to the adverse impact of climate change and variability's. This suggests that agricultural production as an engine of growth and development and vulnerable to climate change and climate variability (FDRE, 2011). While the more pronounced effects on crops and livestock are likely to materialize in later decades, efforts to enhance the resilience to climate shocks of crop yields and livestock production should be improve, this mechanism become increment in agricultural output and leads to climate change adaptation. It is difficult to distinguish the documented cases of climate change adaptation in Ethiopia from general development and agricultural practice.

The vulnerability of Ethiopian farmers to climate change is attributed to their dependence on rain-fed agriculture and high poverty (Yitayal, 2017). Rain-fed agriculture, which supports the livelihoods of the majority of the population, is highly sensitive to climatic conditions. It is characterised by highly erratic rainfall; frequent droughts that often cause famines; and intensive rainfall that often cause floods. Given the dependence of the Ethiopian economy on agriculture

and the dependence of the agricultural sector on climatic conditions, especially rainfall, the macroeconomic performance of the country follows rainfall patterns. (Gebremicheal,2014). These Erratic rainfall and excessive evapotranspiration due to extended dry season have been causing drastic crop yield reductions, or crop failures and decrease herbage biomass yield and carrying capacity of grazing lands.

Low levels of economic development coupled with poor institutional development and poverty is the other source of vulnerability of Ethiopian farmers for climate change (Woldeamlak et.al., 2015). The majority of Ethiopian farmers have limited capacities to mitigate, adapt or cope with effects of climate extreme events such as droughts, which significantly reduce the already low productivity. Hence, there is a strong observable link between climate change variations and overall economic performance.

2.4 Institutional Capacities to Adapt Climate Change in the Agriculture Sector

According to IPCC, adaptation is the adjustment in natural and human systems to actual or expected effects of climate change that causes harms or creates beneficial opportunities (IPCC, 2007). The severity of the impacts of climate change on food security and nutrition depends on the degree of vulnerability of the affected agricultural system. A key way to moderate, reduce and/or avoid these impacts is therefore to reduce a system's underlying vulnerabilities, strengthen its adaptive capacity and increase its resilience (FAO, 2016). Adaptation efforts should therefore focus on building adaptive capacity, or on transforming that capacity into specific actions. An important part of adaptation is the strengthening of social-ecological systems, and fostering them to be more resilient. Another is investing in innovations with the potential to transform systems along more sustainable pathways (Füssel, 2007). Nahar, (2013) describe the role of institutions as a means for holding society together, giving it sense and purpose and enabling it to adapt. The role of inadequate institutional support is frequently cited in the literature as a hindrance to adaptation. Some studies have empirically shown the importance of institutions for the capacity of social systems to adapt to climate change (Nahar, 2013).

Institutional capacity refers to the ability of the institution to perform its activity and achieve its objectives appropriately and its ability to cop up with challenging situations and it is a

combination of human, technical and financial resources, leadership, and institutions (rules of the game) and practices (Orbach, 2000). Gupta et al. (2010), define institutional adaptive capacity as the inherent characteristics of institutions that empower social actors to respond to short- and long-term impacts either through planned measures or through allowing and encouraging creative responses from society both ex ante and ex post. It encompasses the characteristics of institutions (formal and informal; rules, norms and beliefs) that enable society (individuals, organizations and networks) to cope with climate change and the degree to which such institutions allow and encourage actors to change these institutions to cope with climate change. It encompasses the characteristics of institutions (formal and informal; rules, norms and beliefs) that enable society (individuals, organizations and networks) to cope with climate change, and the degree to which such institutions allow and encourage actors to change these institutions to cope with climate change.

The capacities of institutions and the degree of coordination between institutional levels critically determine the effectiveness of climate change adaptation and climate risk management actions (Dovers, 2010). Policymaking for climate change adaptation should be well-informed, from the identification of priorities and policy options to the formulation, implementation and monitoring of actions.

Underdevelopment fundamentally constrains adaptive capacity, especially because of a lack of resources to hedge against extreme but expected events (Engles, 2011). Countries with well-developed social institutions are considered to have greater adaptive capacity than those with less effective institutional arrangements commonly, developing nations and those in transition (Agrawal, 2008). The process of enhancing adaptive capacity is not simple; it involves spurts of growth inter-dispersed with periods of consolidation, refocusing and redirection. Enhancement of adaptive capacity involves similar requirements as promotion of sustainable development and improving agricultural productivity. Assessing the institutional capacity to adapt needs to take into account the characteristics of adaptation and will differ depending on whether the focus of concern is on national policy and priorities, community-based initiatives, or some other form of adaptation (Dany, 2015).

Ethiopia is one of the developing countries, which are more vulnerable to climate variability and change. Low level of socio-economic development, inadequate infrastructure, lack of institutional capacity and a higher dependency on natural resources base make the country more vulnerable to climatic factors including climate variability and extreme climate events (Belay et.al., 2016). Assessing human and institutional capacity available within a country in the agriculture sector is an essential step to designing effective interventions for further capacity building activities such as training courses, as well as identifying ways to build networks and encourage cross sectorial coordination.

2.5 Institutional Capacity to Plan and Integrate Climate Change Adaptation in to National Policy Framework

Effective adaptation actions require strong institutional and technical capacities, inter-organizational networking and cooperation with clearly defined roles and responsibilities, and firm policy commitments. In order for climate change adaptation to be sustainable and applicable on a wide scale, it must be incorporated, integrated or “mainstreamed” into the policy apparatus of governments this should also help to avoid conflicting policies (OECD, 2009). Effective policies should be developed following an informed policymaking approach, from the identification of issues related to climate change, to the formulation, implementation, monitoring and evaluation of the most effective policy options.

Incorporating or integrating adaptation to climate change into planning processes is a necessary strategy for sustainable agricultural productivity over the long term. Policy and development planners require effective tools and frameworks for developing, disseminating and building capacity for adaptation and integrating it into policy at all levels (UNDP, 2004).

Policymaking for climate change adaptation should be well-informed, from the identification of priorities and policy options to the formulation, implementation and monitoring of actions. The integration of concerns related to climate change adaptation into policies for the crop and livestock farming, fisheries, aquaculture and forestry sectors helps create an enabling environment for adaptive capacity building.

Adaptation planning must be based on sound analysis of social and gender issues that influence adaptive capacity and access to adaptation technologies (FAO, 2017). In the same way, national and local development planning agencies need to be informed by the relevant outputs of impact and vulnerability assessments, and environmental and sectoral climate change adaptations priorities (UNDP, 2011). Institutions need to be strengthened in order to be able to address the complexities of addressing and coordinating the implementation of adaptation action by Integrating policy frameworks and strategies in to the institution short and long-term plans (Agrawal, 2008). Furthermore, human and institutional capacity is needed to manage and coordinate adaptation planning processes, which are often cross-sectoral in nature, in order to effect change in Climate.

Adaptation considerations should be mainstreamed into sectoral and cross-sectoral policymaking, and promote good adaptation practices to confront the heterogeneity and uncertainty of climate change impacts (FAO, 2017). The integration of concerns related to climate change adaptation into policies for the crop and livestock farming, fisheries, aquaculture and forestry sectors helps create an enabling environment for adaptive capacity building (Alemneh, 2010).

2.6 Mainstreaming Climate Change Adaptation in Agriculture

In the climate change context, mainstreaming refers to the incorporation of climate change considerations into established or on-going development programs, policies or management strategies, rather than developing adaptation initiatives separately (Mogelgaard, et al., 2018). Agrawala ,(2005) clarifies the term ‘mainstreaming’ which refers to the integration of climate change vulnerabilities or adaptation into some aspects of related government policy such as water management, disaster preparedness and emergency planning or land use planning. Mainstreaming means integrating climate concerns and adaptation responses into relevant policies, plans, programs, and projects at the national, sub-national, and local scales (OECD, 2009). Mainstreaming is process integrating considerations of climate change adaptation into policy-making, budgeting, implementation and monitoring and Evaluation processes at national, sector and subnational levels (UNDP, 2011). In general, mainstreaming is informed integration of a relevant value, theme or concern into the decisions of institutions that drive national, local

and sectorial development policy, rules, plans, investment and action. It refers to the process of incorporating climate and environment consideration to any action, policy, legislation or action in order to ensure that adverse effects from climate change (Mogelgaard, et al., 2018). Mainstreaming can also be a form of cross-sectoral policy integration (Dovers and Hezri, 2010). It is the iterative process of integrating, considerations of climate change adoption. Successful mainstreaming requires change in ideas, culture and practices of the institution.

In the field of climate change, there is a common understanding mainstreaming is a concept that moves climate change from marginal discourse and puts it in the center of a discussion to redesign policies, legal frameworks and to re-think the operation of institutions, investments and all the relevant processes for climate action across the sectors, including governmental and non-governmental actors (Guzman, 2016). The process is seen as on-going, involving multiple stakeholders and contributing to human well-being. climate change risks are not addressed through separate initiatives but through ongoing development policy-making, planning and activities across all sectors (Callaw, 2011). Mainstreaming emerged as a tactical response because it was believed that these crosscutting issues should influence the ‘mainstream’ activities of development, rather than being addressed in separate initiatives. there is a recognised need to take into account the potential long-term effects of climate change when making decisions concerning investments in long-lived infrastructure, or when providing development assistance that will shape future patterns of Agriculture (Agrawala and van Aalst, 2008; World Bank, 2006). Similarly, mitigation strategies can and should be aligned with adaptation strategies, and vice-versa (Ampairea, 2015).

The mainstreaming of adaptation into agriculture sectoral and broader development planning helps avoid duplication of adaptation efforts. Meanwhile, spillovers from adaptation actions implemented in other sectors (e.g. health or education) may influence the outcomes of adaptation actions in the agricultural sector (FAO, 2017). There are two mainstreaming levels: strategic and organizational (CARE, 2009). Strategic level of mainstreaming addresses the organizational environment or structure in which policies and programmes are developed and implemented at operational level it involves integrating climate risk assessment into plans and actions (Callaw, 2011). This involves undertaking an evaluation of climate risks assessment and identifying

effective, efficient and equitable adaptation measures to build adaptive capacity of communities and households.

Broadly speaking, mainstreaming entails the integration of adaptation to climate change into development planning. Part of the idea is that it is often easier to start with existing policies and practices, rather than creating new ones. The expected benefits of mainstreaming climate change adaptation into agricultural activities include avoided policy conflicts; reduced risks and vulnerability; greater efficiency compared to managing adaptation separately, and; leveraging the much larger financial flows in the sectors it is highly affected by climate risks than the amounts available for financing adaptation separately (Agrawala, 2004; Srinivasan and Uchida, 2008). Mainstreaming can therefore save money by making more efficient use of scarce resources, rather than building separate institutions and processes to support adaptation. Adaptation considerations should be mainstreamed into sectoral and cross-sectoral policymaking, and promote good adaptation practices to confront the heterogeneity and uncertainty of climate change impacts (UNFCCC, 2017).

Mainstreaming climate change adaptation in agricultural practice is vital in sector where climate change has significant influences. In developing countries like Ethiopia, the sector is also a major contributor to the economic development. The need to mainstream climate change considerations into agricultural development activity and programmes is increasingly apparent with the general recognition of the close linkage among food security, rural livelihoods and climate change. Therefore, for sustainable and effective result it is essential to mainstream climate change adaptation in to in the programs and projects planning, implementing and monitoring and evaluation process (UNFCCC, 2007).

2.7 Institutional linkages and Involvements of Stake holders in Agriculture for Climate Change Adaptation

Adaptation is a highly complex issue due to the fact that climate change affects regions, sectors (e.g. agriculture, water management), levels of decision-making (e.g. local, national) and actors (e.g. government, business) differently, but it is necessary to coordinate the adaptation measures of different regions, sectors, levels and actors to avoid conflicts and make use of synergies between different adaptation measures (Grothmann, 2013).

Climate change impacts do not happen in isolation; impacts in one sector can adversely or positively affect another; sectors can be affected directly and/or indirectly by climate change and indeed sometimes a change in one sector can offset the effects of climate change in another sector (UNFCCC, 2007). It requires in particular the co-operation between ministries and agencies at the same institutional level, as well as co-operation between different institutional levels, between the federal or central government and the regional, provincial, or local governments. It also requires the co-operation between the government and many private organisations, businesses or other non-governmental organizations (Füssel, 2007).

The impacts of climate change and disasters are largely felt at the local level, meaning that sub-national authorities, communities and other local organizations are essential actors in adaptation and resilience building in Agriculture. Vertical integration of adaptation across levels of development planning and implementation are critical to ensuring that local actors have the knowledge, capacity and resources to manage climate risks (Dazé, Price-Kelly, & Rass, 2016). Climate change adaptation requires the ability to manage issues “horizontally” across institutions , and “vertically” within institution, But there are many factors that seem to be critical for the performance of the institution and involvement of stake holders , such as: the ability to ensure the participation of key actors; the availability of rules of procedures and financial provisions for the network itself; appropriate allocation of responsibilities; sufficient authority of the organization in charge of coordinating actions; as well as the adaptability, but also the stability of the institutional arrangements that have been set up (OECD, 2002). The development of successful agricultural adaptation strategies calls for a high level of cooperation and information-sharing (of scientific knowledge, and of best practices and experiences in adaptation planning, policymaking and implementation) among various actors (FAO, 2017). These institutional arrangements will tend to be more efficient if the agriculture sector as a whole has created a management culture focusing on policy integration and public participation and has developed specific processes to adapt climate change.

The capacities of institutions and the degree of coordination between institutional levels critically determine the effectiveness of climate change adaptation and climate risk management actions (Agrawal, 2008). Clear assignment of institutional responsibility for coordinating climate change adaptation in the agriculture sector can enhance effective action at all scales. the extent to which

relevant stakeholder groups are involved in the national development of strategies and planning; the extent to which representatives of women's organizations and/or other vulnerable groups have participated in the national processes of adaptation planning; the extent to which relevant stakeholder groups have been involved in the regional and local planning process of adaptation will affect the ability to adapt climate change (UNDP , 2009).

Robust and effective participation of relevant stakeholders should occur when assessing and ranking risks, as well as when designing and prioritizing adaptation measures. Collaboration between governments and research institutions helps bridge gaps between policy and research, and facilitates better integration of science- and evidence-based risk adaptation planning and implementation in Climate change adaptation (IPCCC, 2014).

Engagement and collaboration among stakeholders, including local communities, civil society, non-governmental organizations and the private sector in addition to this relevant government ministries and agencies facilitates and strengthens national adaptation planning and implementation (Gabrielle Kissinger, 2013).

UNFCCC outlines the need for a gender sensitive, participatory and fully transparent approach for adaptation. It is crucial therefore that the gender component is recognised while eliciting participation. relevant actors both at the national and subnational level need to get involved in a climate change adaptation policy process and that the adaptation actions cannot preclude women and other vulnerable groups. It is important to involve representatives of disadvantaged groups and particularly in countries where women tend to be disproportionately affected by climate change with an emphasis on women's representatives (WHO, 2014). There needs to be a focused effort at involving stakeholders in generating the evidence, defining the policies, and implementing them. Broad commitment, participation and involvement of different governmental and non-governmental actors are essential for the success of any adaptation strategy and its implementation.

2.8 Institutional Capacity in Knowledge and Information Management for Climate Change Adaptation

Adapting to the consequences of climate change requires decisions that are complex, potentially costly, and that have long-term implications. Given the limited resources, adaptation needs to target those systems that will be most adversely affected by climate impacts (Thornton, 2009). Climate change introduces another source of uncertainty into decision-making, in that it is impossible to be certain about the exact impacts of climate change and the outcomes of adaptation responses. Climate information refers to data about climate impacts, vulnerabilities, and adaptation options that provide the basis for robust decision making about responses to climate change (McCarthy, 2001).

Decision makers must thus be well informed and able to manage uncertainty; they require information about climate impacts, vulnerability and technical options, in order to plan and implement concrete measures at national and local levels (Thornton, 2009). Uncertainty is perceived as an insurmountable obstacle to real action, in particular with regard to adaptation, but also for the implementation of integrated activities that would promote adaptation in the Agriculture. Climate information also distinguishes a business-as-usual development goal from a climate resilient development goal. While many sustainable development practices can improve climate adaptation, offering indirect adaptation benefits, climate resilient development necessitates the use of information about climate vulnerability, risk and appropriate adaptation responses now and in the future.

Human and institutional capacities information management for climate change adaptation refer to the ability of stakeholders and institutions to coordinate adaptation processes as well as to use and manage climate information. The availability of information on climate science, vulnerability, and adaptation options constitutes one part of the adaptation equation. institutional capacity is required to access, interpret, and communicate this information, to understand its relevance for decision-making and ultimately to put it into practice. This is particularly important with respect to the uncertainty created by climate change, which requires skills in adaptive management.

Coordination helps to avoid duplication or gaps, and creates economies of scale in responding to climate change information gaps and challenges, for example, through horizontal coordination

between the ministries responsible for water and agriculture, vertical coordination between national and state level administrators, as well as policy dialogues that include civil society representatives (Worker, 2017). Benefits accruing from collaboration access to more data, cross-sectoral learning, new approaches to tackle existing challenges can act as powerful incentives for institutions and individuals to promote coordination.

Practitioners and policymakers in agriculture sector must be able to manage uncertainty and make decisions that are robust in the face of a range of possible futures, and also develop adaptation strategies that are open-ended and flexible by using adequate and reliable information.

2.9 Monitoring and Evaluation Climate Change Adaptation in Agriculture Institutions

Monitoring and evaluation are different processes, which work together to assess the performance of an intervention over time. Monitoring refers to an on-going assessment of the intervention and progress made in achieving set milestones and targets. Evaluation, on the other hand, examines if people have become better adapted to climate change as a result of the interventions, and the extent to which they are now more resilient to climate change (Dinshaw, 2014). The impacts of climate change will be experienced unevenly, both spatially and temporally and the consequences of climate change will also vary as a result of the differing vulnerability of individuals and communities. It is important to Monitor and Evaluate the effects of the Adaptation action on different social groups and their ability to engage and benefit from the intervention; whether the intervention has targeted the ‘right’ people; and whether certain groups are exposed to disproportionate risks, bear additional costs or suffer dis benefits as a result of the intervention (Pringle, 2011).

Monitoring and Evaluation refers to monitoring climate change impacts, financial resources, and adaptation performance, as well as monitoring and evaluating adaptation results to gauge valuable information for adaptation planning and decision making (Brooks, 2011). M&E systems for adaptation can ensure effective resource allocation, improve accountability, strengthen steering adaptation plans and activities and foster learning on adaptation.

The extent to which M&E systems in the agriculture sector offer entry points to integrate adaptation to climate change. Lessons learned good practices, gaps and needs identified during

the monitoring and evaluation of ongoing and completed projects, policies and programmes will inform future measures, creating an iterative and evolutionary adaptation process in the agricultural institutions (Sanahuja, 2011). In general, and also in the climate change context, a primary concern of M&E in climate change adaptation implementation is that of assurance of the deliverables of this agricultural institutions . The envisaged results in terms of planned outcomes and impacts should be the result of adaptation interventions. With baselines targets and indicators in place, monitoring continuously tracks activities, assess deviations and correct course of action; along with ensuring that the deliverables are being achieved (Sanahuja, 2011).

It is important that an institutional body responsible for monitoring is accepted by the stakeholders within the sector. the extent to which M&E systems exist in the Agriculture adaptation and the extent to which M&E of adaptation takes into account social and gender differences in order to ensure equality between men and women create conducive Environment to adapt climate change in sustainable manner. Monitoring and evaluation of institutions, policies and programmes forms an important part of the adaptation process (Timmerman et al., 2011).

Monitoring and Evaluating an adaptation process is seen as an important step for institutions to assess their progress on adaptation planning and determine their next steps (Mathew, 2016). It can also be an important consideration in tracking outcomes where finance and support are needed. Progress towards adaptation should be monitored across all adaptation processes and components (observation, assessment, planning and implementation). The monitoring and evaluation should capture both stand-alone actions and actions fully integrated (mainstreamed) into sectoral policies and climate change adaptation plans (FAO, 2017).

2.10 Institutional Capacity to Implement Climate Change Adaptation in the Agriculture

Effective adaptation actions in agriculture require strong institutional and technical capacities, inter-organizational networking and cooperation with clearly defined roles and responsibilities, and firm policy commitments to implement (Baumert, 2003). It also requires implementation of the strategies and programs, apparent that the three different components of climate change adaptation would have to be integrated to ensure effective and sustainable results. Effective adaptation requires institutions that are responsive, flexible and able to adapt to the uncertainties associated with climate change. However, responsive governance for climate adaptation is

constrained by weak technical and managerial capacity, poor linkages with other institutions at different levels, weak systems for gathering and disseminating information, and unclear mandates and conflicting priorities between levels and agencies of government (Agrawal, 2009).

Adaptation actions aim to moderate or prevent the impacts of climate drivers and risks by reducing the vulnerability, reinforcing the adaptive capacity, and enhancing the resilience of production systems and communities to climatic variability or change (FAO, 2017). Adaptive capacity encompasses two dimensions: the capacity to manage or moderate climate risks (including extreme climatic events), and the capacity to gradually respond to longer-term climate changes. Institutional capacity and coordination at all levels are fundamental conditions for the effective implementation of climate change adaptation and risk management.

The implementation of adaptation actions to reduce vulnerability, strengthen adaptive capacity and enhance resilience to climate-related risks within broader sustainable development strategies has positive impact on the productivity of agriculture (Smit, 2006). Actions to strengthen formal and informal institutions in the agriculture, formulate policies to improve livelihoods, raise awareness of climate change concerns and integrate them into development activities all contribute towards adaptation effort (FAO, 2017).

2.11 Conceptual Framework

Institutions play an important role in climate change adaptation and Institutions enable and constrain actors opportunities to a changing environment. Moreover, the concepts of institutional capacity will be discussed to assess the institutional capacities of the agricultural institutions.

Climate change exerts multiple stresses on the biophysical as well as the social and institutional environments that underpin agricultural production. Climate change is expected to, and in parts of Ethiopia has already begun to, alter the dynamics of drought, rainfall and heatwaves, and trigger secondary stresses such as the spread of pests, increased competition for resources, and attendant biodiversity losses (EPCC, 2015). Climate change adaptation aims to mitigate and develop appropriate coping measures to address the negative impacts of climate change on agriculture.

The multiple causes and effects of CC, and the interrelatedness of many of these, imply that technical fixes are insufficient: social, economic, cultural, institutional and political responses are also required (Akhtar, 2015). Adaptation actions aim to moderate or prevent the impacts of climate drivers and risks by reducing the vulnerability, reinforcing the adaptive capacity, and enhancing the resilience of production systems and communities to climatic variability or change (UNDP, 2015)

Climate change adaptation is of paramount importance to agriculture, given the reliance of the sector on climate. Effective adaptation strategies and actions should aim to secure well-being in the face of climate variability. In pursuing this aim, climate adaptation should focus on support for the decision-making and capacity building processes that shape social learning, technology transfer and innovation. The key to developing appropriate policies, strategies and actions to enhance climate change is to understand the barriers to adoption of practices, including the trade-offs between short-term costs and longer-term benefits (FAO,2012b). The main requirements for any policy environment capable of promoting climate change adaptation are greater coherence, coordination and integration between climate change, agricultural development and food security policy processes (FAO, 2010). Adaptation is most relevant when it influences decisions that exist irrespective of climate change, but which have longer-term consequences (Stainforth et al., 2007). Policymaking for climate change adaptation should be well-informed, from the identification of priorities and policy options to the formulation, implementation and monitoring of actions. The integration of concerns related to climate change adaptation into policies for the crop and livestock farming, fisheries, aquaculture and forestry sectors helps create an enabling environment for adaptive capacity building (UNFCCC, 2007).

Adaptation planning and mainstreaming involves the identification and assessment of adaptation options to reduce climate change risks and vulnerabilities, and their integration into national and sector-specific policies, strategies and plans. The mainstreaming of adaptation into agriculture sectoral and broader development planning helps avoid duplication of adaptation efforts. Meanwhile, spillovers from adaptation actions implemented in other sectors may influence the outcomes of adaptation actions in the agricultural sector. Adaptation planning must be based on sound analysis of social and gender issues that influence adaptive capacity and access to adaptation technologies, finance and other enabling tools. Mainstreaming is the process by

which actions to address the causes and consequences of climate change are implemented as part of a broader suite of measures within existing development processes and decision cycles (UNDP, 2010). Adaptation considerations should be mainstreamed into sectoral and cross-sectoral policymaking, and promote good adaptation practices to confront the heterogeneity and uncertainty of climate change impacts (UNFCCC, 2017).

The involvement of representatives from government and private entities, as well as civil society, NGOs, and local community groups and involving women's representatives and other disadvantaged groups is especially important since they are often disproportionately affected by climate change (Below, 2016). A gender-sensitive approach is also crucial to achieving climate change adaptation in the agriculture sector. The roles, responsibilities and capabilities of men and women need to be well understood to ensure that both men and women have access to and benefit from climate change adaptation practices and policies.

Progress towards adaptation should be monitored across all adaptation processes and components. The monitoring and evaluation should capture both stand-alone actions and actions fully integrated (mainstreamed) into sectoral policies and sustainable development plans. Tracking should ensure that monitoring and evaluation systems of adaptation projects, programmes and actions are adequately developed and implemented (FAO, 2017). Policymakers also need frameworks that assess an intervention's comparative effectiveness how well outcomes achieve defined objectives compared with other interventions, whether these address climate change adaptations directly or indirectly (Stefan Silvestrini, 2015). Ultimately, the monitoring and evaluation systems should allow stakeholders to draw lessons and improve future adaptation actions.

Implementation takes place at various levels (national, regional or local) and through different means (projects, programmes, policies or strategies). The capacities of institutions and the degree of coordination between institutional levels critically determine the effectiveness of climate change adaptation and climate risk management actions (Agrawal, 2009). Effective adaptation actions require strong institutional and technical capacities to plan and implement, inter-organizational networking and cooperation with clearly defined roles and responsibilities, and firm policy commitments.

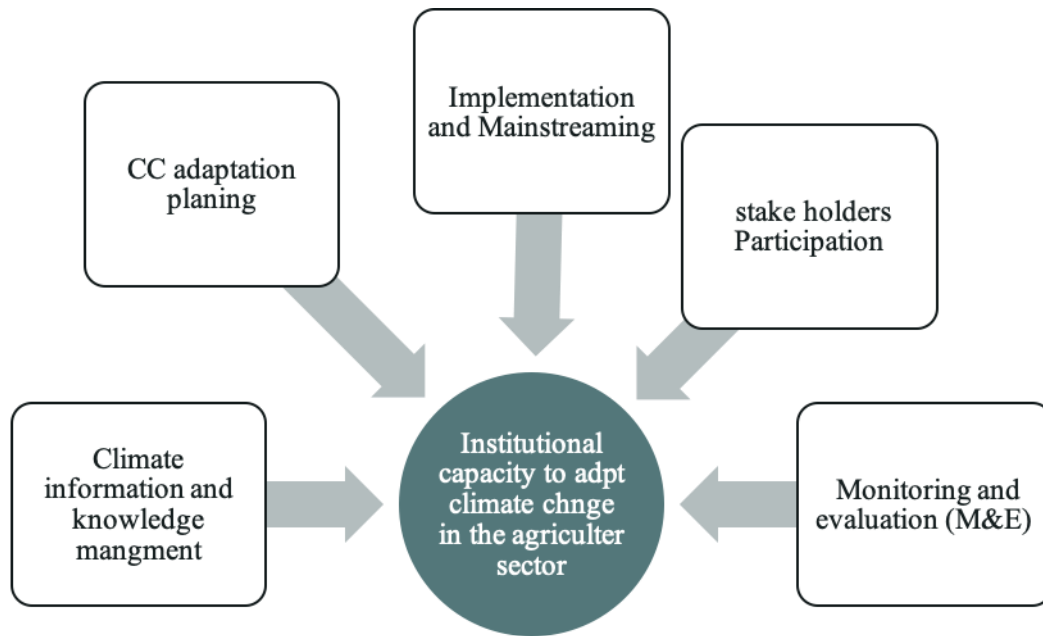


Figure 1: Conceptual Framework

Source: SNAP tool, October 2016 and modified for climate change adaptation capacity assessment

CHAPTER THREE

3. METHODOLOGY

3.1 Description of the Study Organizations

There are institutions that are expected to have environmental and climate change unit at federal level; however, there three institutions have mandate to implement climate change adaptation in agriculture. Thus these three institutions were purposively selected for the research in addition to ministry of agriculture and natural resource because of their mandate to adapt climate change in agriculture sector. These includes: Environment Forest and Climate Change Commission, Agricultural Transformation Agency and Ethiopian Institute of Agricultural Research.

Environment, Forest and Climate Change Commission is the lead government body responsible and legally mandated for environmental management. The vision of EFCCC is to ensure a clean and healthy environment in Ethiopia it is also responsible to implement Ethiopian CRGE strategy to protect the country from the adverse effects of climate change and to build a green economy that will help realize its ambition of reaching middle income status by 20259 (EFDRE,2011).

The Agricultural Transformation Agency (ATA) is a strategy and delivery oriented government agency created to help accelerate the growth and transformation of Ethiopia's agriculture sector. The Agency's mandate is focused solely on improving the livelihoods of smallholder farmers across the country (ATA, 2019).

ATA, among other programs it runs, climate related activities are coordinated under the Climate Change Adaptation & Mitigation Program (CCAMP) unit. The CCAMP reports to the one of the Senior Directors post titled Sustainability and Inclusive Growth which is under the CEO. In ATA, CRGE related activities are all mainstreamed across the programs. For this to happen, M&E Program plays the key role. The M&E is a program in ATA, but unlike the other programs, it reports directly to the CEO. There are 32 active programs in ATA and all of their plans and reports go through the M&E. These programs are expected to include their particular CRGE indicators and targets in their annual plans and reports; if not, the M&E will return it back requesting the Climate Change Adaptation and Mitigation Program for review and endorsement

The Agricultural Transformation Agenda was formally introduced in 2006 E.C. during the first Growth and Transformation Plan (GTP I) in order to provide a platform to address the most critical systemic bottlenecks constraining fulfilment of agriculture sector goals and targets identified by the government. The ATA's mandate is articulated in the Ethiopian Council of Ministers Regulations No. 198/2010 and 380/2016, which specify four distinct Strategic Goals for the agency: to identify systemic constraints of agricultural development, through conducting studies, and recommend solutions in order to ensure sustainability and structural transformation, to support implementation of recommended solutions and To support the establishment of strong linkages among agricultural and related institutions and projects in order to ensure the effectiveness of agricultural development activities it also focuses on development of climate change resilient smallholder farming while enhancing agricultural productivity on-farm.

The Ethiopian Agricultural Research institute is one of the oldest and largest agricultural research systems in Africa. It has evolved through several stages since its first initiation during the late 1940s. EIAR has established with new set up in 1997 by Proclamation number 79/1997, As per this Proclamation, its objectives are to generate, develop and adapt agricultural technologies that focus on the needs of the overall agricultural development and its beneficiaries; to coordinate technically the research activities of Ethiopian Agricultural Research System; build up a research capacity and establish a system that will make agricultural research efficient, effective and based on development needs; and popularize agricultural research results (EAIR, 2019).

EIAR's mission is to conduct research that will provide market competitive agricultural technologies that will contribute to increased agricultural productivity and nutrition quality, sustainable food security, economic development, and conservation of the integrity of natural resources and the environment (EAIR, 2019). EIAR is committed to undertake research that enhances climate resilient agriculture through the provision of climate services required at all scales of interventions, including farm and policy levels with the implementation of geo-spatial science and technology as a research, planning and decision support tool and provide spatial data, synthesized information and knowledge. Currently, its research focused on improving the resilience of cropping systems to climate variability and change. By using its information, it able to produce climate forecasts for individual regions in Ethiopia, project the future frequency and

distribution of droughts and create a national climate database management toolkit. In addition, EIR actively involved in using this valuable body of research-based evidence to shape the national climate change strategy and agricultural development Agenda.

Ministry of Agriculture oversees the agricultural and rural development policies of Ethiopia on a Federal level. The powers and duties of the MoA include: conservation and use of forest and wildlife resources, food security, water use and small-scale irrigation, monitoring events affecting agricultural development and early warning system, promoting agricultural development, and establishing and providing agriculture and rural technology training. Climate change adaptation and coordination work is carried out within the Natural Resources Management Directorate led by a unit. The Unit currently has ten full time staff where one is a team leader. Experts have background of Monitoring and Evaluation, Monitoring Reporting and Verification climate change, Natural Resource Management and crop sub-disciplines. Most of the staffs are involved in implementation of climate change adaptation related projects and programs. Also, they have an active engagement or relationship with other CRGE coordinators at regional level as well as Directors and experts at regional and woreda levels of the MoA.

3.2 Population and Sampling

The researcher selected 50 respondents from the above four organization . The informants were purposively sampled, using expert sampling technique particularly drawing upon the expert knowledge and professional experience. A broad range of informants were selected from a number of departments in this institution due to their cross-cutting nature of climate change adaptation however, informants with responsibilities in the agricultural sector were particularly targeted for this research paper.

3. 3 Study Tools and Method of Data Collection

The study employed two major data collection instruments these are questionnaires and in-depth interview.

The questionnaires were developed to be filled by the participating institutions climate change adaptation experts and the in-depth interview guide- lines were developed to conduct in-depth interview with the officials and with heads of the teams of the participating institutions.

This research Paper uses the Tracking Adaptation in The Agriculture Sector tool, as a tool to assess adaptive institutional capacity in the agriculture sector. The TASS enables us to systematically assess institutional strengths and weaknesses that may help or hinder adaptation. the TASS tool assesses Monitoring and Evaluation not just in terms of the existence of an in-country framework for monitoring adaptation, but also in terms of mainstreaming adaptation in existing national and sectoral M&E systems, and finally to take gender issues into consideration.

TASS guidebook on designing results-based monitoring of adaptation projects states that M&E can promote “Institutional knowledge management”, because climate change adaptation is a relatively new and can offer valuable lessons The TASS developed by FAO (2016) is the only highly operationalized methodology for assessing institutional capacities to adapt to climate change, with the claim to be applicable in Agriculture institutional settings for assessing institutional adaptive capacities focus on sector-specific institutional settings. Other frameworks to assess Climate change adaptation includes ; Tracking adaptation and measuring development (TAMAD) tool also claim, like to be applicable in various institutional settings, but are not focusing on agriculture, like TASS (2016), on climate change adaptation in the agriculture and were therefore not developed for addressing the specific challenges of climate change adaptation.

The methodology includes a scoring procedure, whereby indicators are given scores from 0 to 5 converted from raw quantitative and qualitative data.

3.4 Data Type and Sources

To conduct the research both primary and secondary data types were used. Primary data was collected from primary sources by employing different primary data collection instruments like; in-depth interview guidelines and semi structured questioners where as secondary data was. For

literature review data have been collected from articles, books, plan documents, website which give clear understanding of climate change adaptation strategies and collaboration in the implementation of climate change adaptation, general understanding of climate change adaptation. For the interview people are chosen as they play an important role in climate change adaptation in the agriculture sector. The aim of the interview is to get a better overview about impact of climate change on the agriculture and to assess the institutional capacity for adaptation and the collaboration between stakeholders.

3.4.1 Semi-Structured Questionnaires

Questionnaires have been prepared and distributed to the selected agricultural experts and Decision makers to collect sufficient information about the extent and nature of climate change and organizational ability to adapt its impact in the agriculture sector. The research questioner uses Likert scale to understand respondents view on the institutional capacity on climate change adaptations.

3.4.2 Interview

In-depth interview had conducted with experts and heads of the teams of the participating institutions and concerned bodies in order to extract the necessary information about the Power, Motivation, Communication and the nature of coordination between the participating institutions.

This Interviews had conducted by the research team using an interview question , digitally recorded, and transcribed and translated into English (where necessary) for analysis. Qualitative data have been organized into themes following the initial coding of themes; subthemes have been inductively extracted from the data based on patterns embedded within them.

A semi-structured interview have been conducted and the informants purposively sampled, using expert sampling and snowball approaches, a broad range of informants have been selected from a number of sectors due to their cross-cutting nature of climate change adaptation; however, informants with responsibilities in the agriculture sectors will be particularly targeted for recruitment.

3.5 Data Analysis and Presentation

All data that generated from the respondents have been analyzed by using simple descriptive statistics such as percentages, graphical maps, and tabular form have been used to present for both qualitative and quantitative techniques and SPSS statistics software have been used to analysis quantitative data. Qualitative techniques have been used to analyze cause and effect relationships and also the data that collected from direct physical observation or visualization have been analyzed by describing the phenomena using personal judgment.

CHAPTER FOUR

4. RESULTS AND DISCUSSION

4.1 Data Presentation and Analysis

This part of the research is devoted to analyzing the collected information from primary and secondary data sources to achieve the objectives of the study, which is to assess the institutional capacity of government agencies integrate policies and strategies in institutional plans and activities, to engage stakeholders to adapt to climate change, to monitor and evaluate their progress, and to implement climate change adaptation activities in the agriculture sector.

The primary objective of the study, as stated in chapter one, is to assess the institutional capacity of the agricultural institutions (MoA, ATA, EFCC and EIAR) to adapt to the effects of climate change. To attain this objective, the researcher collected key data from documents and via questionnaires and interviews from experts, employees, and senior management team members of the organizations. This section presents and discusses the data collected through semi-structured questionnaires, interviews, physical observations, and document review.

4.2 Characteristics of the respondents

As shown in table 01 , the institutions which the respondents belongs 36 percent of them from MoA, 16 percent from ATA, 22 percent EAIR and 26 percent of them wear from EFCCC.

When we look at the educational background of the respondents, 58 percent of the respondents are first degree holders, 38 percent have at least one masters degree, and 4 percent are PH.d. holders. Based on the data obtained, all the respondents were first and above degree holders.

With regard to work experience, 30 percent, 40 percent and 4 percent of the respondents are expert, senior expert, and directors, respectively. With regard to work experience of the respondents within the institution, as it can be seen from the table 01, 20 percent of respondents served their institution for more than 10 years, 18 percent of respondents served their institution between 6-10 years, 24 percent of the respondents served 3-5 years, and 38 percent of respondents served the institution between 1-3 years. Hence, based on the data obtained, most of the respondents served the organization from one to three years.

Table 1: characteristics of the respondents

Basic information		Frequency	percent
Institutions	MoA	18	36
	ATA	8	16
	EAIR	11	22
	EFCCC	13	26
Education Level	Degree	29	58.0
	Master	19	48.0
	Ph.D.	2	4.0
Leave of Expertise	Expert	15	30.0
	Senior Expert	13	26.0
	Team leader	20	40.0
	Director	2	4.0
Work experience in the organization	1-3 year	19	38.0
	3-5 year	12	24.0
	6-10 year	9	18.0
	>10	10	20.0

4.3 Institutional Capacity to Plan to Adapt Climate Change in the Agriculture sector

Aligning climate change adaptation planning among the short, medium and long-term objectives and actions of the existing adaptation policy frameworks (climate change strategies, policies, NAP, National Development Plan) is important because it enables identification, prioritization and implementation of adaptation options; it facilitates the integration of concerns and perspectives related to agriculture, food security and nutrition into national climate change adaptation planning and implementation; it also creates an enabling environment for agricultural stakeholders to incorporate climate change adaptation into medium to long-term policy and planning processes; and it establishes a framework for planning, implementing and monitoring adaptation actions in the agriculture sectors.

From group discussion and secondary data analysis, respondents state that Ethiopia has developed a National Adaptation Plan (NAP) and Climate Resilient Green Economy Strategy (CRGE) to mitigate the impact of climate change on the agriculture sector and improve its resilience. Based on the above table, the majority of respondents, 68 percent (26 percent moderate and 42 percent highly), states that these policies and strategies are aligned with short, medium and long-term objectives and actions, while only 28 percent (10 percent very low and 18 percent low) of the respondents state that these policies and strategies are not aligned adequately.

Staff capacity and operational procedures to ensure appropriate priorities for the agricultural sector, as well as integrate agriculture into the NAP, is essential. 24 percent of respondents agreed that there is a moderate capacity to integrate climate adaptation in the agriculture sector. 34 percent and 20 percent of the respondents highly and very highly agreed, respectively, that staff have the potential for climate change adaptation and that the NAP is integrated into agricultural activities and implemented accordingly.

The degree of clarity of mandate, vision and mission within the ministry/department/unit with regard to adaptation planning is essential to achieve short and long-term goals. The majority of the respondents, 76 percent (8 percent highly, 34 percent very highly and 34 percent moderately), agreed that these institutions' vision and mission regarding climate change adaptation is clear and its mandate is well defined.

Determining and projecting climate change induced hazards and perturbations and sensitivity refers to the nature of expected climate change and how a range of possibilities will affect the agriculture sector. The range of impacts is discernible at different scales (for instance, national, sub-national, or community level), depending on the relevance and types of management decisions that need to be made, the information required to determine its impact, and the plan to adopt the effect. This, along with mapping vulnerabilities to climate change, is a key planning tool to formulate climate-resilient plans. Based on the assessment, 46 percent of the respondents moderately and highly agreed that the agricultural institutions use risk mapping adequately to identify potential areas for climate change effects and plan for climate change adaptation. But 22 percent of the respondents stated that their institution does not have the capacity for climate change risk mapping and do not use risk maps adequately to predict the impact of climate change. Only 4 percent of respondents agreed that these institutions have a very high capacity for climate risk mapping.

Based on the above table, the majority of the respondents, 70 percent (24 percent moderate, 34 percent high and 12 percent very high) stated that their institutions' staff have adequate capacity and operational procedures to support national and subnational adaptation planning activities within the sector. Only 30 percent of the respondents stated that their institution has limited staff capacity to plan and is suffering from weak institutional procedures.

By summarizing these indicators, the majority (35.5 percent 28 percent and 7.25 percent moderately, highly and very highly, respectively) of the respondents indicate that these agricultural institutions have sufficient capacity to plan for climate change adaptation

Table 2 : Institutional capacity to plan to adapt climate change in the agriculture

Planning	No Answer	Very low	Low	Moderate	High	Very High
The ministry/the institution supported by robust policy frameworks climate change strategies and policies at national or sectorial level to address adaptation planning).	0	6	14	44	16	20

Alignment among the short, medium and long-term objectives	0	10	18	26	42	4
The degree of clarity of mandate, vision and mission with regard to adaptation planning	0	10	14	34	34	8
Capacity to ensure appropriate priorities for the adaptation of the agricultural sector	0	6	14	46	30	4
Resources assigned for the climate change services and programs	0	10	32	30	20	4
Use of risk maps for adaptation planning	0	12	20	46	20	2
Staff capacity to support national and subnational adaptation planning	0	10	20	24	34	12
Average	0.00	9.14	18.86	35.71	28.00	7.71

4.4 Ethiopian Climate Resilient Green Economy Strategy

The CRGE strategy, focuses to achieve middle-income country status by 2025, highlighting how this will be done in a low-carbon and climate-resilient manner. CRGE ‘Strategy’, which presented a framework for promoting Ethiopia as an early-adopter of low carbon growth and exploiting opportunities to transform the country’s development model towards greater economic and environmental sustainability (Fikreyesus et.al. , 2013). As part of this, the Strategy has three overarching objectives: fostering economic development and growth; ensuring abatement and avoidance of future emissions; and improving resilience to climate change. It outlines for achieving economic development in a sustainable way, highlighting both the country’s prospects for growth and its vulnerability to climate risks and changes.

The strategy is based on four pillars: improving crop and livestock production to increase food security and farmer income, while also reducing emissions; protecting and re-establishing forests to store carbon and provide economic and ecosystem services; expanding power generation from renewable sources; and leapfrogging to modern and energy-efficient technologies in transport, industry and buildings (EFDRE,2011). It envisions a reduction in GHG emissions of

approximately 250 mega tons of carbon dioxide equivalent (CO₂e) by 2030, as well as reduced vulnerability to climate change in the agriculture, health, water, energy, buildings and transport sectors (FDRE, 2011a). Of the four main pillars of the strategy, two are related to the sectors in the Climate resilient Strategy; improving crop and livestock production practices for higher food security and farmer income while reducing emissions (agricultural and land use efficiency measures) and protecting and re-establishing forests for their economic and ecosystem services, including as carbon stocks (increased GHG sequestration in forestry).

The CRGE of agriculture has outlined how the agricultural sector can ensure resilience to climate change and the realization of the strategy is expected to bring sustainable development in the agriculture sector (EFDRE,2011). The agriculture sector's climate resilient strategy is centered on current and future impacts of climate change on agriculture, it sets options to cope with the challenges and financing issues for implementation of the options identified(Woldeamlak et.al , 2015). The three building blocks of the strategy include: Analysis of impacts of current climate variability and projected future climate change on Ethiopia's agriculture; Identification of options to build climate resilience and reduce the impact of current climate variability and climate change, and costing of the same; and Mapping of the steps necessary to finance and implement efforts to build resilience. This initiative focuses on the sectors of responsibility covered by the Ministry of Agriculture (including crops, livestock and forestry).

The institutional arrangements involved in the design of transformational climate policies are critical to their effectiveness and implementation. Despite early suggestions, no stand-alone institution was created for the delivery of the CRGE process. Instead, the Inter-Ministerial and Technical committees created under office of Prime Minister (OPM), with operational and financial mandates handed to EFCCC and Ministry of Finance and Economic Cooperation (OECD, 2013). The CRGE also envisages the establishment of CRGE Units that will seek to mainstream and implement the Strategy in each of the key line ministries and Institutions. The CRGE also infancies the need to improve institutional capacity to adapt the effect of climate changes.

The CRGE's participatory process works across three dimensions: horizontally across sectors; vertically from federal level down to local communities and back up to the federal level; and

through time, gathering and disseminating learning to deepen benefits and widen coverage. A wide range of actors and groups are involved in the development of the CRGE's Vision and Strategy. However, there has not yet been much outreach of the CRGE's plans, and so the CRGE is not yet fully internalised among the many stakeholders who need to understand it. Importantly, a failure to meaningfully engage stakeholders at all levels of society, particularly at the local level, raises key issues of equity, representation and recognition. Coupled with limited consultation, a lack of institutional capacity may hinder the potential of the CRGE to deliver transformational change.

4.5 Ethiopian National Adaptation Plan

Ethiopia's National Adaptation Plan (NAP-ETH) builds on ongoing efforts to address climate change in the country's development policy framework, including the Climate Resilient Green Economy (CRGE) strategy and the second Growth and Transformation Plan (GTP II), as well as sectorial climate resilience strategies and regional and municipal adaptation plans. Its goal is to reduce vulnerability to the impacts of climate change by building adaptive capacity and resilience. NAPETH aims to strengthen holistic integration of climate change adaptation in Ethiopia's long-term development pathway, supported by effective institutions and governance structures, finance for implementation and capacity development and strengthened systems for disaster risk management and integration among different sector (EFDRE, 2019). Ethiopian NAP considers Agriculture as a priority for enhancing food security by improving agricultural productivity in a climate-smart manner.

The Rationale for NAP rests on the low adaptive capacity of LDCs including Ethiopia, which renders them in need of immediate and urgent support to start adapting to current and projected adverse effects of climate change (FDRE, 2007). Three main reasons for addressing the agriculture sectors in NAPs, First, the agriculture sectors are among the most sensitive sectors to changing climate conditions and the most highly exposed to the impacts of climate change. Second, crop and livestock production, fisheries and agriculture and forestry are all critical to food security and nutrition, not only because they produce food, but also because they play an essential role in the economy of many countries, especially the most vulnerable, providing livelihoods and incomes to the most vulnerable populations. Third, agricultural production

involves the careful management of natural resources, including land, water, biodiversity and genetic resources, and so has a key role to play in the adaptation of ecosystems to climate change (FAO, 2016). Because of this, agriculture can make a significant contribution to climate change adaptation at a national level. Realization of these strategic priorities is critical to enable effective implementation of the options identified above. NAP-ETH, completed in 2017, serves as the climate-resilience strategy under the CRGE framework. NAP-ETH has two goals to reduce vulnerability to the impacts of climate change by building adaptive capacity and resilience to enhance economic development and to facilitate the integration of climate change adaptation into relevant policies, programs and activities, in particular development planning processes and strategies, across sectors and levels (MEFCC, 2017).

NAP is a continuous, progressive and iterative process that follows a country-driven, gender-sensitive, participatory and fully transparent approach. Agricultural adaptation is tightly linked to many other cross-cutting or multi sectoral adaptation issues (UNDP, 2004). Cross-sectoral issues, such as early warning systems, disaster reduction and management, and capacity development, are particularly relevant for agricultural stakeholders (Mulat, 2016). The integration of climate change adaptation into relevant policies, programs and activities, in particular development planning processes and strategies, across sectors and levels is essential. Mainstreaming adaptation in development plans, policies and strategies is also identified as a strategic priority for the adaptation plan (FDRE, 2018). The formulation and implementation of NAPs is meant to be a cross-sectoral and multi stakeholder process. It needs to engage all relevant stakeholders, including those from all the agriculture sectors, to identify and prioritize adaptation actions, and the allocation of development and climate financing (Kaisa Karttunen, 2017). In this regard, it is also important to avoid maladaptation, i.e. an action or process that increases vulnerability to climate change-related hazards.

The agriculture sectors also engage many different stakeholders, including indigenous people and women and youth, many of whom are not always in a position to effectively engage in planning and decision-making processes (FAO, 2018). The adaptation options identified in the NAP-ETH will be relevant and will have significant impact if both men and women participate in and benefit from the action the plan of climate change adaptation, women are given due attention because they are often more vulnerable to changes in climate (EFDRE, 2019). The

preparation of the National Adaptation plan of Action (NAPA) s has shown the importance of ensuring a strong engagement of national stakeholders from all sectors in the process of identifying priority actions. Sector-specific actions are needed to ensure that traditionally under-represented systems and communities are considered sufficiently in adaptation planning (Kaisa, 2017). Realization of these strategic priorities is critical to enable effective implementation of the options identified above.

To achieve NAP-ETH goals it needs strong institutional capacity, Intensive capacity building activities will be carried out during the first five-year implementation period of the NAP-ETH in sector line ministries (CRGE Directorate/Unit), regions, city government/ administrations, woreda and kebeles that are responsible for the implementation of NAP-ETHs, so as to ensure timely and accurate information flow and feedback for the M&E system of the NAP-ETH (EFDRE, 2019). Implementation agencies at federal, regional, and local levels need to have adequate human resources and equipped with sufficient M&E capacity so as to ensure the M&E system operates effective during the plan period.

Effective governance is believed to play a significant role in ensuring the successful implementation of the objectives of the National Adaptation Plan (UNFCCC, 2014). The existing CRGE structure is used as the governance structure for the implementation of NAP-ETH. The governance structure of CRGE has captured coordinating, implementing, and executing entities at all government administration levels from the Federal to Regional to Woreda administrative levels. It is not advisable to create new and independent NAP-ETH governance structure; rather, it is recommended to use the existing CRGE governance structure (EFDRE, 2019).

In the governance structure, implementation of NAP-ETH as a whole fall under the mandate of the various sectoral institutions, such as the Ministry of Environment, Forest and Climate Change (MEFCC), Ministry of Agriculture and Natural Resource and other social sectors, commissions/agencies, research and academic institutions, NGOs, CSO, and private sector actors (EFDRE, 2019). The MEFCC holds responsibility for coordination of the implementation of the NAP-ETH, and for coordination of required follow up actions. It has been understood that the implementation capacity of coordinating, implementing and executing entities at all levels of government administration is believed to play a pivotal role in realizing the CRGE vision and the

NAP (EFDRE, 2019). However, a wide implementation capacity gap has been observed among CRGE implementing sector offices in relation to organizational, system and human capacity. This would be one of the major constraints encountered in implementing and Achieving NAP. The implementation of NAP-ETH benefits from continuous capacity assessment works and targeted capacity Building activities (EFDRE, 2019).

M&E of adaptation in the agriculture sector should have a clear goal, which aligns with national policies, including on-going country level efforts towards reporting to major international mechanisms (e.g. Paris Agreement, SDGs, The Sendai Framework) (FAO, 2018). The M&E system should include a Theory of Change, a purpose and focus. Monitoring and evaluation (M&E) frameworks provide a means to track and assess whether activities and policies are achieving desired goals and objectives. M&E of adaptation and agriculture should build on existing M&E systems, available data and institutional arrangements and feed back into the iterative planning process of a NAP, whilst contributing to learning. In the agriculture the M&E systems of a range of programs (PSNP, SLM, etc.) will track data that is relevant for understanding impacts and outcomes of adaptation, and the performance of adaptation initiatives. (FAO, 2018). Links would be made between the M&E systems of relevant long-term programs, and the NAP-ETH M&E system will adapt indicators from these long-term programs (EFDRE, 2019). The NAP-ETH M&E system outlines national, high-level results for sectors.

The M&E system will support adaptive management of the implementation process, linking to the M&E systems of the CRGE, GTP II and other relevant programs such as the Productive Safety Net Program (PSNP). All actors involved in implementing NAP-ETH activities will have monitoring responsibilities within their scope of operations. Mid-term and final evaluations will be carried out during the five-year implementation cycle of the NAP- ETH (EFDRE, 2019).

4.6 Institutional capacity to engage stakeholders for climate change adaptation in the agriculture sector

Climate change adaptation is a multi-sectoral issue that requires collaboration in a coordinated manner among multi-sectoral institutions in planning and implementation of climate change adaptation strategies, plans and policy frameworks. Based on the assessment 32, 14 and 8 percent of the respondents stated that their institutions had a moderate, high and very high

capacity, respectively, to coordinate climate change adaptation. The majority of the respondents, 32 and 18 percent, stated that these agricultural institutions achieve high and very high integration with research institutions. Also, a majority of the respondents in which 40, 14 and 4 percent indicate that these institutions have moderate, high and very high integration and collaboration with the Ministry of Agriculture (MoA), the regional bureaus, and development partners; and that they are working together to enhance coordination among each other to adapt to climate change.

Structural issues, such as limited financial support, lack of technical capacity, overlapping sectorial objectives, and a lack of synergy between the diverse sectors, have impeded efficient coordination and, consequently, implementation of the climate change agenda. The majority of the respondents, 66 percent (36 percent moderately, 14 percent strongly and 16 percent very highly), stated that the human and institutional capacity of the coordination unit is strong enough to conduct a coordination role that includes following up on climate change adaptations that are mainstreamed among the directorates in these institutions.

Collaboration in a coordinated manner among multi-sectoral institutions in planning and implementation of climate change adaptation strategies, plans and policy frameworks are essential based on the assessment of the majority of the respondents. 52 percent (42 percent low and 10 percent of respondents state that collaboration in coordinated institutions is not strong and (30 percent moderate, 14 percent strong and 4 percent very strong) say that these institutions collaborate well to adapting to climate change. 34 percent and 26 percent moderately and highly agreed, respectively, that their institutions are committed to ensuring that partners and stakeholders have adequate access to the Ministry, as well as to the institutional information and knowledge necessary, to support the implementation of the national adaptation priorities

Table 3 : Institutional capacity to engage stakeholders for climate change adaptation in the agriculture sector

Stakeholders Involvement	No Answer	Very low	Low	Moderate	High	Very High
Collaboration in a coordinated manner among multi-sectorial institutions	0	10	36	32	14	8
Human and institutional capacity of the coordination unit to conduct coordination role for climate change adaptation	0	10	26	42	14	8
The level in which, the regional bureaus, and development partners work together	16	10	16	40	14	4
The extent to which the climate change mandate is known by relevant external stakeholders	0	10	44	36	10	0
The staff capacity for mobilizing and engaging stakeholders and partners	0	10	28	28	22	12
The extent to which stakeholder engagement is a priority for the institution in supporting implementation of the national adaptation priorities	0	4	6	42	44	4
The institutional commitment to ensure that stakeholders to have adequate access to the institution information	0	12	28	34	26	0
existing institutional arrangements support the institutions role in engagement with stakeholders on climate change adaptation	0	6	40	42	4	8
The extent in which services address stakeholders' climate change needs.	0	12.5	45.8	35.4	6.3	0
institutional capacity to conduct coordination role for climate change adaptations mainstreamed among the	0	6	28	36	14	16

institution						
Collaboration in a coordinated manner among multi-sectoral institutions	0	10	42	30	14	4
Average	1.45	9.14	30.89	36.13	16.57	5.82

4.7. Institutional Capacity for Information Collocation and Data Management To Adapt To Climate Change In The Agriculture Sector

The extent to which the ministry/department/unit access, manage and provide information on climate vulnerability, hazards and impacts to support decision-making on adaptation is crucial. Based on the assessment, the majority of respondents, 64 percent (30 percent moderate, 22 percent high and 12 percent very high) stated that institutions have the mandate to provide information for decision-making, and the majority of the respondents, 56percent (34 percent moderate and 22 high), stated that these institutions have made sufficient efforts to prioritize the climate information and data analysis needed for decision-making. Based on the above table, the prioritization of appropriate information is not the only problem. Prioritization must also match with the stated climate change goals and objectives of the organization. In this regard, 68 percent (24 percent moderate, and 44high) indicate that their institutions have capacity to align with the goals and objectives of the organization.

Regarding effective climate change, adaptation requires spatially and temporally downscaled climate change projections. The majority of respondents, 66 percent (44 percent moderate, 18 percent high and 4 percent very high) states that staffs members in these institutions are knowledgeable, adequately qualified, and competent in analysis of climate scenarios, climate vulnerability assessments, and provision of information on hazards and impacts. All of which support decision-making on adaptation measures.

Insufficient availability of and access to relevant climate information has been reported as a barrier to adaptation (Adger et al., 2007 and OECD, 2006). Based on the assessment, a majority of respondents, 52 percent (8 percent very low and 44 percent low), states that this agricultural institutions have limited capacity to generate climate data and to analyze information and data to satisfy the need for climate change adaptation . Also, a majority of the respondents, 54 percent

(10 percent very low, 44 percent low and), stated that systems are developed by these institutions (that is procedures, infrastructure and resources) to collect, monitor and analyze appropriate climate data. Yet, the majority of respondents, 52 percent (14 percent very low and 38 percent low and), indicated that their institutions have limited capacity to avail and collect historic data on climate change adaptation. This will affect the institution capacity to learn from previous activities and impacts of climate change adaptation.

By considering the above information, a majority of respondents, 54.67 percent (34.22 percent moderate, 18.67 percent high and 1.78 percent very high), states that these agricultural institutions have adequate capacity to manage climate change information and data for adaptation decision-making and implementation.

Table 4: Institutional capacity for information colocation and data management to adapt to climate change in the agriculture sector

Information collocation and data management	No Answer	Very low	Low	Moderate	High	Very High
Mandate to manage and provide information on climate vulnerability, hazards and impacts to support decision-making on adaptation in agriculture	8	8	20	30	22	12
Access, manage and provide information on climate vulnerability, hazards and impacts to support decision-making on adaptation	4	14	38	30	14	0
Staff knowledgeable, adequately qualified and competent in analysis of climate scenarios, climate vulnerability assessments, provision of information on hazards and impacts to support decision-making on adaptation	0	2	32	44	18	4
Efforts made to prioritize needed climate information, data and analysis	0	6	38	34	22	0
Prioritizations match with stated climate change goals and objectives of the organization	0	10	22	24	44	0
Systems (procedures, infrastructure, resources) in place to collect and monitor appropriate	0	10	44	38	8	0

climate data, information and analysis						
Relevant staff understand climate information, data and analysis	0	12	28	44	16	0
Climate data and, information or analysis satisfy stated purposes	4	8	44	32	12	0
Availability of historic data archived	4	14	38	32	12	0
Average	2.22	9.33	33.78	34.22	18.67	1.78

4.8 Institutional capacity to monitor and evaluate progress for climate change adaptation in the agriculture sector

Monitoring and evaluation refers to the appraisal of climate change impacts, financial resources and adaptation performance; and fostering learning on adaptation; ensuring effective resource allocation, improving accountability, steering adaptation plans and activities, and fostering institutional adaptive capacity (GIZ, 2016). M&E forms an important part of climate adaptation decision-making, mainly because climate adaptation decisions are to be made amidst multiple future uncertainties (UNFCCC, 2010). M&E systems emphasize that adaptation should be continuous, flexible, and subject to periodic reviews. M&E should provide information that is credible and useful, enabling the incorporation of lessons learned into the decision-making process of both recipients and donors’ (OECD 2002, p. 21).

The above table shows that a majority of respondents, 80 percent, states that the institution have a respective mandate for M&E. During the group discussion, a majority of the respondents stated that their institutions have their own climate change unit that has a mandate to monitor and evaluate climate change adaptation processes.

M&E is a continuous function that uses the systematic collection of data on specified indicators to provide management and main stakeholders of an ongoing development intervention with indications of the extent of progress, achievement of objectives, and progress in the use of allocated resources and time. The majority of the respondents, 52 percent (10 percent very low, 10 percent low, and 32 percent moderately) states that this institution use its M&E system to

assess progresses and performance on climate change Adaptation . Only 48 percent of the respondents stated that their institutions use its M&E system/framework/procedures to assess its performance on adaptation and that their institution has adequate M&E systems and frameworks in place to monitor and evaluate their progress on climate change adaptation. The above table indicates that a majority of the respondents, 60 percent (50 percent moderate, 6 percent high and 4 percent very high), stated that their institutions are horizontally and vertically integrated and only 40 percent of the respondents states that this integration is not strong enough to monitor and evaluate their progress adequately.

Based on the above table, a majority of the respondents 60.4 percent (32 percent moderate, 19.6 percent high and 8.8 percent very high) stated that their institutions have adequate capacity to monitor and evaluate their progress on adaptation. In addition to this, during the discussion, a majority of the respondents mentioned that the CRGE and Adaptation plans and other supplementary frameworks prioritize M&E. All of these processes promote continuous monitoring, evaluation and reporting of adaptation actions to manage uncertainty, ensure ‘learning by doing,’ and review decisions in light of more information. M&E systems should assess whether the adaptation actions in the agriculture sector delivered the intended benefits or whether the actions caused adverse, unanticipated outcomes (OECD, 2009). Improved sector-level, climate change adaptation M&E makes the sector more resilient and better able to respond effectively to climate change risks, thus improving the performance of these systems within their institutions is needed.

Table 5: Institutional capacity to monitor and evaluate progress for climate change adaptation in the agriculture sector

Monitoring and Evaluation	No Answer	Very low	Low	Moderate	High	Very High	Total
Mandate for M&E of adaptation	6	6	8	26	30	24	
Existing M&E system for adaptation	6	14	24	22	26	8	
Adequate thematic specialization to	10	10	22	24	30	4	

perform M&E of adaptation to CC							
The institution use its M&E system assess its performance on adaptation	10	10	32	38	6	4	
Adequate institutional arrangements to report on adaptation performance	6	10	28	50	6	4	
Average	7.6	10	22.8	32	19.6	8.8	100

4.9 Institutional Capacity to Mainstream Climate Change Adaptation in the Agriculture

Mainstreaming is an iterative process of integrating adaptation considerations into policy-making, budgeting and implementation processes at national, sector, and subnational levels. It is a multi-year, multi-stakeholder effort that entails working with government actors (head of state offices, environment, finance and planning bodies, sector and subnational bodies, political parties and parliament, national statistics office and judicial system), non-governmental actors (civil society, academia, business and industry, general public and communities, and the media) and development actors. Based on the above table, 60 percent (50 percent moderate, 6 percent high and 4 percent very high) of respondents agreed that stakeholders are consulted to mainstream climate change adaptation in their activities and plans. Only 36 percent (28 percent low, 8 percent very low) of respondents stated that stakeholder consultations are not adequate to mainstream climate change adaptation. Mainstreaming climate change adaptation is not only about addressing climate risks in planned activities, but also in many cases, targeted and/or cross-cutting actions may be needed to reduce vulnerability and build resilience to climate change.

The adverse impacts of climate change overly burden the poorest and the most marginalized segments of society (e.g., women, children, and indigenous peoples). Gender-based inequalities in law and in practice, gender-defined roles in society, and sociocultural constraints render women disproportionately vulnerable to climate change (UNDP, 2016). Mainstreaming gender in climate change policies and programmes helps ensure the integration of women's issues, needs

and contributions across the planning and execution cycle of climate change policies and projects. Gender mainstreaming requires sufficient and appropriate expertise on community based adaptation approaches and alignment with the Ministry/institution. Based on the above table, the majority of respondents, 52 percent (44 percent low and 8 percent very low)) stated that their institutions have low capacity to mainstream gender adequately.

Decision makers and development partners at all levels and sectors need to integrate gender perspectives into the planning, financing and implementation of adaptation efforts. A growing body of evidence establishes that gender equality and women's empowerment lead to productivity gains and environmental sustainability in the agriculture sectors. Involving women and men and drawing on their distinct experiences in communities and households will increase the effectiveness and sustainability of climate responses in agriculture. Based on the above table, the majority of the respondents, 50 percent (16 percent very low, 34 percent low) stated that their institutions had low capacity for conducting adequate gender-responsive awareness raising trainings and initiatives on climate change adaptation. Adaptation actions that do not take gender perspectives into account may result in maladaptation by unintentionally amplifying gender inequalities. This, in turn, can lead to detrimental effects on women as well as threats to the effectiveness of the adaptation strategy itself.

Given the cross-cutting nature of climate change impacts, that is, cutting across economic sectors, geographic and administrative boundaries; and the lengthy time scale needed for change, it is essential that adaptation policies or strategies are formulated as part of broader policies for development. This requires integrating policies and measures addressing climate change into ongoing sectoral and development planning and decision making. Based on the above table, a majority of the respondents, 64 percent (34 percent moderately, 22 percent highly and 8 percent very highly), agreed that their institutions integrate and mainstream climate change adaptation into development policies, strategies and plans. Only 24 percent of respondents (20 percent low and 4 percent Very low) believed that this integration is weak and not adequate. In, of respondents stated that climate change adaptation priorities have been integrated into crops, livestock, fisheries, aquaculture, and forestry policies, strategies and plans. This indicates that this institution has capacity to mainstream climate change adaptation into policies, strategies and plans yet there are limitations to identifying climate change priorities.. Mainstreaming can

increase the likelihood of success of development under a changing climate. It can lead to enhanced results across programmatic objectives, contribute to more efficient use of financial and nonfinancial resources, and improve the sustainability and scale of adaptation efforts.

Table 6: Institutional capacity to mainstream climate change adaptation in the agriculture

Mainstreaming	No Answer	Very low	Low	Moderate	High	Very High
Stakeholders identified and consulted	4	8	28	50	6	4
Adequate gender-responsive awareness raising trainings on CCA	8	16	34	18	20	4
Gender mainstreaming in in the institution for CCA	8	8	44	28	8	4
appropriate expertise on gender mainstreaming in the institution	8	10	48	18	12	4
Integration of climate change adaptation into development policies, strategies and plans	6	6	24	34	22	8
Integration of agricultural sectorial priorities into CC policies, strategies and plan	4	4	20	42	22	8
Average	7.14	8.57	33.71	28.86	15.43	6.29

4.10 Institutional capacity to implement climate change adaptation in the agriculture

Large reductions in adverse impacts from climate change are possible when adaptation is fully implemented. Based on the above table, a majority of the respondents, 84 percent (14 percent very low, 54 percent low and 16 percent moderate), stated that their institutions do not have the capacity to use and manage the available financial resources in a such way that the planed adaptation objectives can be met.

Clear timelines, responsibilities, and resources assigned for the climate change services and programs are needed to improve the sector into becoming more climate resilient and adaptable to climate change. Agricultural institutions in this study have their own climate change resiliency and green economy unit at directorate level which assigns expertise, budget and responsibilities. Based on the above table, a majority of the respondents, 60 percent (44 percent moderate, 8 percent high and percent very high), stated that their institution has adequate specialized units and staff to implement climate change adaptation.

The increasing availability of and access to adaptation finance is key to raising adaptive capacity. For many agricultural organizations, learning how to access and effectively use local, public-private and international financing options represents the first step in the long-term transition to climate resilient development pathways in agriculture. Knowledgeable staff in agriculture, adequately qualified and competent in leveraging climate finance, addressing climate risks and opportunities, and appraising and identifying adaptation options helps agricultural institutions identify what it takes to put in place the necessary strategies, technical and financial means to mainstream climate change considerations into agriculture, forestry and fisheries and to provide the basis to shift to sustainable agriculture.

Leveraging climate finance, addressing climate risks and opportunities, and appraising and identifying adaptation options is critical to implement climate change adaptation in the agriculture sector, Based on the above table, a majority of respondents, 50 percent (36 percent moderate , 10 percent low and 4 percent moderate), stated that their institutions have the capacity to leverage climate finance adequately. Targeted efforts for capacity building can thus help implementers better understand the implications of climate change and be better equipped in terms of how to incorporate adaptation considerations within their decision frameworks (OECD,

2009). Adapting to the impacts of climate change requires the mobilization of a significant amount of funding for adaptation measures in a wide range of sectors. Based on the above table, a majority of respondents, 68 percent (42 percent moderate , 18 percent high and 8 percent very high) stated that staff are competent or have adequate knowledge to implement climate change adaptations. Knowledge is the foundation of capacity for staff and the institution to implement climate change adaptation. It can developed through education, training and learning through experience sharing. This also indicates there is a need to develop the skills of experts and to develop policy and strategies to create an enabling environment to leverage finance from local and international public or private sources.

Meeting the implementation challenge also means collaborating with national, sector and subnational bodies to build their capacities to implement policy measures for adaptation. Based on the above table, a majority of respondents, 78 percent (46 percent moderate , 10 percent high and 8 percent very high), stated that these institutions have limited operational capacity to support national and subnational adaptation implementation actions. By summarizing the above table, a majority of the respondents 52.25 percent (34 percent moderate 13.25 percent high and 5 percent Very high) stated that their institution has adequate capacity to implement climate change adaptation in the agriculture sector

Table 7: Institutional capacity to implement climate change adaptation in the agriculture

Implementation of climate change adaptation	No Answer	Very low	Low	Moderate	High	Very High	Total
Level of financial resources available for planned adaptation	4	14	54	16	12	0	
Leveraging climate finance to addressing climate risks	4	14	32	36	10	4	
Adequate thematic specialization institution to	4	2	34	44	8	8	

support implementation							
Staff are competent in implementing adaptation	4	4	24	42	18	8	
Operational capacity to support CCA implementation.	4	2	30	46	10	8	
Average	4	9.5	34.25	34	13.25	5	100

4.11 Institutional Capacity to Adapt to Climate Change

Maladaptation is the result of sector-based development policies and measures that deliver short-term gains or economic benefits but increase vulnerability in other sectors in the medium to long term. The agriculture sector is the main user of land and water and, therefore, interact closely with other economic sectors that compete for access to these increasingly scarce resources. To address some of these issues in medium to long term planning and budgeting, countries may choose to formulate and implement sectorial plans, such as National Adaptation Plans (NAPs). Based on the above table, a majority of respondents, 71 percent (36 percent moderate, 28 percent high and 7 percent very high) agreed that their agricultural institution have capacity to plan for climate change adaptation.

The linkages between agricultural institutions and other stakeholders continue to be problematic in most developing countries, despite the fact that this has been an important area of reform in the agriculture sector. Agricultural institutions need to build closer connections with agricultural stakeholders to incorporate local knowledge, gain a clear understanding of farmers' needs and problems, and obtain feedback on how climate change adaptation decisions and interventions are working. Agricultural institutions also need to establish stronger connections with researchers, as most of the technological options promoted under climate change adaptation decisions are more knowledge-intensive and locally specific than traditional approaches for agricultural development. Based on the above table, a majority of respondents, 57 percent (37 percent moderate, 15 percent high and 5 percent very high) stated that an institutions' capacity to involve stakeholders on day-to-day activities, decisions and engagement on climate change adaptation

will improve the capacity of agricultural institutions to provide context specific and timely services for farmers.

An important prerequisite for informed decision-making on adaptation is that it is based upon the best available information on the implications of current and future climate change for the sector. Based on the above table, a majority of respondents 55 percent (34 percent moderate, 19 percent high, and 2 percent very high), agreed that these institutions have adequate capacity to collect and manage data for climate change adaptation decisions and interventions. This will help the institutions to provide appropriate information for decision makers and stakeholders to use for climate change adaptation.

Meeting the implementation challenge thus calls for the integration of adaptation in the national monitoring system, to track emerging trends related to climate change, as well as the implementation and impact of policies, developing scientific indicators, strengthening data collection and management, and fully integrating climate change adaptation into the sectorial monitoring system is crucial. Based on the above table, a majority of respondents, 60 percent (32 percent moderate, 10 percent high and 9 percent very high), believes that this institution has adequate capacity to monitor and evaluate the progress on climate change adaptation.

Based on the above table 50 percent (28.86 percent moderate, 15.43 high and 6.29 very high) of the respondents believes that this institutions have capacity to mainstream climate change adaptation plans and actions in to their day today activities. To make the agriculture sector sustainable it needs strong climate change adaptation actions and implementing capacity based on the above table majority of the respondents,52 percent (34 percent moderate ,13.25 percent high and 5percent Very high) believes that this institution have adequate capacity to implement climate actions.

By surmising institutional capacity in adapting the effects of climate change in the sector vis a vis planning, mainstreaming, stakeholder's involvement and collaboration, knowledge and information management as well as monitoring and evaluation progress in climate change adaptation and capacity to mainstream climate change majority of the respondents , (33.49 percent moderate ,18.59 percent high and 5.90 percent very High) believes this agricultural institutions have adequate capacity to adapt climate change and only39 percent's (9.29 percent

very low and 29.05 percent low) believes that this institutions have limited capacity to adapt the effect of climate change in the agriculture sector.

By assess existing policy frameworks, including climate change strategies and policies as well as adaptation plans that support the institutional role and engagement on climate change adaptation. This agricultural institutional have policy frameworks, strategies and plans including NAP and CRGE and they have capacity integrate and implement in to agriculture sector and it also needs improvement in the institutional capacity to implement at a full scale.

Table 8: Institutional capacity to adapt to climate change

Overall outlook of the respondents in the institutional capacity	No Answer	Very low	Low	Moderate	High	Very High
Climate change planning in the organization	0.00	9.14	18.86	35.71	28.00	7.71
Stakeholder involvement/collaboration for climate change adaptation in the agriculture sector	1.45	9.14	30.89	36.13	16.57	5.82
Information, colocation and data management	2.22	9.33	33.78	34.22	18.67	1.78
Monitoring and evaluation in climate change adaptation in the agriculture sector	7.6	10	22.8	32	19.6	8.8
Climate change adaptation mainstreaming in the agriculture sector	7.14	8.57	33.71	28.86	15.43	6.29
Implementation on CCA	4	9.5	34.25	34	13.25	5
Institutional capacity to adapt climate change in the agriculture sector	3.74	9.28	29.05	33.49	18.59	5.90

CHAPTER FIVE

4. CONCLUSION AND RECOMMENDATIONS

4.1 conclusion

The general objective of this study was to assess the institutional capacity to adapt climate change in Ethiopian agriculture sector from the literature review and primary data that have collected on the research process the researcher have learned climate change is a real problem and it needs capacity to adapt and mitigate its effect. Ethiopia is already under pressure from climate stresses which increase vulnerability to further climate change and reduce adaptive capacity. Climate change have a particularly devastating effect on agriculture, which is the mainstay of most Ethiopian economies. This has affected food production with its resultant effect on widespread poverty.

In this study, the institutional capacity has assessed from planning climate change adaptation activities, integrating climate change adaptation in to policy frameworks, engaging stakeholders including women's and vulnerable communities, monitoring and evaluating adaptation activities and progress and informational collection and data management the research also tries to look the capacity to implement climate change adaptation actions. The agricultural institutions assessed in this research has moderate capacity to adapt the effect of climate change and implementing adaptation actions. These institutions also have policy frame works, strategies and adaptation plans including NAP and CRGE to integrate plan and implement climate change adaptation actions, this institutions also have well developed units to implement and monitor and Evaluate the progress in Climate change adaptation. To adapt the effect of climate change it needs to improve the institutional capacity of these agricultural institutions.

Recommendations

Based on the findings and conclusion, the study suggests the following recommendation to enhance the institutional capacity of study area:

1. Incorporating or integrating adaptation to climate change into planning processes is a necessary for sustainable development over the long term and for sustainable agricultural Productivity.
2. Multilevel institutional coordination between different stake holders needed to improve the capacity of the institution in Climate change adaptation and it also needs to improve the vertical and horizontal integration of adaptation actions across levels of development planning and implementation within this agricultural institution.
3. Mainstreaming climate change adaptation into agricultural activities creates enabling Environment to avoided policy conflicts; reduced risks and vulnerability and provides greater efficiency compared to managing adaptation separately in the agriculture
4. Progress towards adaptation should be monitored across all adaptation processes and components (stake holders Engagement, mainstreaming, planning and implementation). The monitoring and evaluation should capture both stand-alone actions and actions fully integrated into sectoral policies plans and strategies to implement climate change adaptation in the agriculture.
5. Improving the Institutional capacity is needed for agricultural adaptation, strategies and policy frameworks should develop trough high level of cooperation and information-sharing (of scientific knowledge, and of best practices and experiences in adaptation planning, policymaking and implementation) among various actors for Climate change adaptation in the agriculture sector.
6. The capacities of institutions and the degree of coordination between institutional levels critically determine the effectiveness of climate change adaptation and climate risk management actions and it needs to improve the capacity to implement climate change adaptation in Agriculture. Improve adaptation actions in Agriculture and create strong institutional and technical capacities, inter-organizational networking and cooperation with clearly defined roles and responsibilities to achieve sustainable Agriculture.

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Annex

Questionnaire

This questionnaire is prepared to collect data for the fulfillment of Masters of Environment and sustainable development thesis. The main aim of this questionnaire is to study and analyze institution Capacity in fulfilling their mandates Climate Change Adaptation in the Agriculture sector in the with due focus on Ministry of Agriculture, Agriculture Transformation Agency, Ethiopian Agriculture Institute and Environment Forest and Climate Change. Based on the finding of results, appropriate solutions will be recommended. The purpose of the study is purely academic. Hence, I will assure you that it will have no any negative effect on you as an individual or on your organization. The effectiveness of the study depends on your genuine and frank response which will be kept confidential. I, therefore, request you to fill the questionnaire honestly and frankly.

I would like to thank you for your kind cooperation in advance

Part 1: Respondents profile

The followings are questions concerning your personal information please respond then by putting either or in the box best describes you.

1. Gender: Male Female
2. Education level: Diploma Degree Masters Ph.D.
3. Profession of the respondent
4. Level of expertise: Expert Senior Expert Team leader
Director

Work experience in the organization: 1 -3 year 1- 5 year 6 -10 year >10 year

Part 2: questions related to research questions

1. Question related to climate change planning in the organization

Instruction: please respond them by putting “X” in the box that describe the question

WHERE 1= Very low 2=low 3= Moderate 4= High 5= Very high

NO	QUESTIONS	1	2	3	4	5
1	Are the ministry/the institution supported by robust policy frameworks (climate change strategies and policies at national or sectorial level to address adaptation planning)?					
2	Alignment among the short-, medium- and long-term objectives and actions of the existing adaptation policy frameworks (climate change strategies, policies, NAP, National Development Plan)?					
3	The degree of clarity of mandate, vision and mission within the ministry/department/unit with regard to adaptation planning?					
4	Staff capacity and operational procedures to ensure appropriate priorities for the agricultural sector, as well as integrate agriculture into the NAP plan?					
5	Clear timelines, responsibilities, and resources assigned for the climate change services and programs?					
6	Does the ministry / the institution use risk maps and data for adaptation planning					
7	Does the ministry/department/unit have the staff capacity and operational procedures to support national and subnational adaptation planning and implementation to respond to the challenges faced by the agriculture sector?					
8	To what extent is the staff knowledgeable, adequately qualified and competent in prioritizing adaptation for agriculture sectors in national and sectorial policy frameworks (climate change strategies, policies, NAP)?					

2. Questions related to stakeholder’s involvement /collaboration for climate change adaptation in the agriculture sector.

Instruction: please respond them by putting “X” in the box that describe the question

WHERE 1= Very low 2=low 3= Moderate 4= High 5= Very high

No	Questions	1	2	3	4	5
1	To what extent is the staff knowledgeable, adequately qualified and competent in leveraging climate finance, addressing climate risks and opportunities, and appraising and identifying adaptation options?					
2	Is the human and institutional capacity of the coordination unit is strong enough to conduct coordination role to follow-up climate change adaptations mainstreamed among the directorates in the ministry?					
3	Is there any collaboration in a coordinated manner among multi-sector institutions in planning and implementation of climate change adaptation strategies, plans and policy frame works?					
4	Is there coordination existed and experienced between MoALFand research institutes?					
5	The level in which MoALF the regional bureaus and development partners working together to enhance coordination among each other?					
6	To what extent do the policy frameworks (climate change strategies, policies, NAP) and existing institutional arrangements support the ministry/department/unit role in engagement with stakeholders on climate change adaptation?					
7	The institutional commitment to ensure that partners and stakeholders have adequate access to the Ministry/ the institution information and knowledge necessary to support the implementation of the national adaptation priorities?					
8	To what extent does the ministry/department/unit coordinate and collaborate with actors and stakeholders at national and subnational levels for adaptation planning and implementation?					

9	To what extent is stakeholder engagement and partnership building a priority for the ministry/department/ unit in supporting implementation of the national adaptation priorities?					
10	Level of involvement of national research institutes in climate change adaptation					
11	Does the ministry/department/unit have the staff capacity and operational procedures for mobilizing and engaging stakeholders and partners?					
12	To what extent is the climate change mandate/mission known to and respected by relevant external stakeholders (e.g., other relevant organizations, beneficiaries)?					
13	What extent do services and programs address stakeholders' climate change needs and priorities?					
14	Is the human and institutional capacity of the coordination unit is strong enough to conduct coordination role to follow-up climate change adaptations mainstreamed among the directorates in the ministry?					
15	Collaboration in a coordinated manner among multi-sector institutions in planning and implementation of climate change adaptation strategies, plans and policy frame works?					

3. Question related to information colocation and data management

Instruction: please respond them by putting "X" in the box that describe the question

WHER 1= Very low 2=low 3= Moderate 4= High 5= Very high

No	Questions	1	2	3	4	5
1	The ministry/department/unit have a mandate to manage and provide information on climate vulnerability, hazards and impacts to support decision-making on adaptation in agriculture?					
2	The extent in which the ministry/department/unit access, manage and provide information on climate vulnerability, hazards and					

	impacts to support decision-making on adaptation?					
3	To what extent is the staff knowledgeable, adequately qualified and competent in analysis of climate scenarios, climate vulnerability assessments, provision of information on hazards and impacts to support decision-making on adaptation?					
4	Efforts made to prioritize needed climate information, data and analysis?					
5	How well does the prioritization match with stated climate change goals and objectives of the organization?					
6	system (procedures, infrastructure, resources) in place to collect and monitor appropriate climate data, information and analysis?					
8	Relevant staff understand climate information, data and analysis? Who are the relevant staff? How well does leadership understand climate change information, data and analysis?					
9	Does the organization climate data and the generated climate data, information or analysis satisfy stated purposes and the leave the quality monitored					
10	The availability of historic data archived? How useable is the format? Who has access to it?					

4. Questions related to monitoring and evaluation in climate change adaptation in the agriculture sector.

Instruction: please respond them by putting “ X” in the box that describe the question

WHERE 1= Very low 2=low 3= Moderate 4= High 5= Very high

No	Questions	1	2	3	4	5
1	Does the ministry/department/unit have a mandate for M&E of					

	adaptation?					
2	Is there an existing M&E system/framework/procedure for adaptation?					
3	Is there adequate thematic specialization in the ministry/department/unit to perform M&E of adaptation to CC?					
4	To what extent does the Ministry/ the institution use its M&E system/framework/procedures to assess its performance on adaptation?					
5	Are there institutional arrangements to report on adaptation performance?					

5. Questions related to climate change adaptation mainstreaming in the agriculture sector

Instruction: please respond them by putting “ X” in the box that describe the question

WHERE 1= Very low 2=low 3= Moderate 4= High 5= Very high

No	Questions	1	2	3	4	5
1	How were these stakeholders identified and consulted? How well do they address gender and cultural barriers as related to climate change?					
2	Is there adequate gender-responsive awareness raising trainings and initiatives on climate change adaptation					
3	Is there sufficient and appropriate expertise on community based adaptation approaches and it aligned with gender mainstreaming in the Ministry/ the institution?					
4	Is there sufficient and appropriate expertise on community based adaptation approaches and gender mainstreaming in the Ministry/ /the institution?					

5	Level of integration of climate change adaptation priorities into crops, livestock, fisheries, aquaculture, and forestry policies, strategies and plans?					
6	Level of integration of climate change adaptation into development policies, strategies and plans					
7	Level of integration of agricultural sectoral priorities into climate change policies, strategies and plans?					

6. Questions related to climate implementation on climate change

Instruction: please respond them by putting “X” in the box that describe the question

WHERE 1= Very low 2=low 3= Moderate 4= High 5= Very high

No	Questions	1	2	3	4	5
1	Are enough financial resources available and managed in such a way that planned adaptation objectives can be met?					
2	Is there adequate thematic specialization in the ministry/ institution to support implementation of the adaptation Policy frameworks (climate change strategies, policies, NAP)?					
3	Leveraging climate finance, addressing climate risks and opportunities, and appraising and identifying adaptation options?					
4	Level of financial resources available and managed in such a way that planned adaptation objectives can be met?					
5	Is there adequate thematic specialization in the ministry/ department/unit to support implementation of the adaptation policy frameworks (climate change strategies, policies, NAP and short and long term sectoral adaptation plan)?					

6	To what extent is the staff knowledgeable, adequately qualified and competent in implementing adaptation,					
7	Does the ministry/department/unit have the staff capacity and operational procedures to support national and subnational adaptation implementation to respond to the challenges faced by the agriculture sector?					
8	To what extent is the staff knowledgeable, adequately qualified and competent in implementing adaptation and disaster risk reduction responses					

1. What are the Existing policy frameworks (climate change strategies, policies, NAP) and existing institutional arrangements that support climate change Adaptation in the agriculture sector
2. How does policy frameworks (climate change strategies, policies, NAP) and existing institutional arrangements support the ministry/department/unit role in engagement on climate change adaptation.....
3. How does MoALF the regional bureaus and development partners working together to enhance coordination among each other?
4. Does the organization generate climate data, information or analysis?
Yes No
a. For what purpose?
5. From where does the organization access climate information, data and analysis? How reliable are the sources?
6. What is the geographic and temporal scale of the available climate information, data and analysis (either produced internally or accessed externally)?
7. What sectors within the organization use the climate change information, data and analysis?
8. How well does the available climate information, data and analysis inform decision-making?
9. Is the decision-making based on scenario planning?
Yes No
10. What additional skills and capacity will be needed to perform effectively?

- A. Information and data on climate change adaptation.....
-
- B. Climate change adaptation planning.....
-
- C. Monitoring and Evaluation.....
-
- D. Implementation.....
-
- E. Mainstreaming climate change adaptation.....
-

11. What are the capacity strengths and gaps for climate change adaptation in the organization?.....

.....

.....

12. Finally, please state your recommendation for better Climate change adaptation in the agriculture

.....

.....

.....

Once again, I would like to thank you for your cooperation