Ethiopia's Climate Resilient Green Economy:

National Adaptation Plan (NAP) Implementation Roadmap

Federal Democratic Republic of Ethiopia

August 2020

Environment, Forest and Climate Change Commission

Original text: English

Cover image: iStock

This National Adaptation Plan (NAP) Implementation Roadmap was produced by the Environment, Forest and Climate Change Commission (EFCCC) of the Federal Democratic Republic of Ethiopia. It was developed through the United States In-Country National Adaptation Plan (NAP) Support Program in Ethiopia, which is implemented by the International Institute for Sustainable Development (IISD), host to the NAP Global Network Secretariat.

Any opinions stated herein are those of the author(s) and do not necessarily reflect the policies or opinions of the NAP Global Network, funders or Network participants.

Guidance in the development of this roadmap was provided by the EFCCC. The contributions of various institutions involved in stakeholder consultations are greatly appreciated. The roadmap document was prepared by a team of experts from Echnoserve Consulting PLC.

NAP Global Network

United States In-Country National Adaptation Plan (NAP) Support Program

Gift of the United States Government

In collaboration with: USAID FROM THE AMERICAN PEOPLE

Implemented by: IISD

Initial funding for the Network also provided by:

Federal Ministry for Economic Cooperation and Development

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Terms and Acronyms

AGP	Agricultural Growth Program
AM	Adaptive management
AO	Adaptation options
ARRA	Administration for Refugee and Returnee Affairs
ATA	Agricultural Transformation Agency
AWD	Acute Watery Diarrhea
BoA	Bureaus of Agriculture
BoANR	Bureaus of Agriculture and Natural Resources
BoFEC	Bureau of Finance and Economic Cooperation
BOFED	Bureaus of Finance and Economic Development
BRACED	Building resilience and Adaptation to Climate Extremes and Disasters
CAF	Cancun Adaptation Framework
CAM	Capacity Assessment Matrix
CBO	Community-based organizations
CHIP	Climate High-Level Investment Programme
CRGE	Climate-Resilient Green Economy Strategy
CR	climate resilience
CRWSP	Climate-Resilient Water Safety Plan
CSA	Central Statistics Agency
CSO	Civil society organizations
DA	Development Agents
DFID	Department for International Development
DRM	Disaster Risk Management
EbA	Ecosystem-based adaptation
EDRI	Ethiopian Development Research Institute
EFCCC	Environment, Forest and Climate Change Commission
EEFRI	Ethiopian Environment and Forest Research Institute
EIAR	Ethiopian Institute of Agricultural Research
EPACC	Ethiopian Programme of Adaptation to Climate Change
EPHI	Ethiopian Public Health Institute
FDRE	Federal Democratic Republic of Ethiopia
FIRM	Facilitating Implementation and Readiness for Mitigation
FAO	Food and Agriculture Organization of the United Nations
FCA	Federal Cooperative Agency
GCF	Green Climate Fund
GE	Green Economy

GEF	Global Environment Facility
GFCS	Global Framework for Climate Services
GHG	greenhouse gas
GoE	Government of Ethiopia
GTP	Growth and Transformation Plan
HACC	HIV and Climate Change Complex
HARITA	Horn of Africa Risk Transfer for Adaptation
HEA	Household Economy Approaches
HMIS	Health Management Information System
IEs	implementing entities
IISD	International Institute for Sustainable Development
IRLI	International Livestock Research Institute
JRIS	Joint Review and Implementation Support
IBCR	Institute of Biodiversity Conservation and Research
MoA	Ministry of Agriculture
M&E	Monitoring and Evaluation
MoF	Ministry of Finance
MoH	Ministry of Health
MoUDC	Ministry of Urban Development and Construction
MoWCY	Ministry of Women, Children and Youth
MoWIE	Ministry of Water, Irrigation, and Energy
NAP	National Adaptation Plan
NDC	Nationally Determined Contribution
NRMD	Natural Resource Management Directorate
NDRMC	National Disaster Risk Management Commission
NMA	National Meteorological Agency (formerly the National Meteorological Services Agency)
NNP	National Nutrition Program
NPC	National Planning Commission
NRM	National Resource Management
OWNP	One WASH National Program
PIF	Policy and Investment Framework
RLLP	Resilient Landscape Livelihood Project
PSNP	Productive Safety Net Program
SCIP	Strategic Climate Investment Programme
SDGs	Sustainable Development Goals
SDPRP	Sustainable Development and Poverty Reduction Program
SLM	Sustainable Land Management
SLMP	Sustainable Land Management Project

SNNP	Southern Nations, Nationalities and Peoples
TEK	Traditional Ecological Knowledge
UNFCCC	United Nations Framework Convention on Climate Change
UNSCN	United Nations System Standing Committee
WASH	Water, Sanitation, and Hygiene
WMO	World Meteorology Organization

1.0 Introduction

Climate change is a global development challenge that is causing widespread impacts on socioeconomic development through the increased intensity of weather extremes such as droughts, heatwaves, shifts in seasons, and intense storms. This crisis requires that countries adapt to its associated phenomena by integrating climate change responses into development planning, activities, and budgeting.

Ethiopia emits a very small proportion of global greenhouse gases (GHGs) and yet is highly vulnerable to the impacts of climate change, which have grave implications for the achievement of its development goals. It has been estimated that climate change could reduce the country's GDP by up to 10% by 2045 compared with a 2011 baseline scenario (Ministry of Environment, Forest and Climate Change [MEFCC] 2015). Climate variability and changes such as the increased intensity of severe weather events (particularly droughts), prolonged intra-sessional dry spells, and flash flooding stemming from rising temperatures and increasing rainfall variability, have impeded the country's efforts to realize its vision of inclusion and prosperity. Climate change, poverty reduction, and economic development are inextricably linked; consequently, climate change adaptation must be mainstreamed in development planning, projects, and programs (MEFCC, 2015).

Ethiopia's pastoral and agro-pastoral communities, as well as smallholder farmers, are particularly vulnerable to climate change. This exposure requires a concerted focus on adaptation to reduce poverty and build resilience. Adaptation activities in agriculture could cut climate shock-related losses by half (International Center for Tropical Agriculture [CIAT], 2017). However, the agricultural systems in Ethiopia are almost exclusively rain-fed. Of an irrigation potential of approximately 2.7 million hectares of land, only 2%–3% of the cropland is currently irrigated (Yirgu et al., 2013; Aragie, 2013).

In order to respond to the growing threat of climate change, the Federal Democratic Republic of Ethiopia crafted the Climate-Resilient Green Economy Strategy (CRGE) in 2011 and mainstreamed it into the second Growth and Transformation Plan (GTPII). The CRGE strategy consists of climate resilience (CR) and Green Economy (GE) components, with adaptation and mitigation programs prioritized within the strategy. The CR component, focused on climate change adaptation, outlines the strategy for achieving economic development sustainably, highlighting both the country's prospects for growth and its vulnerability to climate risks and changes that require a coordinated and sustained effort by all parts of the Ethiopian society—the government, civil society, academia, and—most importantly—the public.

Ethiopia recently completed the National Adaptation Plan (NAP-ETH), which provides an overarching framework for its response to the impacts of climate change. NAP-ETH has identified 18 adaptation options and five strategic priorities to be implemented between 2019 and 2030. It complements other elements of the country's climate change policy suite and

provides a plan for building CR across sectors and levels. It mirrors the National Adaptation Plan (NAP) Process as established under the United Nations Framework Convention on Climate Change (UNFCCC). This document builds on NAP-ETH, elaborating implementation strategies for the adaptation options and strategic priorities identified in the plan.

The objective of the NAP-ETH Implementation Roadmap is to identify key enabling activities instrumental to achieving the country's NAP, their timelines, and key milestones to note during implementation in collaboration with key actors responsible for their delivery. It will also help facilitate the implementation of actions identified through the NAP process. The NAP Implementation Roadmap will further contribute to identifying needs and gaps in relation to adaptation finance. The roadmap was developed through consultation workshops with stakeholders at federal and regional levels, a review of international experiences and nationally available key documents (including sectors' CR strategies), and individual interviews with key actors and major implementing partners.

The NAP-ETH Implementation Roadmap is targeted at a broad audience, i.e., sectoral institutions, research and academic institutions, community-based organizations, private investors, and resource partners/donors.

2.0 Background

Ethiopia is located in East Africa, in the sub-region known as the Horn of Africa. It has borders with Eritrea to the north and northeast, Djibouti and Somalia to the east, Sudan and South Sudan to the west, and Kenya to the south (see Figure 1). Ethiopia has an area of 1.14 million square kilometres and is the 7th largest country in Africa by size. The Federal Democratic Republic of Ethiopia (FDRE) consists of the federal government, nine regional states, and two city administration councils. At the regional state level, there exist over 70 zonal and 600 woreda administrations. The country has achieved significant economic growth over the past decade, becoming one of the top-performing countries on the continent in terms of economic development. Ethiopia envisions becoming a middle-income country by 2025. First, though, it must overcome various hurdles, including its high vulnerability to climate change.

Ethiopia's long-term strategy is reflected in its Growth and Transformation Plan (GTP). Now in its second phase (GTP II, 2015–2020), the GTP has taken a sector-by-sector approach to identify the specific activities to be implemented as well as the roles of NGOs and the private sector in economic development, alongside government institutions. The GTP emphasizes the contribution of crop and livestock production in both commercial and smallholder farming systems in the agriculture sector. In the industrial sector, it has focused on establishing light manufacturing industries, which are labour intensive and benefit citizens. In the mining sector, it seeks to collect, analyze, and interpret geoscience information for potential investors. In terms of infrastructure, the GTP encourages the development of infrastructure that supports rapid economic growth and structural transformation, creating mass employment opportunities. Referring to the GTP II, the TAK-Innovative Research and Development Institute (2016, p. 18), suggests that the government aims, "to improve transparency and accountability through continuous public–private dialogue and …transform the domestic private sector by supporting existing small manufacturing enterprises to grow and transition to medium- and large-scale manufacturing enterprises." According to the World Bank (2015) there are factors impeding ease of doing business in Ethiopia that demand a demonstrable commitment on the part of the government to invest in enhancing the technical capacity and competitiveness of local businesses, particularly those engaged in the construction sector.

Figure 1. Ethiopian political map

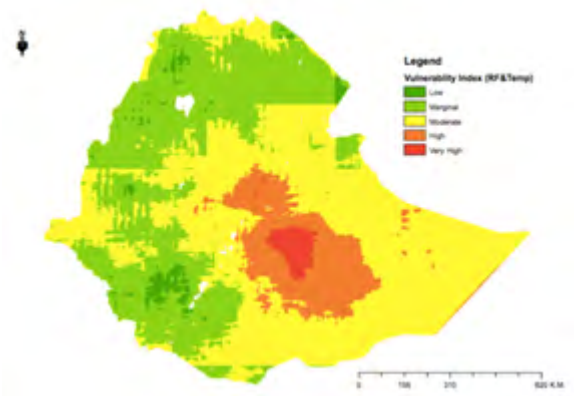
According to Echeverria and Terton (2016, pg. iii) changes to Ethiopia's climate (including changes to rainfall variability, increased

intensity of severe weather events, droughts, prolonged intra-seasonal dry spells, and flash flooding) are constraining

> the country's efforts to realize its vision of inclusion and prosperity. Ethiopia is among the countries that are most vulnerable to climate change in East Africa, and the phenomenon is expected to negatively impact progress in sectors such as agriculture, transportation, energy, and health. Ethiopia's pastoral and agro-pastoral communities, as well as smallholder farmers, are particularly vulnerable to climate change and will require a concerted focus on adaptation to reduce poverty and build resilience. The Government of Ethiopia has made efforts to recognize climate change as a risk in sectoral policies on agriculture, health, and energy. The majority of national and international programming efforts concentrate on the agricultural sector, including pastoralism, as well as disaster risk management and capacity building for government officials and civil society. The country's Growth and Transformation Plan, Programme of Adaptation to Climate Change, and Climate Resilient Green Economy Strategy are key national roadmaps that guide these efforts. However, there are gaps in adaptation action.

Ethiopia's dependence on agriculture makes the country particularly vulnerable to the adverse impacts of climate change on crop and livestock production (see Figure 2). An assessment of rainfall and temperature change has revealed that approximately 60% of the country would be moderately to highly affected in the coming years. Agriculture, water, and human health will be the most vulnerable sectors, with variations across regions based on socioeconomic, institutional, and environmental conditions, among other factors. Agricultural systems are almost exclusively rain-fed, and pastoralists and smallholder farmers dependent on rain-fed agriculture are the most vulnerable populations. Of an irrigation potential of approximately 2.7 million hectares of land, only 2%–3% of the cropland is currently irrigated (Yirgu et al., 2013; Aragie, 2013). Climate change, poverty reduction, and economic development are inextricably linked; consequently, climate change adaptation must be mainstreamed in development planning, projects, and programs (MEFCC, 2015). Ethiopia also has an opportunity to pursue a low-carbon development pathway, achieving economic prosperity while minimizing its contribution to global climate change.

Figure 2. Climate change vulnerability map (rainfall and temperature combined)



3.0 Ethiopia's National Adaptation Plan (NAP-ETH) Process

3.1 Process to Date

The NAP process was established in 2010 through the Cancun Agreements under the UNFCCC. In the 2015 Paris Agreement, the NAP was highlighted as a key mechanism for achieving global goals on adaptation (UNFCCC, 2015). The aim of the NAP process is to reduce vulnerability to climate change by building adaptive capacity and resilience. It also encourages countries to integrate climate change adaptation into relevant policies, programs, and activities across sectors and levels. It was envisioned as an iterative and country-driven process that builds on and complements existing adaptation planning (UNFCCC, 2011).

The NAP-ETH process was launched in September 2017, which was an initial step in the iterative process of adaptation planning, implementation and monitoring & evaluation (M&E), providing a wide range of options for adaptation across different sectors. It provided direction for actors in government, civil society, and the private sector to identify priorities, develop implementation strategies, and start implementing, monitoring, and evaluating adaptation actions. The NAP process provided an opportunity to further elaborate the climate resilience elements of the CRGE strategy, complementing the detailed green economy strategy that was developed in 2011. The goal of NAP-ETH has been to reduce vulnerability to the impacts of climate change by building adaptive capacity and resilience through a holistic integration of climate change adaptation in Ethiopia's development pathway over the longer term. Ethiopia's NAP process is aligned with commitments in the CRGE strategy and aims to contribute to the achievement of adaptation targets set in the CRGE (particularly CR strategies) and Ethiopia's NDC. NAP-ETH also seeks to strengthen the holistic integration process, supported by effective institutions and governance structures, finance for implementation and capacity development, strengthened systems for disaster risk management, and integration among different sectors. The plan and its implementation are guided by the principles of participation, coherent interventions, stakeholder empowerment, gender sensitivity, equitable implementation, and partnership.

The NAP document has identified 18 major adaptation options (AOs) and five strategic priorities (SPs) that will be implemented at all levels in the country and across different development sectors, as shown in Table 2. It is important to note that the NAP options will not be implemented as stand-alone programs or projects but integrated within existing or new programs. The options are aimed at addressing the major challenges of the country that are easily exacerbated by climate change impacts. The options are categorized under five implementation components: agriculture and water; natural resource management; health, livelihoods, and social protection; climate services and adaptation technologies; and infrastructure. NAP-ETH builds on the climate resilience strategies that had already been developed for some sectors and regions through the CRGE process, with NAP-ETH providing a framework under which the different actors plan and implement adaptation actions.

Formulation and implementation of NAP-ETH are guided by the principles of the first key milestone for the NAP process. The NAP should go under formal review at the start of every national development planning cycle (i.e., every five years). Adaptive learning is also needed, with feedback sought from consultative groups comprising stakeholders across government, civil society, development partners, academia, and the private sector.

NAP-Ethiopia also has linkages with and relevance for several Ethiopian government policies and strategies. These policies and strategies can facilitate the implementation of the NAP options. The plan further sets out SPs relevant for the country.

Box 1. Relevant strategies and policies

1. Health Policy, 1993
2. The Constitution of the Federal Democratic Republic of Ethiopia, 1995—includes several articles that are relevant to WASH, public health, and the environment
3. Environmental Policy of Ethiopia (EPE), 1997—a comprehensive document that defines policies for 10 separate environmental sectors, covering soil and agriculture, forest and woodlands, biodiversity, water, energy, minerals, human settlement, industrial waste, climate change, and cultural heritage
4. Ethiopian Water Resources Management Policy, 1999
5. Ethiopian Water Resources Management Proclamation (No. 197/2000)—focuses on protecting natural water sources from degradation, excessive use, and pollution
6. Environmental Impact Assessment Proclamation (No. 299/2002)
7. Initial National Communication (INC), 2001
8. The Growth and Transformation Plan II (GTP II) that covers the planning period from 2015 to 2020
9. Nationally Determined Contribution (NDC) that includes information on both mitigation and adaptation actions to be implemented up to 2030
10. Ethiopian Programme of Adaptation to Climate Change (EPACC) focuses on climate change adaptation—Ethiopia adopted the National Adaptation Programme of Action in 2007. This was updated with the EPACC in 2011.
11. CRGE strategy, 2011 focuses on climate change mitigation
12. Environmental Pollution Control Proclamation (No. 300/2002)
13. National Hygiene and Sanitation Strategy, 2005
14. Solid Waste Management Proclamation (No. 513/2007)
15. National Adaptation Program of Action (NAPA), 2007
16. Prevention of Industrial Pollution Regulation (No. 159/2008)
17. Health Sector Development Program, 2010
18. Environmental and Social Management Framework, 2013
19. One WASH National Program, 2014

20. Livestock Master Plan (LMP): Roadmaps for the Ethiopia Growth and Transformation Plan (GTP II – 2015–2020), 2015
21. National Adaptation Program of Action (NAPA), 2007
22. Climate Change Education Strategy of Ethiopia, 2017
23. Ethiopia National Adaptation Plan, 2018

3.2 Regional Adaptation Priorities

As part of Ethiopia's NAP process, regional- and national-level stakeholders have been engaged through a series of workshops. Through this process, regions have prioritized several AOs. Based on the stakeholder engagement and prioritization, Appendix II reflects the options, which have been given precedence by regions. The prioritization and ranking indicate which AOs are relevant for the country and its citizens. As shown in the Appendix, the AOs prioritized by the greatest number of regions are:

- AO1: Enhancing food security by improving agricultural productivity in a climate-smart manner (prioritized by all 10 regions)
- AO3: Strengthening sustainable natural resource management through safeguarding landscapes and watersheds(prioritized by six regions)
- AO2: Improving access to potable water(prioritized by four regions)

The above AOs are all related to either agriculture or water, demonstrating that both sectors require significant investment and attention. Over 80% of Ethiopia's population currently lives in rural areas and depends on agriculture and natural resources for their livelihood. At the same time, climate change has the most impact on agriculture, followed by water resources; therefore, the adaptation actions meriting significant investment from the government and donor partners are found in these two sectors. As such, the NAP roadmap also attaches due priority to these AOs. Accordingly, it recommends that short-term actions focus on building the necessary foundation for the sectors and ministries that will be responsible for the implementation and oversight of these options.

3.3 Purpose of the Implementation Roadmap

The objective of the NAP Implementation Roadmap is to identify vital enabling activities that will realize the country's NAP, their timelines and critical milestones to note during project implementation, as well as key actors responsible for their delivery. The roadmap is a description of "what" needs to be done for the NAP process by planners, financial institutions, sector ministries, sub-national bodies (regions, woredas, and kebeles), civil society, as well as training and research institutions. The implementation roadmap is not a description of "how" activities need to be done—this will be elaborated as specific initiatives and programs are further developed. During the course of the roadmap development, stakeholder consultation workshops (one for the federal government and two for the regions) were conducted to identify gaps in capacity and knowledge that need to be addressed in order for national and sub-national

institutes to begin implementing the NAP and to identify what mechanisms exist or need to be created to ensure continuous learning and exchange on adaptation to climate change—see Appendix I for a summary of key messages from these workshops. The workshops also explored new and existing potential opportunities that the NAP processes can offer to scale up existing initiatives or build new ones. They identified issues related to the integration of climate change adaptation in operationally active and new programs/projects and institutions that collaborate in the implementation of the NAP-ETH; in addition, they analyzed the modalities of their collaboration. Based on this roadmap and with support from development partners and the private sector, the FDRE will, from 2020 to 2030, clearly define and implement its climate change adaptation agenda and mainstream climate change into development planning.

4.0 Implementation Strategies for the NAP-ETH Adaptation Options

This section outlines the implementation strategies for the 18 AOs identified in NAP-ETH. These have been organized into five implementation components, as shown in Table 1.

Table 1. Implementation components and associated AOs

Implementation component		Adaptation options	
1	**Agriculture and Water**	AO1	Enhancing food security by improving agricultural productivity in a climate-smart manner
		AO2	Improving access to potable water
2	**Natural Resource Management**	AO3	Strengthening sustainable natural resource management through safeguarding landscapes and watersheds
		AO4	Improving soil and water harvesting and water retention mechanisms
		AO6	Improving ecosystem resilience through conserving biodiversity
		AO7	Enhancing sustainable forest management
3	**Health, Livelihoods, and Social Protection**	AO5	Improving human health systems through the implementation of changes based on an integrated health and environmental surveillance protocol
		AO8	Building social protection and livelihood options of vulnerable people
		AO14	Developing efficient value chain and marketing systems
4	**Climate Services and Adaptation Technologies**	AO13	Mainstreaming endogenous adaptation practices
		AO15	Strengthening drought and crop insurance mechanisms
		AO16	Improving early warning systems
		AO17	Developing and using adaptation technologies
		AO18	Reinforcing adaptation research and development

Implementation component		Adaptation options	
5	**Infrastructure**	AO9	Enhancing alternative and renewable power generation and management
		AO11	Building sustainable transport systems
		AO12	Developing adaptive industry systems
		AO10	Increasing resilience of urban systems

4.1 Implementation Component #1: Agriculture and Water

Overview of the Implementation Component

The CIAT (2017, pg. 2) states, "Agriculture is the mainstay of Ethiopia's economy and the primary source of employment for its population. The agriculture sector has contributed approximately 44% to GDP over the past 5 years and employed more than three quarters of the economically active population." On average, crop production makes up 60% of the sector's outputs. CIAT also states that "the livestock sector, one of the largest in the world in terms of numbers of animal heads, contributes 16–20% to the national GDP and represents a key subsistence source for some 10 million pastoralists. Roughly 90% of total export earnings come from agriculture, especially through the commercialization of coffee, livestock products (hides, skins), and seeds and pulses" (CIAT, 2017 p. 2).

Agriculture in Ethiopia is sensitive even to small variations in weather conditions due to its heavy dependence on rain. Vulnerability in this sector is exacerbated by poor farming practices and low adoption of agricultural inputs. Frequent droughts and occasional floods, seasonal shifts in rainfall and temperature regimes combined with extreme events—including heatwaves and storms—are factors augmenting climate risks in the agricultural sector.

Farming communities face increasing risk of crop losses due to extreme weather conditions such as higher variability in rainfall, changing seasonal patterns, shortening of crop plant maturity period, expanding crop pests and diseases, low productivity of soils, and increased decomposition rate of organic matter—all of which have negative impacts on income and food security. Agro-pastoral and pastoral communities, dependent on rangelands or mixed livestock–crop systems (Few et al., 2015), face climate impacts such as decreased livestock feed availability and quality; a rise in the distribution of some infectious diseases; degradation in rangelands; the prevalence of invasive species that affect grazing lands; and reduced water availability for human and animal consumption (World Bank, 2010).

According to UNWater, (n.d., p. 1)

> [h]igher average temperatures and changes in precipitation and temperature extremes are projected to affect the availability of water resources through changes in rainfall distribution, soil moisture, glacier and ice/snowmelt, and river and groundwater flows; These factors are expected to lead to further deterioration of water quality as well. The poor, who are the most vulnerable, are also likely to be affected the most.

Decreases in agricultural production affect men and women differently. For women, a drought could exacerbate a family's food insecurity and create additional health problems within the household, such as malnutrition and disease (EFCCC, 2019). Women and children are also disproportionately affected by climate change, as they are responsible for activities such as fetching water. As the availability of water declines, they are frequently forced to travel longer distances to access it.

Agriculture and water are closely aligned in Ethiopia. According to the United States Agency for International Development (USAID) (2019, n.p.), "[a]gricultural activity is by far the largest consumer of water in Ethiopia. An estimated 93 percent of all water withdrawals in the country (surface water and groundwater) are for agricultural use, much higher than the global average of 70 percent." As such, there are significant opportunities for synergies in adaptation actions for the two sectors. The key activities for this implementation component are shown in Table 2. Stakeholders have identified these activities during the different stakeholder engagement workshops at both federal and regional levels.

Table 2. Key activities for implementing NAP-ETH in the agriculture and water sectors

Adaptation options (AOs)		Key activities	Gender considerations*

AO1	Enhancing food security by improving agricultural productivity in a climate-smart manner	• Inclusive extension system
		• Crop and livestock husbandry
		• Varieties that are heat resistant and drought tolerant
		• Enhancement of fertilizer including organic manure and residues
		• Crop rotation
		• Crop disease and pest management
		• Use of improved storage facility
		• Introduction of livestock species more resilient to climate change
		• Better access to veterinary services and vaccines
		• Use of shading and cooling facilities for poultry farming
		• Better feeding system
		• Small-scale irrigation
			• Promote women's equitable access to and control over:
			  • Agricultural land, livestock, and other natural resources
			  • Climate smart-agricultural technologies (such as improved farm tools, drought-tolerant crop and livestock varieties, and small-scale irrigation)
			  • Agricultural markets
			• Improve women's understanding and ownership of climate-smart agricultural practices, including the use of small-scale irrigation, agroforestry, crop diversification, integrated soil fertility management, and improved livestock feeding practices
			• Facilitate equitable access for women and men to pro-poor financial services
			• Develop and implement a gender-responsive agricultural extension program with equitable representation of women in the extension staff
			• Provide climate-resilient livelihood diversification options to women and men through employment and income generation schemes

Adaptation options (AOs)		Key activities	Gender considerations*
AO2	Improving access to potable water	• Implement and improve basic public health measures such as the provision of clean water and sanitation • Providing training on improved and climate-proofed latrine technology options • Demonstrating improved and climate proofed latrine technology options • Producing and distributing booklet on household water treatment and safe storage • Self-sufficiency in water and energy supply • Prevent and manage waterborne and communicable diseases • Create awareness on water, sanitation, and hygiene • Development of water infrastructure (boreholes, water facilities, etc.) • Creating business models for investments in the water sector adaptation • Community awareness raising and mobilization on access to water • Promote watershed management/ community-based water resource management • Capacity building on sustainable water management • Promoting research on climate change adaptation in the water sector • Mobilization of finance and other resources for local implementation of water resource management initiatives • Providing technical support for sustainable water management	• Ensure that the design and location of water and sanitation structures consider the needs and priorities of women and girls • Facilitate the development of gender-responsive water harvesting and utilization bylaws for increased water use efficiency • Promote equitable representation of women in institutional structures established for managing water and sanitation infrastructure • Promote equitable participation of women in water development, conservation, efficiency, and sustainability improvement

** Gender considerations are taken from EFCCC (2018).*

Policy Context for the Agriculture and Water Implementation Component

KEY POLICIES ON AGRICULTURE

The overall Government of Ethiopia (GoE) agricultural policy has been to increase production to ensure food security and drive economic growth. Between 2002/3 and 2004/5, GoE adopted the Sustainable Development and Poverty Reduction Program (SDPRP) and identified agriculture as the primary driving force for economic development and poverty reduction in the country. The policy noted that the expansion of export crops (particularly non-traditional crops) could contribute significantly to poverty reduction and encouraged the establishment of medium and large commercial farms in lowlands. It promoted a "labour-intensive strategy" for agriculture, which adopted modern agriculture technologies and equipped agriculture labour forces with effective skills. For 2005/6-2009/10, the Ministry of Finance (MoF) developed the Plan for Accelerated and Sustained Development to End Poverty (PASDEP) based on SDPRP. PASDEP explicitly stated that Ethiopia was going to pursue an "Agricultural Development-Led Industrialization" strategy. The strategy indicated that the key objectives of the plan were to build an economy with a modern and productive agricultural sector. The use of technology and agro-industry to drive economic growth was also a key objective. The PASDEP introduced a new emphasis on the commercialization of agriculture as a stimulus for economic growth.

The Growth and Transformation Plan (GTPI) replaced the PASDEP and set ambitious targets for agriculture for 2011–2015. The main goal of the GTP was to contribute to achieving the long-term objective under PASDEP, make Ethiopia a middle-income country by 2025 through agricultural led industrialization, and achieve food security. The strategic direction of GTP was to ensure smallholder agriculture remained the primary source of agriculture growth and transformed subsistence agriculture to market-led production.

The GoE started with GTPII in mid-2016 to carry forward the strategic vision of GTP I from 2015/2016 through to 2019/2020. Agriculture continued to be the main driver of "rapid and inclusive economic growth and development." The plan includes "sustainable agriculture" in its strategic direction for the agriculture sector—it aims to reduce 25.97 million metric tons of carbon emissions from the agriculture sector by 2020 and reduce an additional 51.93 million tons by 2030 by using low-emission inputs and expansion of small-scale irrigation. The plan also aims to industrialize agriculture production and reduce the share of employment in the sector by 7.5 percentage points (from 75% to 67.5%).

The GoE's commitment to the agriculture sector also focuses on eliminating the country's dependency on food aid. The GoE expects to address food security by increasing the purchasing power of the majority of the population and promoting an internally interconnected national economy. It expects to achieve these through various means, such as expanding the domestic market and minimizing the country's vulnerability to external shocks. This policy direction was reflected in the Policy and Investment Framework (PIF). Currently, Ethiopia is preparing its first-ever 10-Year National Perspective Development Plan, which will serve as a basis for the development of the upcoming five-year Growth and Transformation Plans (i.e., GTP III and IV).

The PIF 2010–2020 provided strategic prioritization and investments for the agriculture sector. The PIF also indicated that the government's focus on agriculture is to prioritize investments that drive agricultural growth and development. Under this framework, GoE is expected to

continue its strong commitment to financing agriculture and rural development. It is also projected that the continued strong economic growth will strengthen the agricultural sector budget from around USD 0.75 billion/year in 2010/11 to as much as USD 2.74 billion/year by the end of the PIF period. The total expected budget over the 10 years (2010–2020) of PIF is USD 16.6 billion.

KEY POLICIES ON WATER

One of the early GoE water policies—and the guiding principle for the sector—was the Federal Water Resources Management Policy, which was issued in 2000. The stated goal of the policy is "to enhance and promote all national efforts towards the efficient, equitable, and optimum utilization of the available water resources of Ethiopia for significant socioeconomic development on a sustainable basis" (Ethiopian Water Resources Proclamation № 197/2000). Subsequent strategies and programs in the sector have been informed by this policy. These include the Water Sector Strategy of the Ministry of Water Irrigation and Energy (MoWIE, 2001), the Urban Wastewater Strategy of the MoWIE, The National Sanitation Strategy, and Integrated Urban Sanitation and Hygiene Strategy and Strategy Action Plan of 2017.

One of the stated objectives of the policy was the "allocation and apportionment of water resources based on comprehensive and integrated plans and optimum allocation principles that incorporate efficiency of use, equity of access, and sustainability of the resource" (Zenebe et al., 2011_). This objective is necessary, given the low levels of water access and consumption in Ethiopia. While the water consumption of many developing countries is 20 litres per person per day, in Ethiopia, average consumption ranges from 10 to 20 litres per person per day in some urban areas, and 3 to 4 litres per person per day in rural areas. The GoE's policy on water has rested on supplying improved potable water service for urban areas with tariff structures that are based on "full cost recovery and self-reliance," while rural water supply pricing aims only at operation and maintenance cost recovery. The purpose of the full cost recovery program is to provide incentives for proper use, reduction of waste, and avoidance of excessive consumption of water resources.

In order to address the impact of climate change in the water sector, the GoE prepared the Climate Resilience Strategy for Water and Energy (2015). This strategy identified SPs to respond to climate vulnerabilities and sustainable development needs under power generation, energy access, irrigation, access to Water, Sanitation and Hygiene (WASH), and cross-cutting issues. It is important to note that this strategy goes beyond addressing potable water.

Current Status of the Agriculture and Water Implementation Component

There are a number of ongoing activities related to agriculture and water, and implementation of the NAP can scale up some of the achievements thus far. Some of the achievements, actors, and programs as well as capacities are explained below. As the NAP AOs will be implemented in alignment with existing or planned projects and programs, it is important to assess the current status of major programs and projects pertaining to the two AOs. It is also useful to note that some of the programs and projects might overlap with other AOs.

AO1: ENHANCING FOOD SECURITY THROUGH IMPROVING AGRICULTURAL PRODUCTIVITY IN A CLIMATE-SMART MANNER

Achievements	In the past few years, many Central Statistics Agency (CSA) activities have been piloted and implemented through different projects. Among these are an inclusive extension system; crop and livestock husbandry; introduction of varieties that are heat resistant and drought tolerant; enhancement of fertilizers, including organic manure and residues; crop rotation; crop disease and pest management; use of improved storage facility; introduction of livestock species more resilient to climate change along with better access to veterinary services and vaccines; use of shading and cooling facilities for poultry farming; and promoting better feeding systems.
Actors and Programs	The CRGE Directorate within the Ministry of Agriculture coordinates and oversees the implementation of the ministry's climate resilience strategy and ensures the mainstreaming of climate change adaptation into regular and flagship projects' and programs' planned activities under sectors' responsibilities and others through international non-state actors (e.g., Farm Africa, FAO, Gesellschaft für Technische Zusammenarbeit [GTZ], SNV Netherlands Development Organisation [SNV], United Nations Development Programme [UNDP], United Nations Environment Programme (UNEP), World Food Programme [WFP], etc.) which have been supporting the implementation of planned activities in GTP-II. The Agricultural Growth Program (AGP). The primary objective of the program is to increase agricultural productivity and market access for key crop and livestock products. AGP I worked with 1.9 million households in 93 woredas of the four major regions in Ethiopia. AGP II, which started in 2018, is currently being implemented in 157 woredas (including the 93 from AGP I) in eight regions. AGP is targeted at enhancing agricultural productivity and the increasing availability of improved technologies. It works on accelerating the introduction of technologies (crop, livestock, NRM, agricultural mechanization etc.), and adoption of technologies from elsewhere (within or outside the country) and development of demand-driven agricultural technologies tailored to specific agro-ecologies and socioeconomic conditions of the farming community. Program: PASDIP—small-scale irrigation. Agricultural water development is crucial to improve smallholders' livelihoods since irrigation can help farmers increase their crop diversity with high-value crops while making multiple cropping seasons possible. The current irrigated land area is about 2 million hectares (about 16% of currently cultivated land area). Small-scale irrigation is one of the adaptation technologies identified for the activity for the agriculture sector to increase productivity. It is also one of the main components in the recently funded Green Climate Fund (GCF) project in Ethiopia. As such, it is important to look at other current and past irrigation projects in the country.
Lessons Learned	Irrigation projects have been failing mainly due to insufficient participation by beneficiaries and insecurity of land tenure. New approaches to small-scale irrigations are expected to address these and other challenges.

Capacity	The Ministry of Agriculture possesses sufficient implementation capacity to mainstream climate change adaptation into planned activities. However, capacity building and institutional coordination need to be further enhanced through training and the use of networks to coordinate resilience responses between communities and delivery agencies. Effective institutions and governance structures staffed by adequate human resources at national and sub-national levels are key components for the effective implementation of the AOs. The ministry has the CRGE mainstreaming guidelines for sector, regional, and woreda planning, as well as the CRGE National Capacity Development Strategy and *Integrating Gender Considerations in Ethiopia's National Adaptation Plan (NAP) Process: Analysis and recommendations*. These materials can also be used to train assigned staff in climate change adaptation-related skills. However, it is essential to prevent a high turnover of trained manpower lest it impedes the implementation of the component.

AO2: IMPROVING ACCESS TO POTABLE WATER

Achievements	Over the past years, water supply coverage has improved substantially: the average national rural and urban water supply coverage is reported to have reached 68% and 55%, respectively, benefiting 51.8 million rural and 10.6 million urban people. In 2015, Ethiopia met the Millennium Development Goals' water target, hitting the 57% mark in terms of access to water supply. However, the target focused solely on access to improved water supply without addressing the safety of the sources and possible contamination due to unsafe water handling and storage. Due to water shortages, poor sanitation, and limited hygiene, the region has been repeatedly attacked by outbreaks of Acute Watery Diarrhea (AWD). According to the regional state health bureau's 2009 report on the epidemic, there were 6,583 suspected cases and 183 deaths.[1]

[1] Ministry of Health, National Hygiene & Sanitation Strategic Action Plan for Rural, Per-Urban & Informal Settlements in Ethiopia. 2010–1015.

Actors and Programs	One WASH: One WASH National Program (OWNP) has been the flagship project of the GoE regarding the provision of potable water. The project has consumed about USD 2.4 billion in investments over the seven-year period 2013-2020 in two phases (2013 to 2015/ GTPI and 2016 to 2020/ GTPII). The project involves four government ministries: MoWIE; MoA; Ministry of Education; and the MoF. In addition, several international and local NGOs are taking part in implementation and support. The objectives of OWNP and the Second Growth and Transformation Plan (GTP-2) are similar in that both are geared toward ensuring the safety of drinking water through a quality monitoring system and safety planning and action. Aligned with GTP I and GTP II, the targets of the OWNP were to: • Raise national access coverage from 67% in year 2013 to 98.5% in year 2015 • Raise rural and pastoralist water supply access coverage from 63% to 98% • Raise urban water supply access coverage from 82% to 100% • Improve standards for rural (15 l/p/c/d in 1.5 km) and urban (20 l/p/c/d in 500 m) areas • Improve per capita water consumption rate of 25 l/c/d within one km radius by 2020 • Raise urban coverage from 51% in the year 2015 to 75% coverage with per capita consumption of between 40 and 100 l/c/d. At the end of phase I (2015) of the project, the number of beneficiaries was reported to be around 76 million.
Lessons Learned	The impact of climate change on the health sector has been all too apparent. As temperature rises, so does the prevalence of diarrhea, although to a certain limit. Hence, mainstreaming ONE WASH facilities is vital to the reduction of contamination of potable water.
Capacity	The federal Ministry of Health (MoH) has a wealth of experience in implementing large-scale activities through its structure, extending from the federal to the kebele level. However, the ministry has only recently started to look at the linkage between climate change and health. Consequently, its experts are not knowledgeable about either the linkage or response mechanisms. Therefore, the ministry, in collaboration with regional health bureaus, ought to provide capacity-building training on general topics as well as such specific aspects as sanitary surveillance that involve laboratory-based water quality testing.

Vision for the Agriculture and Water Implementation Component

Aligned with the GOE's overall vision of improving food production of the country, the vision for this implementation component is to make Ethiopia food secure and independent of food aid by 2030. Food security will be assured through the introduction of new agricultural practices as well as irrigation, in order to enable better management of climate risks to agriculture. Agricultural production is closely interlinked with the availability of water, and the agriculture/

water nexus is strong. At the same time, the two sectors are the most impacted by climate change and thus deserve careful attention in the drive to achieve food security.

Looking at the water sector, the vision is to not only improve access to water but also improve water quality. Aligned with GTP II and the One WASH program, the specific targets cited in a Central Statistical Agency of Ethiopia report on drinking water quality are:

- Goal 1.1. Provide rural access to water supply that sets a minimum service level of 25 liters per capita per day (l/c/day) within 1 km from the water delivery point for 85 percent of the rural population, 20 percent of whom are reached by a piped system.
- Goal 1.2. Provide urban access to water supply with a minimum service level of 100 l/c/day for category-1 towns/cities, 80 l/c/day for category-2, 60 l/c/day for category-3, 50 l/c/day for category-4 up to premises, and 40 l/c/day for category-5 towns/cities within 250 m, with a piped system for 75 percent of the urban population" (Central Statistical Agency, 2017, Pg. 3).

As many studies have shown, crop production and water availability in Ethiopia are affected by the failure of rains, erratic rainy seasons, or occurrence of successive dry spells during the growing season. Food shortages resulting from adverse weather conditions are not new in Ethiopia. For example, Gezie (2019, p. 4), suggest that

> increases in temperature and changing rainfall patterns likely will increase the populations and ranges for some agricultural pests and waterborne pathogens, requiring changes to crop and livestock management practices, more aggressive adoption of integrated pest-management practices and introduction of new inputs to counter more virulent challenges.

The GoE has tried to respond to these challenges through business-as-usual development strategies in the agricultural sector. While some of the actions have improved yields, the overall response to the changing climate conditions has to date been weak. The NAP-ETH highlights the impact of climate change on these sectors and identifies options for addressing these changes. For objectives related to food security and access to potable water to be achieved, it is essential that the actions identified in the NAP be integrated into ongoing and new initiatives and investments in the agriculture and water sectors. Particular emphasis is needed to ensure that programs reach women and men in chronically food-insecure households, to build their resilience and support them in achieving food security.

NAP places particular emphasis on the issues and establishes a clear causal link between climate change and WASH, nutrition, and health issues. By providing better access to water in both rural and urban communities, the "One WASH" program plays a vital role in enhancing the adaptive capacity and resilience of vulnerable communities and mitigating the potential health risks induced by climate change. Additionally, it highlights the likelihood that increasing climate change poses risks that need to be tackled in a manner consistent with government policies moving forward. Policies and strategies that fail to address climate change will not have a lasting development impact on the country.

Table 3. Vision for adaptation in the agriculture and water sectors

	AO1: Enhancing food security through improving agricultural productivity in a climate-smart manner	AO2: Improving access to potable water
Outcome	Enabling chronically food-insecure people to better manage risks in order to attain food security; Significantly improve the food security situation of transitory food-insecure people	Increase access to safe and clean water for rural and urban households, in a climate-resilient manner
Key milestones	• Increase agricultural production by 10% by 2030 • Achieve food security by 2030 • Reduce chronic malnutrition by 2030	From the Climate-Smart Agriculture in Ethiopia report: • Provide rural access to water supply that sets a minimum service level of 25 litres per capita per day (l/c/day) within a 1-km radius from the water delivery point for 85% of the rural population, 20% of whom are reached by a piped system" by 2025. • For the urban sector, it will be to "provide urban access to water supply with a minimum service level of 100 l/c/day for category-1, 80 l/c/day for category-2, 60 l/c/day for category-3, 50 l/c/day for category-4 towns/cities," respectively by 2025.
Tracking methods	PSNP M&E system	One WASH M&E system
Regional priority	All regions	All regions

Source: Central Statistical Agency, 2017, p. 3.

Roles, Responsibilities, and Mechanisms for Implementation

The two key ministries that will have a role in the implementation of the actions are the Ministry of Agriculture and the Ministry of Water, Irrigation, and Energy. The MoH will also have a stake in the implementation of WASH components. Within these ministries, the specific directorates tasked with overseeing the CRGE will play the major role in coordinating the implementation of actions by other directorates and programs involved in implementing programs or activities where the integration of adaptation is necessary to achieve objectives. These directorates may or may not be directly responsible for implementation. To take full advantage of these synergies, EFCCC will provide guidance and support to sectors, regional bureaus, and woredas in integrating adaptation and mitigation in planning, implementation, and M&E.

AO1: ENHANCING FOOD SECURITY THROUGH IMPROVING AGRICULTURAL PRODUCTIVITY IN A CLIMATE SMART MANNER

Table 4. Agriculture and water sector institutions and their roles

Institution/ministry	Directorate	Roles and responsibilities
Ministry of Agriculture	CRGE Directorate	Integrating climate change adaptation into planning in line with NAP-ETH. While the CRGE Directorate will be tasked with the overall coordination of climate change, the implementation of climate resilience activities will be implemented by other key directorates such as Natural Resources, Food Security and Job Creation, which are responsible for implementation of PSNP.
Ministry of Water, Irrigation, and Energy	Environment and Climate Change Directorate	Integrating climate change adaptation into planning in line with NAP-ETH. Support other key directorates such as Water Supply and Sanitation Directorate, which is responsible for WASH.
National Planning Commission	PME Directorate	Leading role in the planning process
Regional Agriculture Bureaus	CRGE Focal Points	Coordinating and developing regional plans in line with NAP-ETH
Regional Water and Energy Bureaus	CRGE Focal Points	Coordinating and developing regional plans in line with NAP-ETH
Woreda and kebele offices	CRGE Focal Points	Developing woreda development plans to be reviewed and approved by regional bureaus
Productive Safety Net Programme (PSNP)	Food Security and Livelihood Directorate	A social protection program by the GoE targeting food-insecure households
AGP	AGP Program Manager	A multifaceted investment program supporting agricultural productivity and commercialization

In addition to the previously mentioned government institutions, civil society organizations, and NGOs are expected to proactively participate in the planning and implementation of activities, in the preparation and appraisal of bankable projects through public, private, bilateral, and multilateral partnerships as well as in the provision of technical assistance as required.

To date, the role of the private sector in adaptation planning has been insignificant and needs to be strengthened, given the abundance of private investment. For their part, research and academic institutions can contribute their share by undertaking and publishing study and/or research programs to generate solutions that help measure the effectiveness of past, present, and future adaptation interventions. International partners can help identify new financial sources to fund climate change adaptation through public, private, bilateral, and multilateral partnerships.

AO2: IMPROVING ACCESS TO POTABLE WATER

The Ministry of Water, Irrigation, and Energy will have a key role in overseeing the implementation of WASH project. The ministry is currently the focal institution for WASH. Implementation of the potable water project will be part of the National WASH project under the theme "One Plan, One Budget, One Report," which has been translated into action by a few donors when they established Consolidated WASH Accounts (CWAs) to implement their activities. However, some donors are still using their own financing and implementation modalities. WASH's current functional structure is led by a steering committee at the federal level. It oversees the WASH Technical Team, the National WASH Coordination Office, and the Program Management Units. These federal level structures are both well established and well-functioning. The regional-level structure mirrors that of the federal level.

Several entities are expected to support the process of planning and implementation of the programs required to achieve the aims of the CRGE strategy, including through the implementation of NAP-ETH. These include the implementing entities, which are federal (line ministries) and regional governments (sector bureaus), and executing entities such as NGOs and the private sector. Though the CRGE Facility (MoF and EFCCC) is mandated for coordinating the task, they will need to work with other sector ministries such as MoWIE, MoH and Ministry of Urban Development and Construction (MoUD). The CRGE Facility, particularly the MoF, is well-positioned to provide coordination among the different federal level ministries. Through a close working relationship with the WASH Coordinating Office, the CRGE Facility can facilitate the integration of climate change adaptation actions in the WASH activities at all levels.

The MoH will also have a role to play in integrating adaptation plans into sector plans. Specifically, the ministry will carry out such activities as monitoring of water quality at defined intervals, along with promoting safe and resilient storage and water treatment at the household level. These steps go a long way toward ensuring the quality of drinking water during both regular and emergency periods. The MoH will also provide capacity building in sanitary surveillance involving laboratory-based water quality testing in collaboration with regional health bureaus.

Synergy With Other Actions

The agriculture and water component has direct synergies with NRM; health, livelihood and social protection; and climate service and adaptation technologies. This is evident in some of Ethiopia's flagship projects, such as the Sustainable Land Management program, which is under NRM, and the PSNP, which is under livelihoods, in the Ministry of Agriculture.

There are a few adaptation options that are cross-cutting and have synergy with some AOs in agriculture and water. These are:

STRENGTHEN SUSTAINABLE NATURAL RESOURCE MANAGEMENT THROUGH SAFEGUARDING LANDSCAPES AND WATERSHEDS (NAP-ETH OPTION 4):

The intersection between land management and use represents the key development issue for millions of rural Ethiopians facing water insecurity, food insecurity, land tenure insecurity, and livelihood insecurity—all amplified by climate variability and change. Climate impacts in

Ethiopia are felt primarily through water stress, which is affected by land use and degradation that undermines watershed function. In Ethiopia, the estimated cost of land degradation is 2%-3% of GDP, before accounting for downstream effects such as increased flood risk. The proven remedy centres on delivering a combination of better natural resource management and resource rights; jobs and livelihood enhancements; and gender outreach throughout targeted major watersheds. Restoration effects include a range of resilience-related results, including increased soil moisture and soil fertility (important for higher and less-variable crop yields and improved water availability) and increased carbon sequestration—all of which are major priorities for the government and key for achievement of targets related to food security and access to potable water. This work requires more innovation, more financing, more coordination, and much greater scale if the country is to meet its resilience and low-carbon objectives while achieving middle-income status in less than 10 years as planned (World Bank, 2017).

IMPROVE ECOSYSTEM RESILIENCE THROUGH CONSERVING BIODIVERSITY (NAP-ETH OPTION 6):

According to Mant et al. (2014, pp. 2–3):

> An effective climate change response requires consideration of the role of, and potential impacts on, biodiversity and ecosystem services. … Biodiversity and ecosystem services support people to adapt to climate change through approaches collectively called ecosystem-based adaptation (EbA). Conservation, restoration, and sustainable management of ecosystems can help reduce vulnerability to climatic hazards such floods and droughts. Furthermore, such approaches improve the resilience of ecosystems to climate change so that they can continue to deliver ecosystem services, supporting the provision of alternative livelihood options in the face of climate change.

The Global Environment Facility (GEF) Secretariat (2010) also believes that, "biodiversity is life itself, but it also supports all life on the planet, and its functions are responsible for maintaining the ecosystem processes that provide food, water, and materials to human societies" (p.10), and "ecosystem loss and degradation … compounded by climate change, further accelerates the loss of species, reduces current and future services to societies, and disproportionately impacts poor people" (p. 8).

Implementation Needs

The current gaps and needs can be categorized into three areas: capacity, policy, and institutional.

- **Capacity gaps** include gaps in know-how and skills; coordination problems among stakeholders; and lack of leadership commitment. For example, the GCF has provided a grant for climate adaptation focusing on provision of a reliable and safe water supply, improved food security through irrigation, and rehabilitation of degraded land. The project is expected to be implemented by the Ministry of Agriculture and the Ministry of Water, Irrigation, and Electricity. Coordination between the two ministries is essential to avoid duplication of effort and reduce administrative costs. Coordination is best led by MoF's CRGE Facility.
- **Policy gaps** include lack of policy attention for the livestock sector including pastoral policy; absence or insignificant participation of the private sector in feed production;

information gaps regarding animal disease prevalence; and limitations in climate services, including early warning systems.

- **Institutional gaps** include poor extension and research linkages; resource constraints (finance in particular); institutional instability; and uncontrolled transboundary diseases. To overcome these gaps, overall guidance should be provided by the Inter-Ministerial Steering Committee to the work conducted with respect to NAP-ETH that requires follow-up actions by high-level decision-making authorities to determine what is needed for the implementation of NAP-ETH as envisaged.

To address these barriers, it is imperative to consider major corrective measures including, among others: capacity-development trainings; provision of appropriate technologies; enforcing appropriate policies; strengthening and functionalizing the existing extension system; enhancing the working relationship between extension and research; strengthening the M&E system; functionalizing existing government structures; putting in place a livestock insurance system; and strengthening the existing forums and platforms of stakeholders in the sector.

Short-Term Priorities (2020–2022)

The short-term priorities for both AOs focus on two issues: creating an enabling environment and addressing bottlenecks and gaps. These two actions will lay the necessary foundation for long-term actions and also pave the way for further facilitation of activities that will contribute to the achievement of the adaptation goal.

Table 5. Short-term priorities for implementing NAP-ETH in the agriculture and water sectors

Objective	Activities	Responsible entity	Target institutions	Timeframe
Improve the enabling environment for scaling up of CSA practices	Create or strengthen the existing platform for coordination and collaboration with sectors	EFCCC	Federal-level ministries, NGOs, and donor partners	2020
	Identify opportunities for building on and complementing existing adaptation activities	EFCCC, MoA, Regional Bureaus of Agriculture (BoAs) and MoWIE	Federal-level ministries, regional agriculture as well as water and energy bureaus, research institutions, NGOs	2020
	Develop a sector-specific strategic results framework to track achievements of outputs and outcomes in a sustainable manner	Led by EFCCC, but with technical input from MoA, Regional BoAs, and MoWIE	Federal-level ministries	2020

Objective	Activities	Responsible entity	Target institutions	Timeframe
Address capacity gap barriers	Capacity-development trainings; strengthen and functionalize existing extension system; strengthen M&E system; functionalize existing gov't structure	Led by EFCCC (CRGE Facility), but technical input from MoA, Regional BoAs, and MoWIE	Federal-level ministries, regional bureaus of agriculture and water, woreda- and kebele-level development agents	2020–2022
Study and/or research programs conducted to inform future investments in climate change adaptation in the agriculture and water sectors	• Conduct study and/or research programs in collaboration with relevant universities and research institutions to measure the effectiveness of past, present, and future adaptation interventions to inform the business plans and financial models developed in the agriculture and water sectors • Publish and disseminate the knowledge generated from the study and research program	EFCCC, Ethiopian Institute of Agricultural Research (EIAR)/Regional Institutes of Agricultural Research, research and academic institutions	Federal-level ministries, regional BoAs and water, woreda- and kebele-level development agents	2020–2022

Long-Term Priorities (2023–2030)

Once the enabling environment is in place and capacity gaps are addressed, the long-term goal will be to address specific technical gaps that will be key in building the adaptive capacity and resilience. The long-term priorities were identified from the document *Integrating the CRGE Strategy in Sector Development Plans: Guideline for Ministries and Regional CRGE Implementing Entities*.

Table 6. Long-term priorities for implementing NAP-ETH in the agriculture and water sectors

Sector Actions/ measures	Activities	Barriers	Action
Livestock diversification, including selection of drought-resistant animal breeds	Integrated farming: poultry, fish, and irrigation to reduce food and nutrition insecurity	Capacity gap (know-how and skills); Resource constraints (financing issues) Coordination problems among stakeholders	Provision of appropriate technology; strengthen and functionalize existing extension systems Strengthen M&E system Put in place livestock insurance system
	Develop feed-based livestock production system to mitigate animal feed shortage as a result of water stress	Institutional instability Lack of policy attention for the livestock sector, including pastoral policy Lack of leadership commitment; private sector involvement regarding feed production	Form workable structure for the livestock sector Enhance synergies among stakeholders within government structures Provide incentives such as tax breaks
	Change production system to tackle land-use changes that can significantly contribute to climate change	Lack of clear implementation mechanism and technology	Develop integrated program; introduce new technology
Improved animal breeding and feeding systems	Improve genetic selection for drought resistance, disease resistance, and improved productivity; Selection and upgrading of local breeds	Land resource-utilization problem (as it competes with crop farming) Input scarcity (seed) Encroaching invasive species Lack of knowledge and skills regarding feed resource management Focusing on imported breeds while ignoring the potential of local breeds	Increase availability of improved breeds and seeds Provide intensive training Improve awareness of farmers regarding land utilization Promote forage development strategies Develop breeding ranches

Sector Actions/ measures	Activities	Barriers	Action
Strengthen and expand animal health services	Expand and strengthen animal health systems to address climate-induced diseases (Service provision centres/posts; laboratory; medicine; veterinary education)	Skill and resource constraint Information gaps regarding animal disease (limitations in early warning system) Uncontrolled transboundary disease emanating from the nature of pastoralist system Illegal drug trade Shortage of facilities and equipment	Improve animal health system; provide early warning system; develop an efficient control system for transboundary disease and quarantine Promote private sector veterinary health service providers
Prevent and control the spread of vector-borne diseases and macro parasites	Strengthen community-based animal health system; conducting regular surveillance and vaccination; improve early warning and outbreak reporting as a result of drought and other calamities	Shortage of skilled human resources and medicine (veterinary drugs)	Capacity building Improve early warning system; improve information exchange speed Conduct research on veterinary knowledge (traditional drugs)
Improve rangeland and pasture land-management diversification, including selection of drought-resistant animal breeds	Fodder bank development; pasture development through irrigation; use different pasture development strategies (backyard; oversaw) too address animal food shortages during drought seasons	Shortage of appropriate seed; technical knowledge and skill gap; weak extension system Invasive species	Capacity building; strengthen existing extension system Strengthen range-management system; develop strategy to stop invasive species, including research

Sector Actions/ measures	Activities	Barriers	Action
Apply climate-resilient agricultural practices	Developing agroforestry practices; integrated soil fertility management; integrated climate-smart pest management; good agronomy practices; replace draft power by mechanization; small-scale irrigation; water harvesting; soil-water conservation practices at various level to address prolonged droughts and erratic rainfall; improve post-harvest crop management that directly/indirectly contributes in building the resilience of farms and landscapes to changing threats (e.g., pests)	Lack of awareness and capacity limitation Absence of Climate-Smart Agriculture manual[2] Weak extension services for CSA Lack of appropriate technologies Poor research-extension linkages Climate change-induced pests and disease Poor attention to post-harvest losses	Establish a robust extension system and institutional setup regarding CSA Subsidize farmers in the adoption of new technologies Strengthening appropriate agriculture technology Strengthening research regarding CSA (university, research) Strengthening private sector engagement Improving post-harvest management including appropriate and resilient storage facilities
Increase the use of organic fertilizers	Encourage the use of different types of compost; promote the use of local resources; boost consumption of organic products; improve access to equipment for composting; encourage private sector investment that helps farmers adapt to climate change and makes soil more resilient to floods, droughts, and land-degradation practices	Raw material input shortage Absence of price variation Knowledge and skill gap Technological inputs for the preparation	Follow a participatory approach Create price incentive for organic products including standardization and labelling Increase access to appropriate technologies Create awareness (promotion) Encourage private sector participation in large-scale production of organic fertilizer

[2] There is currently a Climate-Smart Agricultural manual that focuses on natural resources management (NRM), but a manual that includes additional CSA practices in livestock and soil management needs to be prepared.

Sector Actions/ measures	Activities	Barriers	Action
Expand the use of improved crop varieties	Research agro-ecology based varieties; encouraging and supporting seed production at private level and smallholder farmers level in addition to state farm; improve access to credit and financial support	Follow a participatory approach Create price incentive for organic products including standardization and labelling Increase access to appropriate technologies Create awareness (promotion) Encourage private sector participation in large-scale production of organic fertilizer	Develop drought-resistant crop varieties Strengthening extension services Encouraging private sector investment Improving access to land and credit
Strengthen crop disease and pest monitoring system	Capacity-building training for experts and producers; application platform; implement regular crop disease and pest surveillance; survey and assessment based on weather/climate conditions	Knowledge gap in identification, differentiation among various diseases Information gap Infrastructure gap Shortage of various tools and equipment Absence of regular monitoring	Identification of pest-management strategies Establish and strengthen community-based pest monitoring Utilize endogenous knowledge

4.2 Implementation Component #2: Natural Resource Management (NRM)

Overview of the NRM Implementation Component

Natural resources, agriculture and human activities are highly interrelated in most developing countries, including Ethiopia. Land clearing for agriculture, rising demand for fuelwood, and illegal settlement within forests have resulted in the deterioration of forest resources, reduction of biodiversity, and a hike in incidences of soil erosion and land degradation in Ethiopia. As such, the role and importance of natural resources in economic development and societal well-being are fully appreciated in developing countries like Ethiopia, whose populations are predominantly rural and directly dependent on natural resources for subsistence. Today, the natural resource bases of the country are suffering heavily from widespread improper and unwise utilization, resulting in rapid degradation. Deforestation, desertification, loss of biodiversity, soil erosion, soil fertility decline, soil acidification, salinization, environmental pollution, the fuelwood crisis, and water scarcity are some of the manifestations of natural resources problems in Ethiopia. Many of these issues are exacerbated by climate change. As more users put demands on the

scarce environmental resources and the impacts of climate change become more apparent, the need for intelligent conservation and rational management of natural assets is increasingly necessary to ensure the resilience of ecosystems and the people that depend on them.

The key activities identified at the stakeholder consultation workshops for this implementation component are shown in the table below.

Table 7. Key activities for implementing NAP-ETH through NRM initiatives

Adaptation options (AOs)		Key activities	Gender considerations
AO3	Strengthening sustainable natural resources management through safeguarding landscapes and watersheds	• Conduct climate change impact assessments considering issues such as land degradation, soil erosion, and deforestation loss of biodiversity etc. • Enhancing climate-resilient rural livelihoods through participatory watershed development • Capacity building to escape from and remain out of poverty through more productive and resilient livelihoods and ecosystems • Improve land-use planning to integrate climate change • Develop bankable projects to safeguard watersheds and landscapes to enhance the ecosystem resilience and livelihoods • Sustainable prevention measures to protect hydropower dams from siltation and encroachment	• Facilitate the development of gender-responsive and sustainable watershed and NRM guidelines and bylaws • Enhance both women's and men's capacity for sustainably managing and utilizing natural resources and the ecosystem at large • Develop and implement strategies and guidelines that promote women's equitable access to and control of natural resources, including land and water • Link sustainable NRM programs with targeted gender-responsive income-generating and employment activities

Adaptation options (AOs)		Key activities	Gender considerations
AO4	Improving soil and water harvesting and water retention mechanisms	• Develop NRM plans that integrate climate change • Develop integrated NRM technologies for adaptation in vulnerable landscapes in consultation with concerned communities • Conserve the existing forest land through biological and physical conservation to build climate resilience • Rehabilitate deforested watersheds to reduce soil erosion due to erratic rainfall through integrated land management; area closure and gulley control • Enhance area-specific rural water retention technology, taking climate change into account	• Ensure equitable participation by women and men in governance institutions for soil water harvesting and water retention measures • Ensure that water harvesting and retention technologies are designed with due consideration to women's preferences in terms of costs and ease of using, maintaining, and fixing the technologies • Effectively address policy, social, economic, and technological barriers for the equitable participation of women in water use and management structures (for example, in relation to labour requirements) • Promote approaches to water harvesting and retention that recognize that men and women have different needs, interests in, access to, and control over water and water-harvesting technologies and services based on a variety of factors, including gender
AO6	Improving ecosystem resilience through conserving biodiversity	• Awareness creation on climate change impacts on ecosystems for conservation practitioners • Integrate climate change adaptation in conservation planning to address climate impacts on ecosystems • Develop/adopt appropriate technologies for enhanced forest and wildlife management to build climate resilience • Establish ex-situ and in-situ sites for improved biodiversity management to reduce climate risks • Build infrastructure in national parks and protected wildlife areas to improve wildlife water supply, health, and protection	• Ensure equitable participation of women and men in biodiversity governance institutions • Develop and implement adaptation actions that build on existing capacities of women and men (for example, taking into account women's role in managing agro-biodiversity and men's traditional knowledge on livestock management) • Invest in the design and implementation of strategies that reduce the high dependence of resource-poor women on traditional biomass for their energy, medicine, and livelihood needs • Facilitate equitable access for women and men to education, information, training, and extension services in relation to ecosystem management and biodiversity conservation

Adaptation options (AOs)		Key activities	Gender considerations
AO7	Enhancing sustainable forest management helps to create enabling situations for sustainable management of forest resources and contributes to the livelihoods of forest-dependent communities in particular and to the national economy at large	• Plan and implement forest health measures that increase resilience to climate change • Develop a strategy to protect forests from forest fires • Introduce disease/pest-resistant tree species released through research • Promote participatory community-based forest management through rehabilitation, afforestation/ reforestation on degraded forest land for increased climate resilience • Enhance law enforcement effectiveness and efficiency in protected forest lands	• Revise/develop forest management strategies and plans that take women's and men's constraints, gender roles, knowledge and usage of forests and rangeland resources into account • Address gender-based inequalities in informal usage and formal employment in the forestry sector • Collect and analyze sex-disaggregated data and information on the use of forests and forest products, agro-forestry, participatory forest management and community-based rehabilitation of degraded forests • Ensure that supporting services, such as extension, information dissemination, and seedling provision are gender-responsive • Ensure equitable participation of women and men in forest management and governance systems • Address the time poverty of women and girls by prompting interventions that facilitate their access to fuel-efficient energy technologies

Gender considerations are taken from EFCCC (2018).

Policy Context for the NRM Implementation Component

Natural resources are important for the majority of Ethiopians as they rely on them for their livelihoods. Natural resources have been traditionally governed under the rural land administration regime, an area that has undergone constant reform. The first federal law in this regard is the Federal Rural Land Administration Proclamation No. 89/1997, which was underpinned by the constitutional principle that land is a public property to be administered by regional states. This law repealed legislation in force at the time, specifically the long-standing Derg-era Proclamation No 31/1975 that declared land to the tiller.) Proclamation No. 89/1997 untethered land rent from the whole array of property rights restricted under proclamation 31/1975.

The federal government further expanded the scope of land-based property rights by introducing Proclamation No. 456/2005. This Proclamation, while amending the existing rural land-use law, reaffirmed the constitutional mandate of regions' autonomy to enact their own

laws in compliance with minimum requirements set according to federal land administration laws. This proclamation authorizes regional states to decide on the duration that rural land may be rented out by farmers. Farmers can rent out their land to fellow farmers or investors engaged in large-scale, mechanized farming or to farmers that use modern technology. Proclamation 456/2005 is in the process of being revised, with ongoing stakeholder consultations. Meanwhile, the revised draft proclamation has been circulated to regional states, and the feedback they gave is being incorporated therein as appropriate.

The GoE has acknowledged that an integrated, aligned, and harmonized land-use plan and land-use policy are vitally important. Land-use planning is a prerequisite for any visionary urban and rural development undertaking to bring about economic, social, and environmental transformation.

Current Status of the NRM Implementation Component

The Sustainable Land Management Project (SLMP) has been the major flagship government project aimed at building natural resources in the country. The first phase of the project (SLMP-1) was implemented from 2008 to 2013, followed by the second phase (SLMP -2) from 2013 to 2019. SLMP-1 introduced sustainable land management practices in selected areas of the country and led to remarkable results in rehabilitating targeted degraded areas that had previously been uneconomical and unproductive. It was implemented in 45 watersheds in six regions. The project supported a comprehensive strategic approach to improved natural resources management, which included a distinctly participatory identification of degradation factors and impacts, the subsequent planning and design of the most appropriate interventions, and community-led implementation of improved practices and infrastructure. A total of 98,000 rural households (responsible for 190,000 ha) benefited from a combination of environmental and productive interventions. SLMP 2 scaled up the same interventions in 135 watersheds/ woredas (including the 45 watersheds from SLMP-1), covering 937 kebeles in the Amhara, Tigray, Oromiya, Southern Nations, Nationalities and Peoples Region (SNNPR), Gambela, and Benshangul Gumuz regions. Direct and indirect beneficiaries of the project include an estimated 1,850,000 people. Given the fact that SLMP 2 commenced after the CRGE, it also worked on integrating climate-smart interventions. The Landscape Management Program, a USD 500 million results-based program, has now replaced SLMP. Though the activities to be implemented are similar, the approach will be different. The project is expected to increase the adoption of sustainable land management practices and expand access to secure land tenure in non-rangeland rural areas.

The GoE recently secured a loan and grant from the World Bank to continue on SLMP 3 but under a different approach and name. The SLMP III is now named the Resilient Landscape Livelihood Project (RLLP), and it will support core investments in biophysical watershed restoration with a set of additional activities supporting sustainable livelihoods in restored landscapes. It also expects to incorporate CSA, diversified income-generating activities, connections to value chains, and improved land tenure. The project area will include the previous 152 major watersheds located in the Ethiopian Highlands, averaging approximately 10,000 hectares each. Under a phased approach, the 45 watersheds supported under SLMP-I will receive assistance to graduate from project-based support, including the creation of WUAs (Watershed User Associations) and preparation of Watershed Management and Use Plans

(WMUPs). Support for the 90 SLMP-II watersheds will allow the implementation of their Multi-Year Development Plans (MYDPs) for watershed restoration to be completed prior to provision of graduated support as for SLMP-I watersheds. Seventeen new watersheds selected for RLLP were prioritized according to extent and severity of land degradation and will receive assistance for the preparation of MYDPs, followed by investment in the identified Sustainable Land Management (SLM) interventions. The project is expected to run from 2019 to 2024.

In addition to the government-led NRM project, several local and international NGOs are also currently implementing NRM activities. Following are a few examples of projects in NRM areas. Additional donor-funded projects are attached in Appendix III, and NRM-related activities could be screened through further investigation.

- FARM Africa–Bale Ecosystem Reducing emissions from deforestation and forest degradation (REDD+) project
- Catholic Relief Services—The Resilience through Enhanced Adaptation, Action-learning and Partnership Activity (REAAP)
- EU Funded SHARE II project in Bale Eco-Region in Oromia Region, implemented by Frankfurt Zoological Society, Farm Africa and including SOS Sahel-Ethiopia, PHE-EC and IWMI

Vision for the NRM Implementation Component

Current farming practices—coupled with inherent fragile soils, undulating terrain, and highly erosive rainfall—make Ethiopia highly vulnerable to soil erosion. The country has faced persistent challenges in conserving its soil fertility. Moreover, about one-third of the agricultural land is moderately to strongly acidic because of long neglect in soil conservation and traditional farming practices. Gully and other natural structures also render natural resources vulnerable to climate hazards. Natural resources management and conservation not only build communities' adaptation capacity to climate change but also improve agricultural production. The vision of NRM-related AOs is to rehabilitate degraded lands and enhance ecosystem resilience to enable rural communities to increase agricultural productivity as well as build their adaptive capacity.

Ethiopia has been implementing natural resources management for the past several years. However, deforestation and soil erosion have continued to affect watershed rehabilitation. Therefore, the "business-as-usual" approach to natural resources management needs to be updated to clearly address climate change. New NRM approaches need to include the intersection of land management and rights as well as other livelihood activities.

Table 8. Vision for adaptation in NRM

	AO3: Strengthening sustainable natural resources management through safeguarding landscapes and watersheds	AO 4: Improving soil and water harvesting and water-retention mechanisms	AO 6: Improving ecosystem resilience through conserving biodiversity	AO7: Enhancing sustainable forest management
Outcome	Natural resource management sustained and landscapes safeguarded against the impacts of climate change	Climate-smart agriculture and conservation practices adopted and extent of soil erosion reduced	Households' ability to absorb shocks and stresses induced by climate change increased	Scope of degraded forests rehabilitated increased Wildlife population increased
Key milestones	Fodder production increased by 15% by 2030	Production increased by 10 % by 2030 and excessive use of agrochemicals reduced by 25% by 2030	Number of food-insecure households drops by 50% by 2030	Number of small-scale farmers benefiting from NTFPs increased by 25% Migration/ mortality of wildlife reduced by 50% by 2030 Deforestation rate declined by 25%
Tracking methods	CSA – Annual Sample Survey Report, Measuring, Verification and Reporting (MRV)	CSA – Annual Sample Survey Report and MRV	CSA – Annual Sample Survey Report and MRV	CSA – Annual Sample Survey Report and MRV
Regional priority	Five regions (Amhara, Tigray, Oromia, DD, Somalia)	Two Regions (SNPPR, Afar)	Benshangul, Gambella	Two regions (Amhara, Tigray)

Roles, Responsibilities, and Mechanisms for Implementation

Implementation of NRM activities will emulate the current SLMP[3] institutional arrangements. The NRM Directorate at the Ministry of Agriculture will have the overall technical responsibility to coordinate, supervise, and support implementation at all levels of government. The SLM Program implementation structure has four levels—federal, regional, woreda, and kebele—and

[3] The Sustainable Land Management Program and Sustainable Land Management Project are two different structures and that the Project is a subset of the program. While the project is funded by the World Bank, the program has different donors as well as activities

activities were implemented through existing GoE structures and community institutions. Implementation of NRM activities is best undertaken through a decentralized approach with communities assuming primary responsibility for executing most project activities at the watershed level. This requires strong community-based institutions. The Sustainable Land Management Project II (funded by the World Bank) has been working on strengthening existing community structures as well as building new ones in different watershed areas. Best practices from these experiences should be benchmarked to scale up community-based watershed management toward increased climate resilience. The Woreda Offices of Agriculture and development agents provide necessary backstopping and coordination of technical support to communities.

Civil society organizations and NGOs will also have a role in implementing activities as well as resource mobilization and provision of technical support. For their part, research and academic institutions can contribute by undertaking and publishing studies and/or research programs that generate solutions to help measure the effectiveness of past, present, and future adaptation interventions. International partners can help identify new financial sources to fund climate change adaptation through public, private, bilateral, and multilateral partnerships.

List of selected NGOs working in NRM	Oxfam (UK/USA), World Health Organization (WHO), Agriteam Canada, Christian Aid, Farm Africa, Action Aid Ethiopia, Mercy Corps, SOS Sahel, CARE International, Red Cross, CHF, Catholic Relief Service, Agri Service Ethiopia, World Meteorological Organization
List of selected universities working in NRM	Haramaya University, Addis Ababa University, Mekelle University, University of East Anglia

Unlocking Synergies With Other Actions

The NRM intervention is cross-cutting and contributes to the effectiveness of multi-sectoral climate change adaptation-related interventions in urban and rural development settings. Enabling activities for the effective implementation of other components (e.g., Agriculture [Soil/Crop]; Forest Sector; Biodiversity Subsector; Protected Areas Conservation Subsector) can be synergized with such mitigation interventions as enhancing lower- emitting techniques for agriculture; forest management; and natural forest and woodland management.

Implementation Needs

In comparison with the other components, the NRM component does well in terms of human resources (information, knowledge, and capacity) and investments in infrastructure, equipment, and technology. This is attributed to significant financial supports (e.g., SLM Project, PSNP) secured through bilateral and multilateral partnerships. However, as the performances in different parts of the country are varied, resource mobilization effort should be strengthened to uniformly address climate change adaptation-related interventions in a sustainable manner.

The performance of the component, however, encountered barriers that hindered its implementation as it was envisaged. Inadequate institutional structure at sub-national

levels; lack of human, financial, and material resources; lack of appropriate technologies; low awareness and market linkages; absence of commitment on the side of the government and community; lack of integration in implementation; and an inadequate M&E system were the major constraining factors necessitating immediate government action in partnership with multi-sectoral state and non-state actors.

Short-Term Priorities (2020–2022)

The short-term priorities for AOs under the NRM component focus on major issues that can promote the implementation of the long-term actions that will help achieve the intended adaptation goal by addressing bottlenecks and gaps in NRM.

Table 9. Short-term priorities for implementing NAP-ETH through NRM initiatives

Objective	Activities	Responsible entity	Target institutions	Timeframe
Improve the enabling environment for scaling up of NRM practices	Stakeholder mapping to identify potential contributors and establish or strengthen existing federal/regional platforms for better coordination and collaboration on climate change adaptation	EFCCC/ Regional Bureaus	Federal-level ministries, NGOs, and donor partners Regional bureaus, NGOs and development partners	2020
	Stocktaking of best practices in conservation and adaptation to climate change in NRM to identify gaps and plan for appropriate implementing actions	EFCCC, MoA	Federal level ministries, regional BoAs as well as NGOs	2020
	Develop sector-specific strategic results framework to track achievements of outputs and outcomes in climate change adaptation in NRM in a sustainable manner	Led by EFCCC with technical input from MoA and other line ministries	National Planning Commission (NPC), EFCCC, Federal level ministries	2020
Address capacity gap barriers	Conduct assessment of current adaptation practices, options and constraints, and capacity assessment followed by capacity development trainings targeting the existing government structure	Led by EFCCC (CRGE Facility), with technical input from MoA and MoWIE	Federal level ministries, regional BoAs, and water, woreda- and kebele-level development agents	2020–2022

Long-Term Priorities (2025–2030)

To ensure the sensible use of available resources, it is critical to align and harmonize the implementation of NRM-related programs and projects to enhance collaboration between major stakeholders, including the community. It is also important to develop a reliable resource-mobilization mechanism to ensure the sustainability of operationally active initiatives and those in the pipeline. Furthermore, it is paramount to draw lessons from stocktaking exercises in NRM-related interventions and make sure that these lessons may be scaled up and replicated by other sectors in the upcoming plan (GTP III).

Table 10. Long-term priorities for implementing NAP-ETH through NRM initiatives

Sector key actions/ measures	Activities	Barriers	Action
Promote agrobiodiversity	• Identify agrobiodiversity resources; establishment of biodiversity reserve; conserve endogenous gene and species; promote community/ endogenous knowledge; undertake agrobiodiversity mapping and risk assessment	• Awareness gap • Lack of attention in extension services • Lack of incentives • Loss of local species (genes) • Research gap on improving local varieties	• Enhance policy support • Promote beneficiaries' participation • Improve research works
Integrate climate change adaptation in NRM planning	• Developing checklist and guideline for mainstreaming climate change adaptation in conservation planning, reporting and M&E • Promoting animal and microbial diversity conservation • Human, institutional and physical facility capacity building • Enhancing conservation research capacity • Prompting climate-smart biodiversity	• Lack of awareness and capacity limitations • Absence of comprehensive CSA manual • Establishment of clear linkage between NRM and agricultural development	• Establish a strong extension system and institutional setup to promote Climate Smart Agriculture • Support the implementation of CSA manual which has focused on NRM and draw lessons for scaling up • Strengthening private sector engagement in NRM and forestry

Sector key actions/ measures	Activities	Barriers	Action
Rehabilitate deforested watersheds to reduce soil erosion	• Strengthen physical conservation works • Promote the construction of bunds, cut-offs; waterways, etc. • Implement contour cultivation, strip cropping	• Materials and input shortage such as seedlings • Knowledge and skill gap • Lack of technological inputs	• Follow participatory afforestation and rehabilitation approach • Create a price incentive for forest products • Increase access to appropriate technologies • Encourage private sector participation in large-scale forestry
Area closure of deforested watershed, land, and gullies to reduce soil erosion	• Demarcating and fencing for area closure • Degraded land closures combined with tree planting, mulching and water harvesting • Strengthen biological conservation for soil erosion reduction	• Basic seed shortage for the rehabilitation of land and reduce soil erosion • Financial constraints • Resistance to area closure • Shortage of equipment	• Strengthening extension services to be able to work with communities in promoting area closure • Improve access to land and credit for communities to be engaged in alternative livelihoods
Improve wildlife and biodiversity management	• Introducing community-based wildlife management • Execute integrated community-based wildlife management plan • Strengthen law enforcement mechanisms • Capacity building and awareness creation • Payment for ecosystem services	• Lack of sense of ownership • Illegal hunting • Encroachment and deforestation	• Establish community bylaws on the use of forest products • Introduction of ecotourism where communities share benefits • Policy enforcement against possible encroachment actions and illegal hunting

Sector key actions/ measures	Activities	Barriers	Action
Plan and implement forest health measures	• Stretching community forest management extension system (improve Indigenous knowledge, demonstration site and FTC/PTC) and introducing alternative livelihoods (improve non-timber forest product, benefit-sharing mechanisms, ecotourism, alternative energy) and human and institutional capacity building (infrastructure, hand tools, regulation, proclamation and bylaws) • Integration (among relevant stakeholders platform and GOs and NGOs)	• Inadequate institutional structure at the sub-national level • Lack of human, financial, and material resources • Lack of technology (ICT, Management technology) • Awareness and market linkage • Lack of commitment on the side of the government and community regarding cooperation • Lack of implementation • Lack of integration with related activities • Inadequate M&E system for monitoring progress	• Put in place/ strengthen the structure at the sub-national level by advocating and creating awareness strategies • Support with program /projects • Develop long-term capacity-building strategies • Introduce and support with new innovative technologies • Enhancing and stretching Integration among stakeholders (establishing platform MOU and etc.) • Mainstreaming of gender in every activity • Establishing the M&E System

Sector key actions/ measures	Activities	Barriers	Action
Community-based rehabilitation of degraded forest land **Afforestation/ reforestation on degraded forest land**	• Afforestation and reforestation (agro-ecology and Indigenous species) • Area closure • Watershed management (strengthen and enhance watershed extension management system) • Alternative energy • Building human and institutional capacity • Integration among relevant stakeholders platform and GOs and NGOs	• Inadequate institutional structure at the sub-national level • Lack of human, financial, and material resources • Lack of technology (ICT, Management technology) • Lack of awareness and market linkages • Lack of commitment from government and community regarding cooperation • Poor implementation	• Put in place/ strengthen the structures at the sub-national level by advocating and creating awareness strategies • Support with programs/projects • Develop long-term capacity-building strategies • Introduce and support with new innovative technologies • Enhancing and stretching integration among stakeholders (establishing platform MOU etc.) • Mainstreaming of gender in every activity • Establishing M&E System

Source: Joosten & Grey, 2017, p. 26.

4.3 Implementation Component #3: Health, Livelihoods, and Social Protection

Overview of the Health, Livelihoods, and Social Protection Implementation Component

The provision of a social protection-based safety net is a precondition for the type of risk management and investment needed to build climate-resilient livelihoods. Social protection-based safety net mechanisms such as the PSNP contribute toward the reduction of vulnerability and are a foundation for building resilience. Social protection, livelihood improvement, and health care services are closely related, as they serve the most vulnerable populations. Health care is one of the sectors incorporated in NAP-ETH that is not included in the CRGE, despite its contribution to building resilience with regard to climate impacts such as heatwaves. Climate risks such as heavy rain exacerbate the potential impact of other health and environmental problems like vector-borne diseases, water-borne diseases, severe malnutrition, flooding, and the displacement of significant numbers of people, particularly

in drought-prone areas. Drought has significant social and economic impacts leading to the significant impacts among the vulnerable population in rural communities.

PSNP started out as a safety net program but has now become the GoE's key response mechanism to climate change. The unpredictable weather patterns in the country—coupled with poor agricultural practices—are impacting farmers. Thus, the PSNP, in addition to providing short-term relief, is expected to build the long-term adaptive capacities of households and communities. PSNP IV provides multi-year transfers to chronically food-insecure households and emergency support through an annual contingency budget. The emergency support is provided to help households smooth consumption and avoid distress asset sales in the face of drought or changing climatic variability. The public works, such as terracing and other watershed rehabilitation, are expected to reduce erosion and improve soil nutrition. The PSNP promotes small-scale irrigation, which is expected to increase agricultural production and thus household and community resilience to climate change. PSNP IV has also introduced a number of new approaches in public works, such as the provision of livelihood support, gender provisions, and climate-smart agriculture. PSNP IV is also linked to broader national policy systems for social protection and disaster risk management. The PSNP is transitioning from a development partner-funded program to being increasingly funded by the GoE. The key donors of PSNP had been the Danish International Development Agency (DANIDA), Department for International Development (DFID) (United Kingdom), the Dutch Embassy, EU, Global Affairs Canada (formerly CIDA), Irish Aid, United Nations International Children's Fund (UNICEF), USAID, the World Bank, and WFP.

The MoA has been the leading implementing agency of the PSNP. There are differentiated institutional arrangements for the delivery of the PSNP according to individual regional structures. The Food Security Directorate is responsible for PSNP delivery, EWRD/National Disaster Risk Management Commission (NDRMC) is responsible for local food management issues and early warning, while financial control and resources flow directly though the Regional Bureau of Finance and Economic Cooperation (BoFEC). The Natural Resources Directorate is responsible for public works. At the woreda level, arrangements adopt similar lines of command and responsibility as the regional structures. In a federal system, there remain strengths and challenges in each of the regional structures as well as the relationship with the centre.

The link between social protection and health is clearly articulated in the PSNP IV, which also focused on improving access to social services, including health care, both directly through the provision of infrastructure and indirectly through better transportation networks. Since the beginning of the PSNP, more than 1,000 health posts have been supported, along with the significant contributions made to increase access to improved water sources and the reduction of waterborne diseases.

Relevant AOs that contribute to these components are:

- AO5: Improving human health systems through the implementation of changes based on an integrated health and environmental surveillance protocol
- AO8: Building social protection and livelihood options of vulnerable people
- AO14: Developing an efficient value chain and marketing systems

Table 11. Key activities for adaptation in health, livelihoods, and social protection

Adaptation Option	Key activities	Gender considerations
A05: Improving human health systems through the implementation of changes based on an integrated health and environmental surveillance protocol	• Awareness creation for health workers on the impacts of climate change • Design climate-sensitive disease prevention programs • Undertake disease surveillance based on an integrated health and environmental surveillance protocol • Provision of infrastructures to improve basic health and emergency medical services	• Facilitate equitable access to early warning information for women and men to enable preparedness planning and informed health-related decision making • Review the health extension system's disease surveillance and monitoring protocols to incorporate gender-disaggregated indicators, utilize timely early warning and disease surveillance information and deliver an effective health response for women and men • Devise and implement strategies that aim to protect women and girls from abuse and exploitation during post-disaster emergency situations • Improve women's access to and utilization of health-related resources by addressing sociocultural barriers such as time and resource constraints and intra-household resource allocation and decision-making • Develop and implement adaptation actions for the health sector that recognize the vulnerabilities as well as central roles women play as both providers and recipients of healthcare at different levels of the health system • Develop and implement adaptation actions for the health sector that consider the intersectionality of gender with other sociocultural characteristics (such as poverty, ethnicity, and disability) and address social norms that present barriers to gender equality in the health sector

Adaptation Option	Key activities	Gender considerations
AO8: Building social protection and livelihood options of vulnerable people	• Strengthen safety net systems for vulnerable groups to ensure access to social protection mechanisms when affected by/recovering from a climate shock • Organize vulnerable communities under micro, small and medium-sized enterprises to help them adapt to climate change • Resilient and risk-informed livelihood diversification as an adaptation to climate change	• Put in place gender-responsive eligibility criteria in social protection programs that consider not only household income, but also the intra-household distribution of resources that may disadvantage women, in particular girls and older women • Schedule public works at times that do not conflict with men's and women's key agricultural activities • Ensure public works are conducted within an environment conducive for women, including those with young children • Ensure that safety nets do not reinforce traditional gender roles; integrate mechanisms to address unequal decision-making and power relations within households • Ensure the presence of both female and male household members during payments to support equality in intra-household power relations • Enhance awareness among financial service providers on women's and men's unique needs and barriers to accessing financial services • Design demand-driven financial products that create opportunities for women, for example, to increase profitability for female-run businesses and to promote women's control over investments and expenditures • Link credit services with other financial and non-financial services to maximize contribution to individual and household resilience • Strengthen women's technical capacity to pursue climate-resilient livelihood options (for example, by strengthening financial literacy and business plan development skills)

Adaptation Option	Key activities	Gender considerations
AO14: Developing an efficient value chain and marketing systems	• Awareness creation on climate risks to value chains and approaches to building climate resilience • Establish market centres to improve the resilience of value chains for crop/livestock/ forest products • Enhance linkages between unions and buyer cooperatives in urban areas • Develop commodity quality control and standardization system • Provide input supply to improve the resilience of value chains	• Promote sustainably produced, certified products that address the challenges vulnerable women and men face in value chain and market systems • Improve women's and men's access to value chain services including finance with secure land and property rights • Provide inclusive capacity building services (for example, by providing technical trainings on value chains at times and places that are convenient for women) • Support equitable participation by women and men in cooperatives • Work with value chain actors to assist them in integrating gender considerations in policies and operations

Gender considerations are taken from EFCCC (2018).

Policy Context for the Health, Livelihoods, and Social Protection Implementation Component

There are a few key policies that are currently guiding social protection and health provision in Ethiopia. These key policies are:

- The Social Protection Policy (SPP)
- The Disaster Risk Management (DRM) Policy
- The National Nutrition Programme (NNP)
- The National Health Adaptation Plan (NHAP)

Social Protection Policy: The aim of the SPP is for all Ethiopians to enjoy social and economic well-being, security, and justice. The policy primarily aims to reduce the number of people living below the poverty line in Ethiopia.

Disaster Risk Management: The goal of the DRM policy is to reduce the risk and the impact of disasters through the establishment of a comprehensive and integrated disaster risk management system within the context of sustainable development.

The National Nutrition Programme: The NNP aims to improve the nutritional status of women and children in Ethiopia.

The National Health Adaptation Plan to Climate Change, the FDRE Constitution, the Health Policy, Health Extension Programme, and the National Sanitation and Hygiene Strategic Action Plan are among the vital policies, plans, and commitments that guide the implementation of AOs in the health sector. Through support from WHO and DFID, the MoH has developed H-NAP

and the National Framework and Health Vulnerability and Adaptation Assessment report. The N-NAP looked at addressing malnutrition, vector-borne and waterborne diseases, respiratory tract infections, and heat stresses, which are largely caused by climate change.

Table 12. Current status of the health, livelihoods, and social protection implementation component

Achievements	The MoH has started supporting the mainstreaming of climate change adaptation into relevant activities. To that end, MoH has developed a National Health Adaptation Plan to Climate (MoH, 2018) and assigned experts to coordinate, organize, and monitor adaptive activities being carried out by respective directorates and agencies under MoH. The PSNP is the largest government program aimed at addressing social protection gaps in the country, and it is currently on its fourth cycle. The program provides coverage for households in Afar, Amhara, Dire Dawa, Harari, Oromia, SNNPR, Somali and Tigray, and targets those that are chronically and transitorily food insecure. The program provides cash and/or food transfers to households. The public work component focuses on activities such as integrated community-based watershed development, soil and water conservation measures, rangeland management, and the development of community assets such as roads, water infrastructure, schools, and clinics. These works contribute to improving livelihoods (through increased availability of natural resources including water and cultivatable land, fertile soil, increased agricultural production, and improved market access); strengthening DRM and climate resilience, and better nutrition. The PSNP has been a key driver of poverty reduction, with the immediate effect of the transfers reducing poverty by about 7%. The program has also made a significant contribution to the improvement of food security in Ethiopia. The PSNP has the potential to make a significant contribution to climate resilience in Ethiopia if adaptation is systematically integrated across the activities.
Actors and Programs	Health: MoH, MoWIE, and Ministry of Urban Development and Construction. All of them have a role in the implementation of the ONE WASH National Programme. Livelihood and social Protection: MoA, Ministry of Labour and Social Affairs (MoLSA), Ministry of Women, Children and Youth (MoWCY), Federal Micro and Small Enterprises Development Agency, and Federal Cooperative Agency (FCA).

Lessons Learned	Health: Guidelines to adapt building codes of health facilities to resist climate change effects; maximizing climate information utilization by the health sector for predicting and preventing climate-sensitive disease epidemics as well as to prepare the needed logistics ahead of disaster or disease outbreak; and building and renovating WASH facilities are among the approaches followed by the ministry. Additional measures include: • Adaptation of climate-proof latrine design and technology guidelines • Logistical preparation to avert climate change disasters • Strengthening early warning and integrated disease surveillance systems through operational research • Providing training on the utilization of climate data toward the prevention and control of climate-sensitive diseases • Monitoring and surveillance of water quality for the to achieve safe drinking water (along with the provision of training for the health and water sector workforces on household water treatment and safe storage mechanisms) • Sensitization of people on the health impacts of climate change and AOs are also a few of the steps which are being taken currently to ensure the well-being of communities exposed to the effects of climate change. Livelihoods and social protection: Targeting the poor has been successful since 48% of the beneficiaries of PSNP are considered to be very poor, while 34% are moderately poor. Social protection and livelihood mainstreaming are being implemented through small-scale initiatives that benefit high-priority groups including women and children. Different NGO-led programs/projects are addressing vulnerabilities through a community-wide approach, such as increasing income and enhancing capacity through the restoration of houses and food storage facilities (asset creation and protection). There are also other initiatives supported by non-state actors, i.e., microfinance institutions (access to credit) and improved information; the diversification both on-farm and off-farm income (livelihood diversification), and relocation of communities from areas of high climatic risk to low-risk areas mitigate the negative impact of climate variability on vulnerable segments of the society. The above-mentioned intervention has been implemented in the past decades due to regular severe flood and drought events; it is perceived to have been effective in saving lives but has been managed in silos. Based on a recent Household Living Standards Survey, the number of people living below the poverty line declined from 34% in 2010/11 to about 27% by 2015/15 (World Bank, 2017b).

Capacity	Health: The MoH has been implementing several large-scale projects and possesses the capacity to coordinate, implement, support, and supervise such projects. The ministry has benefited from several financial and technical supports over the years to build its internal capacity; however, the capacity of regional and woreda level bureaus is quite limited, particularly in the relatively underdeveloped regions such as Afar, Somali, Gambella, and Benishangul. Livelihoods and social protection: Aligned with the PSNP IV, the GoE is currently being supported to build its capacity through the Technical Assistance to Strengthen Capacity Development (TASC) project. TASC provides technical assistance to government institutions currently implementing PSNP IV. The project is funded by Global Affairs Canada, DANIDA. DFID, the EU, Ireland, the Netherlands, Swedish International Development Agency (SIDA), USAID, and the World Bank. Though there are capacity gaps in lower-level government institutions—particularly, with those at woreda and kebele level—the resources already available in PSNP for capacity building and support would go a long way toward filling those gaps. Also, through technical support from the EU, the MoA is currently implementing the Climate-Smart Mainstreaming (CSM-PSNP) project. Designed and financed under the Global Climate Change Alliance Plus (GCCA+) instrument of the European Commission, the four-year (2018–2012) technical support project aims to improve the resilience and adaptive capacity of targeted beneficiary communities by mainstreaming climate-smart planning and implementation into the Productive Safety Net Program IV (PSNP4). CSM-PSNP is supporting the MoA to mainstream climate-smart approaches in PSNP planning and implementation. CSM-PSNP will undertake certain catalyzing activities jointly with the PSNP implementers, such as training workshops and learning events.

Vision for Health, Livelihoods, and Social Protection

The vision for this AO is aligned with the vision of the PSNP, which is to build livelihoods and resilience to shocks while improving food security and nutrition for vulnerable rural households. PSNP is a key instrument to build the adaptive capacity of vulnerable groups in Ethiopia. In recent years, the interventions of the PSNP have started to incorporate adaptive measures in response to the impacts of climate change, for example, through the Climate-Smart Initiative; however, this is not yet systematically integrated in the program. In addition to the livelihoods support component, part of PSNP has focused on public works, which suggests there has been little impact in reducing the direct dependence of household livelihoods on sensitive-climate related factors, particularly rainfall (Tecleab, 2018). Therefore, concrete and additional effort must be made to incorporate climate change into all components of PSNP and increase the adaptive capacity of PSNP beneficiary households and communities.

In terms of the health sector, the vision is to cope with the health impacts of climate change exhibited by morbidity and mortality due to temperature extremes; increases in vector-borne diseases; increase in non-vector borne diseases related to weather conditions; health problems associated with weather-related air quality; injury and mortality through floods and storms;

and impacts of climate-related influences on food and water supply, such as malnutrition. To lessen the health impacts of climate change, MoH will implement the Health NAP at the national and sub-national levels by mainstreaming it to its various programs; and by strengthening its partnership with relevant line ministries and development partners with full the participation of communities at the grassroots level through the health extension program's health professionals, health extension workers, and health development armies. The scale of the services varies across regions due to factors such as infrastructure, implementation capacity, accessibility etc. Health service is a basic human need, and thus the whole population (vulnerable communities in particular) benefit from climate change adaptation mechanisms.

Table 13. Vision for adaptation in health, livelihoods, and social protection

	A05: Improving human health systems through the implementation of changes based on an integrated health and environmental surveillance protocol	**A08: Building social protection and livelihood options of vulnerable people**	**A014: Developing efficient value chain and marketing systems**
Outcome	Rural and urban residents have access to sufficient health care services including preventive measures for climate-related diseases Control and eliminate communicable diseases through the Health Extension Program (HEP)	Reduce the number of individuals and households who are food insecure and aid-dependent	Increased resilience of household livelihoods through support in value chain activities, diversification of income sources and access to markets
Key milestones	Increase the number of health extension workers by 34,000 by 2025 and provide job training for 20,000 workers annually Reduce morbidity from communicable diseases induced by climate change from 22% to 10% by 2025 CSA Annual Sample Survey Report Health Management Information System (HMIS) being built at MoH	Number of food-insecure households drops by 50% by 2030	Annual traded goods among unions to reach 10 million tons by 2025
Tracking methods	CSA Annual Sample Survey Report Health Management Information System (HMIS) being built at MoH	PSNP annual report CSA – Annual Sample Survey Report	Reports from unions
Regional priority	All regions	Afar, Amhara, Dire Dawa, Harari, Oromiya, SNNPR, Somali, and Tigray	All regions

Roles, Responsibilities, and Mechanisms for Implementation

The implementation of the social protection and livelihood activity will be aligned to the current PSNP structure.

Table 14. Key federal level ministries, with roles and responsibilities

Institution	Roles and Responsibilities
MoA	Responsible for public works, livelihood and food security-related activities.
MoLSA	Responsible for creating safe employment, decent work situations, and secure developmental social welfare
MoF	Responsible for overall financial management and reporting, and allocates resources to implementing agencies and regions
MoWCY	Plays an important role in ensuring that gender-responsive approaches are employed in implementing the different AOs
Federal Small and Medium manufacturing Industry Development Agency	Provides technical support to small and medium manufacturing enterprises at the federal level; coordinates work among regional entities and NGOs and other governmental entities working to support small enterprises
FCA	Coordinates work among unions; works with MoA and agricultural extension workers to support unions in marketing and accessing technical support
MoH	Provides technical support, implementation, and guidance on health sector activities
KEY RESPONSIBILITIES OF DIRECTORATES AND BUREAUS	
MoA: The Natural Resource Management Directorate (NRMD) in the MoA	Provides implementation support, technical coordination, and oversight of PSNP public works and safeguards through its Public Works Implementation Unit.
NDRMC	Responsible for the early-warning system, including triggering of a response that also informs the use of the PSNP contingency budgets, and the food management system for storage handling, dispatch, delivery, and monitoring of in-kind resources.
MoA: Job Creation Directorate	Responsible for creating agricultural sector jobs in rural areas and providing technical input for agricultural sector investment on jobs.
Joint Strategic Oversight Committee (JSOC)	Twice a year, a high-level JSOC, chaired by the minister of MoA and heads of agencies of PSNP donor partners, meets to discuss strategic challenges and agreed mitigating measures in-between the Joint Review and Implementation Support (JRIS) missions. PSNP currently has 10 donors: Global Affairs Canada, DANIDA, the European Union, Irish Aid, the Netherlands, SIDA, DFID, USAID, WFP, and the World Bank.

Regional administrations through their cabinets, regional food security steering committees, and heads of Bureaus of Agriculture and Natural Resources (BoANR) manage PSNP. There are also several task forces that oversee the implementation of PSNP at the regional level.

At the woreda level, the woreda cabinet oversees implementation, including budgeting and unresolved appeals. The Woreda Office of Agriculture (WoA) is responsible for the overall management of the PSNP. There are also several task forces and technical committees at woreda level, such as Transfers & Resource Management and Public Works and Livelihoods. The Woreda Food Security Desk (WFSD) coordinates safety net and the livelihoods activities. It chairs the Transfers & Resource Management as well as the Livelihoods technical committees.

Looking at the health sector, the MoH has established a directorate under the Ethiopian Public Health Institute (EPHI) to mitigate the adverse effects of disaster and disease outbreaks, including the ones posed by climate change. Cooperation and collaboration among sectors are important since climate change effects are wide and borderless—and affect most sectors either directly or indirectly. Therefore, the MoH establishes partnerships with beneficiary communities as well as line ministries, civil society organizations, development partners, and the private sector to overcome the adverse effects of climate change on the health sector.

Unlocking Synergies

The health, livelihoods, and social protection component has greater synergy with different line ministries that are directly or indirectly affected by climate change. Therefore, the component has created synergies with all the other components that fall under the EFCCC, MoA; MoWIE; Ministry of Urban Development and Housing (MUDHo); and the National Metrology Agency. Reducing emissions also has multiple benefits—less pollution, less damage to the ecosystem, and better health conditions.

Implementation Needs

The health structure reaches communities by establishing health posts for each rural kebele and deploying health extension workers who provide basic health services. Having a structure that reaches the grassroots level and the support that the ministry provides to regional states are both very helpful to implement the health adaptation plan to climate change. The health and agricultural extension workers in Ethiopia are present at woreda and kebele levels across the country; they are thus the ideal structure for reaching rural communities for agricultural and health services. Though there is a capacity gap in extension workers at the lower levels, the system allows the GoE to reach a wide range of the population. The existing system should be strengthened and put to use by the government, thereby ensuring the capacities are in place to address additional challenges posed by climate change.

The MoH has an HMIS equipped with computers to encode data and generate information at regular intervals and feed consolidated data to the MoH. Health professionals and managers at all levels have knowledge on how to prevent diseases, promote health, and how to treat/manage communicable diseases through pre-service and in-service trainings. Indigenous, local, and traditional knowledge systems and practices will also be promoted as major resources for adapting to climate change. To promote climate-resilient sanitation facilities, health workers

should be trained on climate-proof latrine technology options that will benefit household water treatment and safe storage.

However, there are constraints on the implementation process in terms of technical equipment, inaccessibility of quality information, limited surveillance capacity and skilled workers, as well as resource limitations. Corrective measures recommended to overcome these constraints include improved supply of the necessary equipment, capacity building in data management and other skills, resource mobilization (public and private), along with human and institutional capacity building.

Climate change must not be conceived as a narrow sectoral issue. Instead, a cross-sectoral response is needed that involves cross-cutting issues such as gender, HIV/AIDS, and nutrition. Such a response will require cooperation, planning and action across government sectoral ministries and agencies, regional governments, and woreda administrations. Apart from government institutions, civil society organizations, religious groups, the private sector, local communities, academic and research institutions, international and national NGOs, and development partners have to be engaged.

The MoWCY also plays an important role in ensuring that gender-responsive approaches are employed in implementing the different AOs throughout different ministries. Though some of the key ministries have a gender directorate, the MoWCY also has a role in ensuring that gender policies (as well as issues pertaining to gender) and climate change are guaranteed policy development, program design, and implementation.

Short-Term Priorities (2020–2022)

Table 15. Short-term priorities for implementing NAP-ETH in health, livelihoods, and social protection

Objectives	Activities	Responsible entities	Target institutions	Timeframe
Create an enabling environment for scaling up of health services provision	Develop the platform for information exchange and linkage to strengthen health systems to prepare for climate change	MoH	Federal ministries and donors as well as non-state actors	2020
	Develop sector-specific strategic results framework to track achievements of outputs and outcomes in climate change adaptation in a sustainable manner Integrating climate change adaptation in public health to improve the resilience of local public health systems to climate change	MoH	Donors and private sectors	2020–2021

Objectives	Activities	Responsible entities	Target institutions	Timeframe
Address capacity gap barriers	Conduct capacity assessment followed by capacity development trainings targeting the existing gov't structure at regional and woreda levels	MoH	Federal-level ministries, regional bureaus of health, woreda- and kebele-level health extension agents	2020–2022
PSNP V	Draw lessons on institutional arrangements and implementation for design of PSNP V	MoF	Federal-level PSNP implementation agencies	2019–2020

Long-Term Priorities (2023–2030)

Table 16. Long-term priorities for implementing NAP-ETH in health, livelihoods, and social protection

Options	Sector actions/ measures	Activities	Barriers	Actions
NAP-ETH AO14	Develop efficient value chain and marketing systems	• Improve market infrastructure so it is more climate resilient • Improve information exchange to increase market opportunities and improve management of risks	• Lack of information • Poor infrastructure • Limited competition	• Create platforms for linking producers with large buyers • Improve infrastructure • Market information exchange linked to climate information services

Options	Sector actions/ measures	Activities	Barriers	Actions
NAP-ETH AO5	Climate-sensitive disease prevention and management	• Develop local early-warning systems • Strengthening surveillance systems • Conduct research and assessment regularly • Enhance M&E system	• Limitation in terms of technical equipment • Inaccessibility of quality information • Limited surveillance capacity • Limited human resources	• Establish a health IT system and upgrade the existing information system to incorporate issues related to environment and health surveillance, integrating climate change
	Improve basic health services	• Creating community awareness on climate-related illness and injury • Strengthening capacity of health extension workers to address climate-related illness and injury • Strengthening health institution service • Increasing the availability of essential drugs	• Resource limitation • Limited capacity	• Linkage with already existing networks for awareness • Improve the capacity of health extension workers
	Improve emergency medical service	• Strengthen health facilities and make more resilient • Establishing mobile health teams • Strengthening M&E tools	• Inaccessibility of logistics	• Improve health centre facilities

Options	Sector actions/ measures	Activities	Barriers	Actions
NAP-ETH AO4	Strengthen safety net systems for vulnerable groups	• Integrate adaptation to climate change at all levels of planning (community, watershed, program) • Strengthen program integration with other components to ensure resilience building • Better selection and follow-up mechanism after shocks have been experienced	• Capacity gap and work overload of experts at woreda and kebele level	• Improve monitoring and follow-up system • Capacity building on climate change adaptation and how to integrate it into activities • Better allocation of tasks for support staff
	Enhance access to financial services for vulnerable groups	• Preparation of specialized financial packages that enable investment in resilient livelihoods and management of risks • Raise awareness of microfinance institutions on climate risk management • Incentive mechanism for saving	• Absence of incentives for microfinance institutions to work with the poor • Awareness of the role of financial services in building climate resilience	• Work with microfinance institutions to develop special packages that enable investment in resilient livelihoods and management of risks • Work with NGOs and other non-state actors to strength local saving and credit programs • Invest in building financial literacy toward better management of risks
	Support livelihood diversification for vulnerable groups	• Introduce new technologies and activities for climate-resilient livelihood activities • Linking with ongoing or new programs to benefit from activities	• Lack of knowledge and information on potential activities that will be more climate resilient • Absence of a mechanism to introduce new options	• Conduct research on best practices and new technologies for climate-resilient livelihood activities • Piloting of programs and find opportunities for scaling up

4.4 Implementation Component #4: Climate Services and Adaptation Technologies

Overview of the Climate Services and Adaptation Technologies Implementation Component

This component has two broad and interrelated AOs. While climate services focuses on the provision of information and soft services such as insurance, adaptation technologies are broader than climate services and include additional new technologies that can build resilience and adaptive capacities of households and communities. It is important to note that climate services can be part of adaptation technologies. According to the UNFCCC (2006, p. 9), climate adaptation technologies can take

> "hard" forms, such as new irrigation systems or drought-resistant seeds, or "soft" technologies, such as insurance schemes or crop rotation patterns. They could also use a combination of hard and soft, as with early-warning systems that combine hard measuring devices with soft knowledge and skills that can raise awareness and stimulate appropriate action.

The World Meteorology Organization (WMO) (2016, p. 5) defines climate services as

> the collection of climate data; generation and provision of a wide range of information on past, present and future climate; development of products that help improve the understanding of climate and its impacts on natural and human systems; and the application of these data, information and products for decision-making in all walks of life and at all levels of society.

The availability of information regarding past and present climate trends as well as likely future scenarios is key for climate-informed decision making and planning. However, the availability of such reliable information in Ethiopia is highly inadequate. Lack of climate information and services is not the only challenge, but also the lack of awareness, capacity to generate, disseminate, and use information, are the other challenges. On the other hand, the generation and utilization of reliable climate information is one of the key mechanisms to build resilience.

Relevant and reliable climate information is important for the implementation of NAP-ETH and also for decision making regarding important climate-related risk management issues. A coherent national plan for climate services could enhance the understanding of the community on climate variability and change, together with the associated risks and opportunities. Understanding the need for reliable climate information systems, Ethiopia is now developing and implementing a national plan for climate services with the aim of enhancing social, economic, and environmental benefits through better-informed climate-related risk management and improved capability for adaptation to climate change and variability. Related to climate services are adaptation technologies, which both facilitate access to information and expand the range of options available to people to manage climate risks. This implementation component also addresses early-warning systems and insurance mechanisms and research and development.

The AOs identified under these thematic areas are as follows:

- AO13: Mainstreaming endogenous adaptation practices
- AO15: Strengthening drought and crop insurance mechanisms
- AO16: Improving early warning systems
- AO17: Developing and using adaptation technologies
- AO18: Reinforcing adaptation research and development

Table 17. Key activities for implementing NAP-ETH through climate services and adaptation technologies

Adaptation option	Key activities	Gender considerations
AO13: Mainstreaming endogenous adaptation practices	• Stocktaking of endogenous practices for scaling up • Document findings of the stocktaking for future reference	• Promote and implement adaptation actions that build on the ecological knowledge and existing capacities of local women and men (such as women's specific knowledge about plants and forage species and traditional early warning and weather forecasting systems)
AO15: Strengthening drought and crop insurance mechanisms	• Develop/scale up index-based agricultural insurance systems (for crops and livestock)	• Bundle insurance with other financial services, such as credit and savings, as women and men face multiple risks that erode their adaptive capacity, which may not be covered entirely by an insurance policy • Ensure affordable and equitable insurance coverage for women and men by rolling out the products at times when potential clients have cash (for example, after a harvest) • Support access to financial education and simple, easy-to-understand products, policies, and claim processes for women and men • Implement transparent insurance value chains where both women and men can participate in product design processes (considering risks that are specific to women and men), premium collection, and payout distribution, reflecting their needs and capacities throughout the process • Work with trusted and preferred distribution channels taking into account the differences in needs and access between women and men

Adaptation option	Key activities	Gender considerations
AO16: Improving early-warning systems	• Develop contingency plans for drought/flood • Establish new (and enhance existing) meteorological stations • Provide support to regional and federal meteorology centres for generation, collection, analysis, and dissemination of climate information • Strengthen informal/ Indigenous climate information exchange practices • Establish/strengthen early-warning dissemination mechanism	• Ensure that early-warning systems take into account both women's and men's information needs (for preparedness, during disasters, and post-disaster) and preferred channels of communication • Understand factors that prevent women and men from taking action based on the early-warning information and develop strategies to fill the gaps. • Provide trainings to all stakeholders to improve their understanding of climate information (for example on probabilities behind forecasts and levels of impact associated with forecasts) • Invest in co-production approaches that engage both women and men for demand-driven climate services • Improve the capacity of climate service providers (such as the National Meteorology Agency) in understanding gender issues in early warning systems • Promote intra-household sharing of weather information to improve women's access to information (information is usually shared with the head of households, mostly men) • Diversify climate service products with regard to gender needs, type of product, space, time, format, etc. and corresponding routes of communication as appropriate

Adaptation option	Key activities	Gender considerations
AO17: Developing and using adaptation technologies	• Capacity building and awareness creation on climate change • Strengthening research and technology development capacity on climate change • Develop adaptation technologies for different actors • Produce research products that address climate change adaptation/ consider climate change impacts • Establish/strengthen policy and enabling environment for private sector involvement in innovation response for climate adaptation • Strengthen co-production of sector-specific climate services and linkage among stakeholders in the climate services chain	• Mainstream gender into extension services by sensitizing and training extension workers on gender-responsive approaches • Provide technical trainings for both women and men on how to implement selected adaptation technologies • Use women-friendly channels to share information on available technologies • Encourage intra-household sharing of information on adaptation technologies • Promote technologies that address women's and men's specific needs and priorities, but do not continue to reinforce traditional gender roles • Promote technologies that are affordable or establish appropriate financing mechanisms to facilitate access • Promote time- and labour-saving technologies for women
AO18: Reinforcing adaptation research and development	• Encourage local universities and agricultural research centres to conduct research and development on new technologies • Provide technical and financial support for research • Support research to field activities to disseminate new findings	• Integrate gender perspectives throughout the adaptation research cycle (design, data collection, analysis, database development and reporting) • Involve women and men in adaptation research and development • Engage MoWCY, gender and climate change research institutions, and academia to fill the gap in gender and adaptation research • Consider the intersection of gender with other socioeconomic variables such as poverty, disability, pregnancy, and age • Highlight gender-specific adaptive capacities as well as vulnerabilities • Operationalize research by linking findings to adaptation action, particularly focusing on transforming social norms and unequal power relationships (These AO18 gender considerations are similar to that of SP4)

Gender considerations are taken from EFCCC (2018).

Policy Context for the Climate Services and Adaptation Technologies Implementation Component

The National Meteorology Agency (NMA) is the lead agency in climate services. It has the role of developing climate models, predicting and building scenarios, and doing seasonal forecasts, clarifying climatic uncertainties for each agro-ecological zone in Ethiopia. The other key roles of agency under "Data Service" include formulating "NMA Data Policy," determining "NMA Service Charges," providing "Dataset and Information," and handling the "Data Request Form." These policies basically pertain to those outside of NMA and requiring specific data sets. Only a limited number of top government agencies and researchers, collaborating with NMA, can routinely receive data free of charge. Currently, however, NMA is the only institution mandated to disseminate weather information, although on some occasions, it has given NGOs and other government agencies the right to disseminate forecast and agro-advisory services. Some of the delegated institutions currently disseminating forecast and agro-advisory services on a pilot basis are EIAR and the Agricultural Transformation Agency (ATA).

Current Status of the Climate Services and Adaptation Technologies Implementation Component

In order to strengthen the role of climate information in resilience, the GoE is currently preparing the National Framework for Climate Services (NFCS) as part of the Global Framework for Climate Services (GFCS). The NFCS is a coordinating mechanism that enables the development and delivery of climate services at the national level. The NFCS will also bring about improved risk management through the incorporation of science-based climate information and prediction mechanisms into the decision and policy-making process.

The MoWIE and NMA are currently leading the preparation of the NFCS with the support of donors and NGOs such as WMO and Christian Aid. There are currently several key actors for climate services at the federal and regional levels, and one of the main purposes of the NFCS is developing a mechanism for better coordination and interaction among stakeholders in climate services toward improved climate services in Ethiopia. Through better coordination and collaboration, effective climate services will be provided to beneficiaries in the country. The recommendations for climate services actions provided in the NFCS are the following:

- Strengthen the co-production of sector-specific climate services and linkage among stakeholders in the climate services chain.
- Diversify climate service products with regard to gender needs, type of product, space, time, format, etc. and corresponding routes of communication as appropriate.
- Have a well-planned capacity building interventions for DAs and extension workers for improved climate service to local communities with a gender lens.
- Awareness creation and continuous training for actors (particularly at the local level) on the nature and application of weather forecasts & climate predictions (MoWIE, 2019).

In March 2018, an administrative restructuring took place and NDRMC, which was reporting to the council of ministries under the auspices of the Deputy Prime Minister, has now been moved to a newly formed Ministry of Peace (MoP). There are also two key entities under the MoP related to humanitarian assistance—a State Ministry for Peace that deals with internally displaced

people (IDPs) and the Administration for Refugee and Returnee Affairs (ARRA) that caters to the needs of refugees.

Achievements	Preparation of the NFCS. The setting up of national data service at the National Metrology Agency is another achievement.
Actors and Programs	NMA: Lead agency tasked with climate information services. EIAR: With the support of donors including the World Bank and Rockefeller Foundation, the EIAR has been working on the establishment of a communication tool system for agro-weather advisory services extension. The EIAR is also experimenting with the best modalities for improving the accessibility of locally relevant climate information; however, it is apparent that much more research and learning is required to better understand the most effective and appropriate means of communicating climate information. MoA: Using NMA-generated forecasts to develop agro advisory services, coordinate work among actors, and provide support to farmers through local extension workers. It has also developed Training of Trainers on Weather and Climate Information and products for Agricultural Extension Services in Ethiopia, including the support NMA has received. ATA: Supports the installation of an automated network of meteorological stations, and pilots the generation and dissemination of forecast and agro-advisory services. UNDP: Lists agro-advisory services as one of the AOs in several of its projects, including the Promoting Autonomous Adaptation project (funded by GEF). Irish Aid: Ireland and the WMO, together with NMA have also piloted small-scale agro-advisory services in Tigray and SNNPR. Farm Africa, Mercy Corp and Christian Aid: Christian Aid leads the Climate and Meteorological Services Advancement in Ethiopia project. Building resilience and Adaptation to Climate Extremes and Disasters (BRACED project) is a DFID-funded project operating in Afar, SNNPR, and Somali regions. Christian Aid assumes the leadership of the consortium in BRACED-X, and closely supports the NMA and other members in moving forward with the development of the national framework. Farm Africa and Mercy Corp are also part of the BRACED-X project. NDRMC: Responsible for the early-warning system. African Development Bank (ClimDev): Supports the strengthening of NMA's technical and human capacity. The EFCCC also has a Technology Promotion and Dissemination Directorate that is responsible for the identification of climate adaptation technology, facilitating engagement with research centres, the private sector, and donors to pilot and promote new technologies as well as provide policy recommendations on new technologies. Ethiopian Environment and Forest Research Institute (EEFRI), which is part of the EFCCC, is also responsible for conducting research on technology generation and dissemination.

Lessons Learned	There have been several pilot projects in climate information as well as risk finance, such as the R4 Rural Resilience Initiative, which was implemented by Oxfam America and the WFP. The "Horn of Africa Risk Transfer for Adaptation" (HARITA) project, on the other hand, integrated the risk management framework developed by Oxfam with resource management (risk reduction), insurance (risk transfer), microcredit (prudent risk taking), and savings (risk reserves). The risk reduction component of R4 involves the risk transfer aspect by focusing on weather index insurance. The weather index insurance component of the R4 Ethiopia initiative is based on historical and current weather information, especially rainfall. Lessons learned from the project include the importance of the involvement of the community, which is key to designing robust and tailored indices, the importance of the integration of insurance into the larger risk-management package, the importance of trainings and workshops to build local capacity, and the importance of working with local partners. Throughout the several pilot projects, other lessons learned include the need to pay attention to Indigenous knowledge in weather forecasting and agricultural practices, the convenience of using extension workers (who are much closer to farmers when it comes to meteorological data dissemination); and the importance of training them and assigning them the responsibility for disseminating meteorological information. Also important is the need for better collaboration between NMA and MoA as well as research institutions.
Capacity	NMA currently lacks the capacity to generate the woreda- or location-specific agro-advisory services needed by farmers. In order to scale up to generating location-specific forecast and agro-advisory service, the capacity of NMA needs to be built on top of strengthening the regional bureaus of the metrology agency.

The UNFCCC has recognized the importance of technology transfer as a key means to combat human-made climate change. This was stated in Article 4.5 of the Convention, and all countries are to prepare Technological Needs Assessment (TNA) as a first step to identify potential technologies to be adopted by the country (Ethiopia), toward meeting its climate adaptation goals. Ethiopia has prepared its TNA in 2007 (UNDP, 2007); it is presently outdated. However, the GoE is currently working on updating the existing TNA in line with the NAP and NDC.

Vision for Climate Services and Adaptation Technologies

Communities have been developing local response mechanisms for climate change. However, the growing challenge requires either modifying current responses or introducing new technologies. This needs to be done appropriately for the local environment as well as sustainably and cost effectively. In addition, it is important to note that the introduction of technology isn't a one-off activity but rather an iterative process. Climate will continue to change, and communities will need to continue to check their response mechanisms and introduce new technology as appropriate or necessary.

Climate services can offer several benefits across a range of sectors in Ethiopia. These include safeguarding investments in infrastructure and bringing about long-term changes to the country's smallholder farmers, as well as improving access to risk-management mechanisms like index-based insurance. Climate services can also be used for long-term plans for a country that is highly sensitive to rainfall patterns, drought conditions, floods, and other natural disasters. The aim of these AO components will be to strengthen climate services and particularly improve the use of agro-meteorological services with a focus on services for smallholder farmers as well as short-term and long-term planning and investment. The activities will be targeted toward investments in generating and disseminating accurate, timely, and reliable weather and climate information, which is important to inform different sector adaptations and climate risk management plans and decision making.

The vision for climate services is aligned with the NFCS, whose vision is "Ethiopians whose livelihoods are resilient through climate-informed decisions." Strengthening weather and climate services and improving the use of agro-meteorological services with a focus on short-term and long-term time scales will be instrumental in guiding the planning and investment processes.

The goal of providing climate information is different from that of early warnings and weather forecasts. Climate information can be used to inform policy decisions, investments on infrastructure, long-term planning, and even crop production, while early warning is used to empower individuals and communities to respond appropriately and in a timely way to the hazards in order to reduce the risk of death, injury, property loss, and damage. However, early warning information is generated from climate information (UNDP, 2016). Using past and current climate information (as well as modelling and forecasts), early warning messages are generated and disseminated to individuals, households, and communities.

The current NDRMC early-warning system focuses on monitoring droughts, monitoring which is also tied to food assistance. The information for monitoring and early warning is generated from woreda and regional monthly reports. On the other hand, the seasonal assessment uses Household Economy Approaches (HEAs) and a Livelihood Impact Assessment Sheet (LIAS) to predict the numbers of people in need of food assistance. Previously, the GoE also used the Livelihoods Economy Assessment Profiles (LEAPs).

Table 18. Vision for implementing NAP-ETH through climate services and adaptation technologies

	AO13: Mainstreaming endogenous adaptation practices	AO15: Strengthening drought and crop insurance mechanisms	AO16: Improving early-warning systems	AO17: Developing and using adaptation technologies	AO18: Reinforcing adaptation research and development
Outcome	Locally applicable practices identified and promoted	Local insurance companies providing crop insurance coverage	Functional early-warning system in place and reach farmers on time	New adaptation technologies introduced	Produce research and learning outcomes to feed into program design and policy-making
Key milestones	Identify endogenous practices by 2021 Develop guidelines for mainstreaming and scaling up those practices	Insurance companies develop a product by 2022 A targeted number of farmers covered by 2025	Assessment of current system and feedback for improvement System in place by 2022	Finalize Ethiopia's TNA which has clearly Identified new technologies and practices by 2021 Develop guidelines for mainstreaming and scaling up these technologies	Establish collaboration with research centres and universities Identify priority areas for research
Tracking methods	Reports	Insurance packages purchased	Early-warning information generated and disseminated	Project documents	Research documents produced
Regional priority	All	Amhara, Oromia, Tigray, and SNNPR	All	All	All

Roles, Responsibilities, and Mechanisms for Implementation

The NMA is the only organization mandated to generate and disseminate weather forecasts in Ethiopia. The NMA is also the lead agency in climate services, and it is responsible for developing climate models, prediction, and building scenarios, as well as conducting seasonal forecasts, thereby clarifying climatic uncertainties for each agro-ecological zone in Ethiopia. The NMA operates an extensive observatory network, with four categories of observing stations:

Synoptic Stations; Principal/Indicative Stations; Ordinary Stations; and Rainfall Recording Stations. Though the number of operational stations that NMA has is not clear, there are about 1,300 meteorological stations in the country, most of which are likely Ordinary or Rainfall Recording stations. Station data gaps and uneven coverage of the stations are the major limitations of NMA's stations in the country.

Regional-level NMA bureaus also have a role in managing stations, while NDRMC is the agency responsible for the early-warning system, including predicting the numbers of people in need of food assistance. It is also responsible for emergency assistance.

EIAR: The EIAR is a semi-autonomous federal body that is working on agro-weather and agro-climate research and extension projects, which are highly relevant to Ethiopian farmers. Its Agro-meteorology, Biometrics, and GIS Research Directorate provides climate information services for smallholder farming activities.

ATA: ATA has recently initiated the Climate and Environment for the Sustainable Development program. Under this program, ATA has already put agro-meteorological advisories to use in selected districts in Ethiopia. The agency has found out that working closely with farmers is important for determining and then servicing their agro-meteorology information needs, as well as for supporting adaptation and food security. In addition to these agencies, project-based programs such as BRACED are also involved in the dissemination of forecast and agro-advisory services for selected woredas.

Other key international and local actors include CARE International, Christian Aid, DFID (through the BRACED Project), Farm Africa, Irish Aid, International Livestock Research Institute (IRLI), Rockefeller Foundation, and the WMO.

Unlocking Synergies

Climate services are closely aligned with the agricultural and water sectors as well as social protection AOs. Because climate impacts are location specific, local and decentralized climate services are essential to address the impact of climate change on food production and access to water. There are four main elements of localized climate services for agriculture: collection and synthesis of data on local weather, climate, crops, and market price of crops and input; use of weather and climate forecasts; analysis and development of impact outlooks and management options; and communicating to end users (Bernardi, 2011). All four elements need to be implemented to provide full climate services for farmers, which involves providing climate advisory services to farmers that allow them to decide when best to plant and harvest—and when to get out of harm's way. Climate services can be strengthened by integrating climate information into insurance and credit provision as well as crop monitoring and yield forecasting. At a policy level, additional climate services for agriculture include identifying, analyzing, and prioritizing the current and future vulnerabilities and climate risks and design management strategies to promote proactive decision making.

Implementation Needs

Human resources	Though the NMA has improved its capacity to analyze and produce reports on rainfall and forecast, it still lacks human resources (capacity) to generate local- and woreda-level data in large quantities. Thus, it is only generating local project-based data for up to 15 woredas at a time. A human capacity gap also exists at the regional level, especially with agricultural bureaus to support smallholder farmers.
Information, knowledge, and capacity	Usability and communication of information as well as coordination Forecasting capacity Developing index-based insurance
Investments in infrastructure, equipment, and technology	Expanding automatic weather stations Research support Technology support other than climate services

The GoE faces a wide range of developmental challenges and does not have sufficient resources to address all of them. This results in complex decision-making processes and balancing difficult trade-offs, which have left some of the needs, such as strengthening NMA and climate services at a disadvantage. The NMA has attempted to address funding and capacity limitations with the support of a range of partners. In addition to the financial and technical support that NMA has received, NGOs have played a key role in building the capacity of government agencies and expanding the type of services offered by the NMA. Examples include programs such as BRACED, funded by DFID and implemented by a consortium of NGOs led by Farm Africa, and the GEF financed "Strengthening climate information and early warning systems in Africa for climate-resilient development and adaptation to climate change" project.

Through these projects and institutional restructuring, the NMA has made important advancements in data transparency and data sharing, such as the Climate Analysis and Application. Through a partnership with the International Research Institute for Climate and Society at Columbia University (under a project titled Enhancing National Climate Services initiative) the NMA has made climate information available on its website. Users can now access different visuals of decadal and monthly rainfall and temperature information.

Short-Term Priorities (2020–2022)

Table 19. Short-term priorities for implementing NAP-ETH through climate services and adaptation technologies

Objective	Activities	Responsible entity	Target institutions	Timeframe
Improve the enabling environment for scaling up of climate services	Finalize NFCS and get more stakeholders engaged from federal and regional levels	NMA	Federal ministries, regional bureaus, and donors as well as non-state actors	2020
	Finalize TNA and develop an action plan for implementation of the TNA	EFCCC	Ministries, donors, and private sectors	2020–2021
	Develop enabling environment for private sector and non-state actors to pilot new adaptation technologies	EFCCC and MoF	Ministries, universities, and private sector organizations	2020–2022
Address capacity and institutional gap barriers	Conduct institutional constraints and human capacity gap assessment at federal and regional levels on identifying new technologies for climate adaptation, dissemination mechanism, followed by capacity-development trainings targeting the existing gov't structure at federal and regional levels.	EFCCC	Federal-level ministries, regional bureaus	2020–2022

Long-Term Priorities (2023–2030)

Table 20. Long-term priorities for implementing NAP-ETH through climate services and adaptation technologies

Options	Actions/ measures	Activities	Barriers	Actions
NAP-ETH AO15	Promote drought and crop insurance	• Investment in risk insurance • Access to finance for farmers to pay premiums • Awareness creation for farmers on farm managements • Create index mechanism for insurers	• Climate variability, increased/high risk • Political conflict, absence or lack of reinsurers • Limited awareness of farmers • High transaction costs • Lack of climate data • Lack of infrastructure/ technology	• Gov't guarantee to reinsurance, awareness creation, incentive mechanism for insurers • Policy – subsidy, facilitate premium payments for farmers • Facilitate cluster system • Enhance climate data for insurance purposes
NAP-ETH AO16	DRM planning and preparedness	• Capacity building on early warning • Logistics and other disaster management and preparedness	• Lack of capacity and awareness at the local level	• Linkage with research centres and universities for ongoing capacity building • Work with NGOs for DRM and response
	Strengthen climate information and early warning systems	• Make climate data available • Data • Forecasting system • Coordination	• Capacity • Finance • Skilled workers • IT modelling etc. • Technology • Institutional structure	• Training • Money • Access to technology

Options	Actions/ measures	Activities	Barriers	Actions
NAP-ETH AO17	Enhance adaptation technology development and adoption	• Pilot programs, extension services, input supply • Capacity for development agents, farmers, gov't subsidy • Introducing new technology • Encourage foreign direct investment to introduce new technology	• Lack of infrastructure, lack of awareness	• Demonstration centres • Research • Infrastructure building • Public–private partnerships • Market linkage • Integrating climate change on universities teaching
NAP-ETH AO18	Strengthen multidisciplinary research on adaptation	• Availability of funding • Individual's interest	• Absence of action research • Bureaucracy challenges • Lack of experience • Lack of data • Low value for money	• Incentivize researchers • Strengthen research centres
NAP-ETH AO13	Mainstreaming endogenous adaptation practices	• Produce endogenous plants • Conservation • Research support • Seed conservation • Local/ community-level engagement in conservation • Conservation and preservation at regional biodiversity centres • Availability of alternative livelihoods and products	• Poor legal enforcement • Natural barriers (difficult to get) • Human and livestock interference (problem of free grazing) • Financial and human resources • Lack of alternative energy • Lack of awareness of utility • Policy initiatives • Lack of research-based ecosystem benefits • Absence of institutional structure	• Create appropriate legal measures • Awareness creation for judges • Enforcement mechanism • Push to include support institution in planning • Inclusive engagement proposal writing • Mainstreaming biodiversity with other cross-cutting issues

4.5 Implementation Component #5: Infrastructure

Overview of the Infrastructure Implementation Component

Building the capacity of the domestic construction industry while bridging critical infrastructure gaps (with a particular focus on ensuring the provision of quality infrastructure services) is one of the major GTP II directions. All human settlements are critically dependent on many types of infrastructure, ranging from power and water infrastructures to transportation and waste disposal systems. In developing countries such as Ethiopia, such infrastructure is already under severe strain as a result of population growth, rural–urban migration, high levels of poverty, and the demand for more roads and vehicles. This existing pressure is likely to interact with, or be exacerbated by, different aspects of climate change, some of which will be direct. Changes to temperature or rainfall amounts along with extreme weather events might have an immediate impact in terms of bringing down power lines, washing away roads and bridges, or overwhelming drainage systems. There can also be less obvious, longer-term impacts; if higher temperatures lead to drier soils, for example, land subsidence could occur. The transport sector presents a particular challenge, given its dependence on petroleum-based fuels, prevailing individual transport modes, and well-established travel lifestyles. The relevant AOs that contribute to this component are shown below.

Table 21. Key activities for implementing NAP-ETH in the infrastructure sectors

Adaptation Option	Key activities	Gender considerations
AO9: Enhance alternative and renewable power generation and management	• Increase access to off-grid energy from low-carbon technologies • Promote a diverse energy mix through introduction of different energy types such as solar/wind/geothermal/other	• Provide technical capacity support to women so that they are able to participate in energy-related dialogues in a meaningful way • Support access to financial services to promote investments in modern energy services and energy-efficient appliances that address women's and men's needs (for example to address time poverty of women and minimize negative health effects of existing energy sources) • Equalize water and land rights for women and men • Support the creation of a conducive business environment for women to become energy entrepreneurs (for instance, through the establishment of gender-responsive human resource policies in government as well as the private sector)

Adaptation Option	Key activities	Gender considerations
AO10: Increase the resilience of urban systems	• Increase access to improved housing and infrastructure to upgrade the condition of housing • Buildings with green areas (i.e., green parks modern cemeteries) to enhance urban greenery • Awareness creation for urban planners of climate change impacts in urban environments • Develop and implement plans that take into account climate change impacts as part of urban planning • Develop cities' disaster risk reduction plans • Enhance energy and water infrastructure safety system • Develop a liquid waste management system	• Improve access to early-warning information through channels and products that are appropriate to the specific needs and situations of women and men • Promote and demonstrate the value of intra-household sharing of early warning information • Establish urban safety net schemes (including insurance) targeting those in the informal sector, most of whom are women • Enhance the capacity of city planners and authorities in gender-responsive adaptation approaches • Put mechanisms in place to protect women and girls from labour trafficking and sexual exploitation and abuse • Ensure decent work and pay in the formal and informal sectors for female and male urban dwellers • Establish social structures for women and men new to urban areas to minimize stress and risk-taking behaviours, which increase during disasters and displacements • Provide basic business development skills training accessible for women and men to improve capacity to deal with shocks • Work with women and their institutions to secure land and property titles

Adaptation Option	Key activities	Gender considerations
AO11: Build a sustainable transport system	• Design infrastructure and revise safety standards based on anticipated climate change impacts for transportation systems • Develop new projects with climate change adaptation components • Develop adaptive management systems for different transportation modes to implement adaptive asset management systems based on projected changes in climate • Develop contingency plans to ensure resilience to weather-related disruptions (e.g., immediate WASH program) • Construct infrastructure to connect climate-vulnerable areas to ensure movement of aid and support to communities affected by climate hazards • Protect transportation infrastructure from climate hazards through the planting of grass/trees on roadsides and construction of soil conservation structures alongside transportation infrastructure	• Address women's safety issues in the transport system (for example, by ensuring well-lit roads and public transport stops) • Improve infrastructure that women frequently use (such as footpaths and pedestrian bridges) • Provide training and create employment opportunities for women in the transport sector, at all levels • Build transport systems that take into consideration women's and men's travel patterns (for example by constructing roads that improve the accessibility of health centres that women go to frequently due to their role as caregivers)

Adaptation Option	Key activities	Gender considerations
AO12: Developing adaptive industry systems	• Using modern, efficient technology • Implementation of life-cycle assessment to quantify environmental impacts that mainly applies to products • Ecolabelling of products • Promote industrial value chain enhancement • Improving agro-industry linkage • Establishing industrial clusters that create a competitive advantage for the related firms in a particular region • Climate-smart (infrastructure, design, and construction materials) • Implement appropriate industrial site selection • Apply environmental and social impact assessment (ESIA) study an essential tool to integrate environmental and social concerns in the industrial development process • Using alternative renewable energy sources (biofuel, biomass, solar)	• Promote multistakeholder partnerships consisting of international, national, and sub-national actors to attract investment and mainstream industrial best practices that support adaptation • Ensure health and safety standards for workers considering both women's and men's specific vulnerabilities and priorities • Provide capacity-building (for example trainings and business skills development) and access to information for equitable participation by women and men in the sector • Ensure an enabling work environment for women, for example by providing childcare facilities and flexible working arrangements • Develop female-friendly industrial parks, for example by addressing safety issues and providing appropriate sanitary facilities • Promote equal and decent wages for women and men in both the formal and informal sectors

Gender considerations are taken from EFCCC (2018).

Policy Context for the Infrastructure Implementation Component

Due to rapid urbanization, the number of urban centres with at least 20,000 people is projected to increase from 86 in 2010 to 237 in 2030, according to the Ministry of Urban Development and Housing (MUDHo). As per UN estimates, Ethiopia's urban population will triple between 2010 and 2040. Preliminary city-level population projections suggest that some of Ethiopia's larger cities will more than triple their 2010 population by 2040: for instance, Hawassa's 2010 population will grow more than six-fold by 2040, while Mekele almost five-fold and Adama and Bahir Dar almost four-fold. Strengthening resilience to climate change in the urban environment is thus becoming increasingly urgent (Angel, 2013). National policies such as CRGE and GTP II have identified a set of SPs that need to be implemented across Ethiopia's urban areas, including more sustainable forms of waste management and transportation and an increase in urban greenery coverage.

Urban sectors in Ethiopia need proper planning in solid waste management, green parks, and non-motorized transportation to address the demands of the growing population. As Ethiopia's urban population grows, its urban centres will face challenges related to such things as provision of sanitation services as well as pollution in industrial and urban areas. Adaptation

issues are not currently covered in the solid waste management plan, so additional effort is needed to address climate adaptation in solid waste management.

The GoE has also prepared an urban sector resilience strategy as well as an energy sector climate adaptation strategy. These sector-level CR strategies have identified relevant approaches to integrate climate adaptation in urban and energy sectors. The City of Addis Ababa is also currently preparing a resilience strategy in collaboration with the C40 Cities Climate Leadership Group.

Current Status of the Infrastructure Implementation Component

Achievements	Urban plan/map for 907 small towns prepared. This helped to improve land development and administration systems and utilize scarce land resources efficiently.
Actors and Programs	Facilitating Implementation and Readiness for Mitigation (FIRM) Project – Ethiopia (UNEP, 2015, p. 9) states: > The World Bank is currently working with the GoE to provide support for the urban sector as part of Second Local Governance Development Program using "Program for Results" as a lending tool for investment. The Second Urban Local Government Development Programme (ULGDP II) in Ethiopia is a continuation of GoE['s] fiscal decentralisation plan that started with the first phase of the program, which has been implemented since 2009 with World Bank's support. The proposed Programme will mainly cover 44 large urban local governments, including the 18 local governments participating in the existing government program, and 26 additional local governments. The Urban Governance and Decentralization Program is implemented jointly by the GTZ, KfW and the German Centre for International Migration and Development (CIM) and is well orchestrated with the activities of the World Bank and other development organizations. It lasted from 2005 to 2014 and supported 18 pilot cities in the four main regions of the country. The "Urban Development Fund" (UDF) is a EUR 24 million program that proposed recommendations regarding the operation and maintenance of infrastructure facilities including landfills. The overall goal of the program is to contribute to improved service delivery and infrastructure provision as part of the "good governance" of selected Ethiopian urban self-governments. Urban Development Safety Net Program: According to Ambasciata d'Italia ad Addis Abeba (2016) this project, which started in 2017, "will be implemented over five years with a total cost of USD 450 million, aims at improving the income of urban poor households and establishing of urban safety net mechanisms in Ethiopia. The objective will be achieved through provision of cash transfers, financial, and technical support to access livelihood opportunities, building the capacity of institutions to effectively deliver the support, and developing core systems for delivery of safety nets and complementary livelihood services" (p. 8). The urban safety net program is built on the experience of the PSNP. Adaptation fund for water, irrigation and watershed management (MoWIE)

Lessons Learned	Creating Opportunities for Municipalities to Produce and Operationalize Solid Waste Transformation (COMPOST) is another key intervention from which to draw lessons. The project promotes integrated solid waste management and urban green infrastructure in six municipalities. Development projects (e.g., The Grand Renaissance Dam Project, Railway Projects, Sugar Development projects, etc.) have markedly shifted the delivery of infrastructure and industrial outcomes, but equally important is that they had some drawbacks that offer lessons regarding the means of enhancing the institutional and technological capability of Ethiopia in the delivery of such projects in the future. The capacity gained in this process experiences (e.g., industrial park development, Addis Ababa Light Rail Transport etc.) will serve as a springboard for the planned industrial expansion during GTP II and beyond.
Capacity	The Ministry of Urban Development will be the key implementing agency along with the Ministry of Transport as well as MoWIE. The MoLSA will also have a role to play. The Ministry of Urban Development and MoWIE have experience in designing and implementing large-scale projects as well as staff knowledgeable about climate change. They also have a structure at the regional level. The Ministry of Transport (MoT) has a strong climate change unit but weak linkages with regional bureaus.

Vision for the Infrastructure Implementation Component

Climate hazards such as floods are expected to damage infrastructure, communication systems, and roads. As such, a business-as-usual approach to constructing this infrastructure will not work in the future, and new construction could fail in the face of floods and landslides. Therefore, it is essential that new infrastructure developments take climate change into consideration. Climate hazard assessments need to be conducted before plans are made for new development or infrastructure. The vision for infrastructure components thus needs to make it resilient to climate shocks such as flooding.

The EFCCC needs to provide technical support to sector ministries involved in infrastructure development, helping them to conduct climate risk assessments as well as to develop plans and designs that will be able to resist climate hazards and changes. The current urban development, transportation, and construction guidelines are weak in providing clear guidance on making infrastructure resistant to climate shocks.

The report on regional prioritization processes revealed that AO10 (Increasing resilience of urban systems) prioritized only two regions (Dire Dawa and Somalia). However, the implementation of the component had wide coverage across regions that were reaffirmed by the participants of the federal and regional level consultative workshops recently held as a prerequisite for the developing of an implementation roadmap for ETH-NAP. The scale is relatively higher in Amhara, Oromia, SNPPR, and Tigray regions (and the two Administrative States, Addis Ababa and Dire Dawa) than the remaining five regions. Factually, the vast majority of the population living in urban and rural settings is benefiting from the implementation of the infrastructure component.

The expected short-term outputs could be better facilities such as electricity, transport, and job opportunities, while in the medium to long terms, Ethiopia could reach middle-income status before 2025.

Table 22. Vision for adaptation in the infrastructure sectors

	AO9: Enhance alternative and renewable power generation and management	AO10: Increase the resilience of urban systems	AO11: Build a sustainable transport system	AO12: Developing adaptive industry systems
Outcome:	Expand access to safe energy to households in urban and rural areas	Have climate-resilient urban areas	Urban areas have a transport system integrated with livable communities and resilient to climate impact	Make sure that a structured, iterative process of robust decision making in the face of uncertainty, with an aim of reducing negative impacts
Key milestones:	Expand networked urban areas by 25% by 2025	A targeted number of urban areas develop resilience plan by 2022 Resilience plans implemented by 2025	A targeted number of urban areas develop resilience plan which clearly included the transport sector by 2022 Resilience plans implemented by 2025	A targeted number of industries of different scales and types develop/enhance their adaptive management (AM) /adaptive environmental assessment and management (AEAM) Industrial value chain developed and implemented
Tracking methods:	CSA data as well as project reports	Report from urban areas	Report from urban areas	CSA data as well as information collected from sector institutes and project report
Regional priority:	Afar, Somali, Gambella, Benshangul, Oromia, and SNNPR	All regions and urban areas	All regions and urban areas	Regional bureaus of Trade and Industry supported by Ministry of Trade and Industry (MoTI)

Roles, Responsibilities, and Mechanisms for Implementation

Ministry of Urban Development and Housing: According to UNEP (2015),

> the MUDHC was established after the government approved a national Urban Development Policy, whose main objective was to assist municipalities in providing efficient and effective public services to residents as well as complement and

> facilitate rural development. The Ministry of Urban Development, Housing, and Construction has the institutional mandate to facilitate infrastructural development in municipalities. (p. 16)

MoT: The MoT provides strategic planning and implementation of transport sector activities throughout the country. The Ministry has understood the impact of climate change on transport infrastructure and has started the process of formulating a sector-specific CR strategy. The Environment and Climate Change Directorate is a department established under the Ministry. There are two teams under this directorate: Environment and Social Impact Monitoring Team and Climate Change Team, the latter of which is also the host of CRGE. This directorate (Climate Change Team in particular) is responsible for the CRGE (adaptation and mitigation) planning, intervention, and monitoring of the sector in the country. Currently, the team has three experts, including the coordinator.

Bureaus of Urban Development, Housing and Construction: UNEP (2015) observes that

> most regions have Urban Development, Housing, and Construction bureaus, which are responsible for urban management and development issues within the regional government. Several of the World Bank Urban Local Government Development Projects are implemented in the municipalities with the support of Urban Development, Housing, and Construction bureaus. (p. 16)

Urban Planning Institute: UNEP (2015) also states, "the nine regional states, as well as the cities of Addis Ababa and Dire Dawa, have urban planning institutes, which support their respective Urban Development, Housing and Construction bureaus" (p. 16).

City councils: According to UNEP (2015)

> Under the current decentralized system, Addis Ababa and Dire Dawa are federal chartered cities with City Council[s] that directly report to the federal government. Accountable to their own councils, municipalities have the authority and the mandate to raise revenue and deliver services. At the regional level, city councils are accountable to the regional government." (p. 16)

MoWIE is responsible for the diversification of energy sources for sustainable energy supply.

Civil society organizations and the private sector have significant roles and responsibilities in capacity building and technical support and demonstration of best practices across regions. Research institutions and international partners as well have critical roles in technology generation and transformation and in capacity building, technical support, and resource mobilization.

Unlocking Synergies

The synergy required for climate change adaptation at federal and regional levels cannot be met by current sectoral and regional resilience strategies. Therefore, the recently launched NAP-ETH under the Cancun Adaptation Framework is expected to address these limitations through a programmatic, multi-sectoral and long-term planning approach.

One approach involves expanding electricity generation from renewable sources (i.e., on/off-grid, improved public transit in Addis Ababa, light rail transit, and clinker substitution in relation to waste heat recovery, energy efficiency, and fuel switching). This would be supplemented by such mitigation actions as landfill gas management; urban greenery and integrated infrastructure planning; energy efficient design of new buildings; and reuse, composting, and biogas generation from solid waste provide synergies with the increased resilience of urban systems.

Implementation Needs

To increase the technical understanding of climate change impacts on infrastructure development, a number of investments are needed to increase human resources; build occupational, technical, and institutional capacities; and enhance leadership skills. For planners from the infrastructure sector to conduct risk and vulnerability assessments (and to develop risk mitigation and resilience plans), improved city-level climate and disaster data collection and risk assessment and information-sharing systems need to be established along with capacity building in data management. Increasing the accessibility of the financing mechanism; substitution of locally available industrial inputs/raw materials; creation of a decent working environment; incentivizing and subsidizing the manufacturing sector, and capacity /knowledge and technology transfer are also crucial for the implementation of the component.

Some of the major inhibiting factors in the case of transport include financial constraints; design technology and knowledge gaps; weak law enforcement in asset management; delays in maintenance of damaged assets; and capacity limitations. In the case of the industrial sector, component implementation is hindered by a shortage of finance or high inflation; shortage of foreign currency; shortage of industrial inputs; high staff turnover; poor working culture; inadequate provision of incentives and subsidies; shortage of skilled workforce/capacity; and a lack of modern technology. In the urban sector, major constraints include scarcity of capital, land, and technology; weak legal enforcement, scarcity of professionals and high staff turnover; low attention to the sector by urban managers and the lack of an urban implementation master plan. According to participants in the NAP Roadmap Stakeholder Consultation Workshop, some of the factors listed above could be overcome by private investor engagement; a structured resource mobilization strategy; strengthened public–private partnership and collaboration between concerned sectors; capacity building and exposure visits; substitution of local industrial inputs/raw materials; decent working environment; incentives and subsidies; and technology transfer.

Short-Term Priorities (2020–2022)

Table 23. Short-term priorities for implementing NAP-ETH in the infrastructure sectors

Objective	Activities	Responsible entity	Target institutions	Timeframe
Develop guidelines and standards for the introduction of technologies	Establish/enhance urban climate change resilience bureau, regional and city municipalities	MoUD	Federal ministries, regional bureaus, and donors as well as non-state actors	2020
	Resource mobilization from local and international fund sources	EFCCC	Ministries, donors, and private sector organizations	2020–2021
Address capacity gap barriers	Conduct demand-driven capacity building along with upgrading of job descriptions	MoUD, MoT, MoWIE	Federal-level ministries, regional bureaus	2020–2022

Long-Term Priorities (2023–2030)

Table 24. Long-term priorities for implementing NAP-ETH in the infrastructure sectors

Options	Sector/regional Actions	Enabling activities	Barriers	Strategies to overcome identified barriers
NAP-ETH AO11	Climate-resilient design and safety standards for transportation systems	• Improve design guideline preparation by Ethiopian Roads Authority to address climate change	• Financial constraints • Technology gaps • Knowledge gaps, specifically on issues related to the impacts of climate change on transport and infrastructure • Limited knowledge of private sector (contractors) on climate change	• Engagement of the private sector • Resource mobilization • Strengthen public–private partnerships • Strengthening collaboration between the MoT and MoTI • Capacity building of short and long term • Exposure visit or best practices
	Revise transportation planning, project screening and development process to take climate change into account	• CR Strategy developed • Guidelines under preparation to regulate importing of vehicles	• Low level of awareness by the staff and departments involved in the planning and development process	• Awareness raising for all levels of administration • Institutional climate change mainstreaming guideline implementation
	Implement adaptive asset management systems based on projected changes in climate	• Establishment of Road Fund established in MoT • Establishment of structure in area responsible for road maintenance	• Low level of awareness by the users • Weak law enforcement in asset management • Delay in maintaining damaged assets • Social unrest	• Awareness raising at all levels • Increasing the road fund • Law enforcement • Enhance climate risk warning system

Options	Sector/regional Actions	Enabling activities	Barriers	Strategies to overcome identified barriers
	Facilitate movement of aid and support to communities affected by climate hazards	• Urban resilience strategy prepared and implemented • Rural transport strategy enacted	• Financial limitations • Absence of transport infrastructure in the remote and inaccessible areas • Capacity limitations	• Increase communities awareness and participation • Involve private sector • Involve development partners
	Protect transportation infrastructure from climate hazards	• Road Fund established and running	• Low level of awareness by the users • Weak law enforcement in freight transport	• Awareness raising at all levels • Law enforcement • Enhance climate risk warning system

Options	Sector/regional Actions	Enabling activities	Barriers	Strategies to overcome identified barriers
NAP-ETH AO10	Improve the provision and condition of housing	• Urban development policy, strategy, manuals, guidelines	• Funding constraints and lack of technology	• Improving housing legislation, policy, and strategy • Encouraging private sector participation engagement • Establish integrated land use management system
	Enhance urban greenery	• Urban greenery strategy, standard and manuals • Institutional arrangements, urban climate change resilience bureau, regional and city municipalities	• Weak legal enforcement • Low level of professional capacity and high staff turnover • Absence of urban master plan implementation	• Strengthening legal enforcement strategy, capacity building, and upgrading the capacity of existing staff • Assigning of professional staff to relevant jobs
	Adaptive urban planning	• Urban development policy, strategy, manuals, guidelines	• Lack of urban master plan implementation • Weak legal enforcement • Lack of relevant skilled workers	• Strengthening master plan and legal enforcement • Implementation, training, and upgrading staff educational status in adaptive urban planning

5.0 Cross-Cutting Issues for Implementation

The following are guiding principles for Ethiopia's NAP process:

- Participation
- Stakeholder empowerment
- Coherent interventions
- Gender sensitivity
- Equitable implementation
- Partnership

These guiding principles introduce cross-cutting issues that must be taken into consideration in the implementation of all the AOs and SPs. This section provides an overview of how the guiding principles will be put into practice in the implementation of NAP-ETH. In addition, it also describes how nutrition will be addressed as a cross-cutting priority.

Participation and Stakeholder Empowerment

Multistakeholder empowerment and participation at different levels and stages of the implementation are crucial to the success of a NAP process and implementation of the adaptation actions. The potential benefits of stakeholder engagement in the NAP-ETH implementation process, which should be considered, include (adapted from Twigg, 1999):

- Participatory NAP implementation processes are more likely to be sustainable because they build on local capacity and knowledge, and since the participants have a sense of "ownership" toward any decision made and are thus more likely to comply with them. Participatory initiatives are thus more likely to be compatible with long-term development plans.
- Working closely with local communities, including women and representatives of vulnerable groups, through an inclusive stakeholder engagement process can help decision-makers gain greater insight into the communities they serve, enabling them to work more effectively and produce better results. In turn, the communities can learn how the decision-making process works and how they can influence it effectively.
- The process of working and achieving things together can strengthen communities and build adaptive capacity through increased awareness of the issues within the community, leading to co-creation of solutions to address them. It can also reinforce local organizations, and build up confidence, skills, and the capacity to cooperate. In this way, it increases people's potential for reducing their vulnerability. This, in turn, empowers people and enables them to tackle other challenges, either individually or collectively.
- Stakeholder participation in planning, through priority setting and voicing of preferences, as well as in the implementation process, accords with people's right to participate

in decisions that affect their lives. These processes of engagement can improve the likelihood of equity in decision making and provide solutions for conflicts.

- Engaging stakeholders may take longer than conventional, externally-driven processes, but may be more cost effective in the long-term; a stakeholder-based process is more likely to be sustainable because the process allows the ideas to be tried, tested, and refined before adoption.

In general, through rigorous stakeholder empowerment and participation, Ethiopia's government can effectively ensure that the most vulnerable and marginalized groups are heard and engaged in the NAP-ETH development and implementation.

Coherent Interventions

During the implementation of NAP-ETH and adaptation interventions, critical assessment needs to be undertaken to ensure consistent and coherent intervention. In most cases, adaptation interventions do not start from scratch; new actions should always be drawing on experiences and lessons from previous actions through regular stocktaking, reflection, and learning processes. In particular, existing initiatives such as SLM, PSNP, ONEWASH, etc. should be reviewed and documented to ensure coherent implementation of actions at national, sub-national, and woreda levels and to identify what needs to be done differently to ensure that such programs are addressing climate risks and are aligned with NAP-ETH. The descriptions of synergies among the different AOs in the sections that follow are aimed at increasing coherence in implementation.

Gender

It is paramount that gender concerns be integrated into the NAP process from the outset, as gender equality is a universal human right, acknowledged by many international instruments such as the Universal Declaration of Human Rights and the Convention on the Elimination of All Forms of Discrimination Against Women. The integration of gender considerations has been identified as a key requirement under the UNFCCC. Finally, this also ensures compliance with the Gender Plan of Action (GAP) in 2014, which was created by the UNFCCC under the Lima Work Programme on Gender to advance women's issues on climate change (Dazé & Dekens, 2018).

In order to ensure gender-responsiveness in Ethiopia's NAP process, a targeted gender analysis has established a strong basis for moving forward. The analysis explored three main issues: gender differences in adaptation needs, opportunities, and capacities; equitable participation and influence in adaptation decision-making processes; and equitable access to financial resources and other benefits resulting from adaptation investments. This analysis was used to generate recommendations to address gender issues in the context of NAP-ETH, with specific recommendations for each of the AOs and SPs (EFCCC, 2018). These are incorporated in the sections that follow, and the full report is available here.

To help ensure a gender-responsive NAP process reflecting wider government policy, the national-level steering committee for NAP-ETH should contain a representative from the MoWCY. Representatives from civil society and development actors with expertise on gender

issues in Ethiopia are to be sought after in consultative groups. Capacity-building efforts may be required to enable effective participation.

Equitable Implementation

Equity should be placed at the centre of any adaptation action. NAP-ETH implementation should result in equitable benefits for people of all wealth and social groups. This will include targeted actions for the most vulnerable groups, as well as facilitating equitable access to services that enhance adaptive capacity. Climate, financial, and agricultural extension services, among others, play a key role in enabling people to undertake adaptation actions. Governmental and non-governmental actors providing these services must undertake actions to ensure that access is equitable for women and men and for vulnerable groups.

Partnerships

Partnerships are critical for the effective implementation of adaptation actions. EFCCC has recently started the CRGE Forum, which will meet regularly to discuss CRGE implementation and progress. The forum includes donors such as the EU, Netherland Embassy, and DFID, as well as representatives from civil society and academia. It is recommended to build on the work of this forum and leverage its platform by encouraging civil society organizations (CSOs), community-based organizations (CBOs), private sector, and academia to proactively engage in the implementation of NAP-ETH. The forum is currently led by the EU. Under the leadership of regional EFCCC offices, a similar forum shall also be established and promoted at the regional level, especially focusing on the NAP approach in general and specific prioritized AOs in particular.

Nutrition

Though not included as a guiding principle in the NAP document, nutrition has been identified as a critical cross-cutting issue for implementation.

According to the World Bank (2015a, p. 77):

> In Ethiopia, 40 percent of children under the age of five suffer from stunting as a consequence of chronic and cyclical malnutrition. The National Nutrition Program (NNP) was revised in 2013 to strategically address the nutrition problem in the country to include initiatives that have emerged since the 2008 NNP, including taking into account the multi-sectoral and multi-dimensional nature of nutrition and the linkages among key implementing sectors, one being agriculture. This program, endorsed by MoA, the Ministry of Health and another eight line ministries, includes a strategic objective to strengthen implementation of nutrition-sensitive interventions in the agriculture sector..

To ensure the equitable implementation of NAP-ETH, the food and nutrition insecurities of millions of people that are adversely impacted but least served with health and social services must be addressed. In light of that fact, "a combination of nutrition-sensitive adaptation and mitigation measures, nutrition-smart investments, increased policy coherence, and institutional and cross-sectoral collaboration can address the threats to food and nutrition security from climate change" (CIAT, 2015, p. 123).

Nutrition and food security need to be integrated in the enhanced action on adaptation and also explicitly addressed in the climate-resilient development, national adaptation, and disaster risk reduction plans of the FDRE.

As the UNSCN (2010, p. 2) observes:

> A revitalized twin-track approach to ensure food and nutrition security could reduce vulnerability, build resilience, and secure nutrition under a changing climate. Track one consists of the upscaling of nutrition-specific interventions and safety nets. Track two consists of a multi-sectoral nutrition-sensitive approach to sustainable and climate-resilient agriculture, health and social protection schemes, risk reduction and risk management plans and climate-resilient community-based development. It is essential to increase attention to and target the most vulnerable to suffer from undernutrition, such as mothers and young children.

6.0 Implementation Strategies for NAP-ETH SPs

The SPs identified in NAP-ETH are critical to creating an enabling environment for the implementation of different AOs. The following sections provide an overview of the implementation strategies for the five SPs:

1. Mainstreaming climate change adaptation into development policies, plans, and strategies
2. Building long-term capacities of institutional structures involved in NAP-ETH
3. Implementing effective and sustainable funding mechanisms
4. Advancing research and development in the area of climate change adaptation
5. Improving the knowledge-management system for NAP-ETH

6.1 Strategic Priority #1: Mainstreaming climate change adaptation into development policies, plans, and strategies

Overview of the Strategic Priority

In order for climate change adaptation to be sustainable and implemented on a broad scale, it must be integrated or "mainstreamed" into the policy apparatus of governments. Mainstreaming climate change is the process of integrating adaptation and mitigation objectives within development agendas. In other words, climate change risks are not addressed through separate initiatives but through the ongoing development policy-making, planning, and activities across all sectors (Oates et al., 2011). Through mainstreaming, climate change adaptation policies do not need to be developed for specific sectors, but rather facilitate their development and implementation as part of existing sectoral policies.

Through mainstreaming climate change into policies, plans, and strategies, resources will also be used efficiently, avoiding cross-programming and multiple similar activities being implemented by different agencies. Mainstreaming climate change adaptation into development activities will also reduce policy conflicts. Using integrated budgeting, additional financial leverage can also be achieved. Accordingly, Ethiopia's NAP initiative is part of its grand ambition of mainstreaming climate change adaptation into current and future development plans, across sectors and levels.

Climate change has significant implications for the achievement of Ethiopia's 2030 strategies, policies, and programs in climate-sensitive sectors (e.g., agricultural development, food security, health, livelihoods, resource management, and risk management). Mainstreaming of climate change adaptation in vulnerable sectors is essential to reduce the negative effects of climate hazards, changes and uncertainties regarding the achievement of development objectives.

Further, as much of the implementation of adaptation actions will occur at the local level, integration of adaptation in sub-national planning is critical.

The mainstreaming climate change into policies and programs requires targeted effort from policy-makers and program designers to make changes in their approach to budgeting, evaluation, and reporting. These changes require the engagement of experts from the federal to lower levels of administration. Policy-makers and program designers thus need to have enough knowledge about climate change to be able to make significant contributions to the mainstreaming of climate change. In addition to having the required capacity, identifying entry points for policy mainstreaming is essential. This involves understanding the linkages between climate change and national development priorities and understanding the governmental, institutional, and political contexts.

Mainstreaming also requires engagement with local communities, NGOs, and private sector actors. This engagement will provide a buy-in from non-state actors who are also active in implementation.

Policy Context for the Strategic Priority

Ethiopia's commitment to creating climate-resilient development has been clearly articulated in its various plans and strategy documents, notably the CRGE strategy. The strategy calls for the mainstreaming of the CRGE agenda in sector plans (FDRE, 2011), creating a strong imperative for sectoral ministries to explicitly integrate climate change adaptation and mitigation in the planning process. Mainstreaming adaptation in development plans, policies, and strategies is also identified as a strategic priority for the NAP-ETH (FDRE, 2019). The CRGE strategy was prepared in 2011 during the first phase of GTP (2010–2015) and thus climate change wasn't articulated presented and integrated in GTP I. An effort was made to integrate CRGE or climate change into GTP II (2015–2020). However, CRGE was still presented as a stand-alone activity/program, and attention to adaptation issues was weak.

The update of the CRGE mainstreaming guidelines has provided a pathway for mainstreaming adaptation in sector, regional, and woreda planning in line with the NAP. In addition to the guideline, the increased awareness at the national level has helped in mainstreaming climate change in sector plans; however, significant effort needs to be made on capacity building at the local level to be able to scale up and replicate the local-level plan across the country. The mainstreaming of climate adaptation at the policy level has been guided by the CRGE strategy.

While the GTP provides a short-term (five-year) strategy, Ethiopia's long-term economic policy-making has focused on the developmental state approach, which focused heavily on boosting GDP growth with intensive effort placed on public investment and raising agricultural output. This long-term strategy guides the GTP. However, the extent to which climate change has been mainstreamed into the long-term strategy isn't clear. Thus, macroeconomic policies and strategies currently in force, as well as regional strategies, should be revised or updated regularly in order to address climate change. Further, additional efforts are needed to ensure that development investments reach poor and marginalized groups, who are most vulnerable to the impacts of climate change.

The NPC has been the lead agency tasked with long-term planning and working on the inclusion of NAP-ETH impact indicators for GTP reporting. NPC's responsibilities also include integrating CRGE indicators with the M&E of NAP-ETH's implementation performance. However, although the NPC has the leading role in the planning process of NAP-ETH, it has been led by EFCCC. This is a reflection that the first step in mainstreaming climate change or identification of an entry point has been missing. Mainstreaming needs to start by finding an entry point that includes conducting assessment and linkage between climate change and policy, understanding political and institutional contexts, raising awareness and stakeholder engagement. In addition to a lack of capacity and understanding of adaptation, the key policy focus for the GoE and NPC had been economic growth and mitigation, rather than resilience—this has represented a challenge to mainstreaming climate change into national policy. One of the critical first steps to finding an entry point is capacity building at NPC.

Entry points for mainstreaming climate change should also be considered at the regional, sectoral, and local levels. At the regional and sectoral levels, the focus should be sector-level strategies, budgets, and plans. At the local or woreda level, it should begin by addressing woreda-level decentralized plans, community engagement in planning, and relevant indicators for reporting.

Current Status of the Strategic Priority

The NPC is currently preparing Ethiopia's 10-year perspective plan as well as GTP III. The development of these plans provides an entry point for integrating the NAP into both national- and sector-level plans and strategies. As the NAP seeks to enhance Ethiopia's resilience to the impacts of climate change, it is essential to recognize the vulnerability of the country, mainstreaming climate change into all macro-level and socioeconomic sector plans. Though national-level planners do have the institutional framework to integrate climate change into the planning process, additional effort is required from actors such as EFCCC to make sure that systems and capacities are in place and that appropriate actions are taken to mainstream climate change to both the 10-year plan and the GTP III. In addition, technical support and capacity development will be required to mainstream climate change into sector-, regional-, and sub-national-level plans.

An updated guideline was prepared to support the relevant ministries and regional bureaus within the GoE to integrate the CRGE strategy in annual and medium-term sectoral plans. The guideline was developed to ensure that sector plans are climate resilient and contribute to the development of a green economy. It reflects the latest thinking on how to implement the CRGE strategy. In particular, it seeks to integrate adaptation actions as outlined in NAP-ETH. The guideline is for actors in sectoral ministries and regional bureaus with a mandate to integrate the CRGE strategy in their work. The CRGE strategy is expected to be integrated during medium-term (five-year) and annual planning processes, alongside other guidance documents (EFCCC, 2018). As previously noted, a similar guideline has been prepared to support the integration of climate change in woreda planning.

Almost all line ministries except the MoH have established Environment and Climate Change or CRGE Directorates tasked with coordinating the CRGE. However, the horizontal and vertical coordination of these directorates is rather weak—and, in some cases, non-existent. Climate

change mainstreaming is also not systematic across regions. Feedback obtained from the NAP-ETH stakeholder's consultative workshop revealed that the mainstreaming of climate adaptation actions is relatively encouraging in Oromia, SNNPR, Benishangul, and Somali regional states. This was evident as reflected by participants from Oromia and SNNPR; both regions currently have a significant number of project with climate adaptation actions. However, the process seems to be in the early stages in the remaining regions, requiring close follow-up from the EFCCC.

Climate change adaptation is essential for all stakeholders, and to the small-scale farmers and pastoralists in particular. If the mainstreaming process is employed as envisaged, sector ministries and regions could incorporate climate change adaptation into their annual plans and could easily initiate its implementation. The outcomes (medium to long term) resulting from the implementation of this priority could include reductions in climate change effects that eventually strengthen resilience in the vulnerable communities and contribute to the economy of the country at large. It will be pertinent to have a robust M&E system that comprises a strategic results framework to track results at different levels in a timely way.

Vision for the Strategic Priority

The vision of this strategic priority is to facilitate the mainstreaming of climate change adaptation into GTP III and the 10-year plan. In addition, all sectors and regions will have sector-level and regional-level adaptation plans. Woreda-level plans will also integrate climate change and take local climate hazards into consideration when planning.

Roles, Responsibilities, and Mechanisms for Implementation

Policies are made at the national level, and so federal-level entities will have the most significant role in mainstreaming climate adaptation into policies. The key federal-level ministries that will have vital roles and responsibilities are as follows.

Ministry/institution	Role
EFCCC	Leads and provides strong coordination for the implementation of NAP-ETH
MoF	Resource mobilization both from domestic and international sources, in collaboration with EFCCC, counterparts in the various sectors, and stakeholders
NPC	Leading role in the planning process for the NAP-ETH
GoE Parliament	Provide high-level direction, guidelines, and support to the implementation of NAP-ETH
Federal implementing entities (FIEs)	Coordinate the implementation of sectoral and subsector activities to implement NAP-ETH successfully

Ministry/institution	Role
Regional implementing entities (RIEs)	Responsible for prioritization and integration of the strategic AOs for their respective regional bureaus in planning, as well as for implementation, monitoring, and evaluation
Woreda offices	Responsible for prioritization and integration of the strategic AOs for their respective woreda offices, as well as for implementation, M&E

As a principal entity, EFCCC will have a leading role in facilitating and monitoring the mainstreaming of climate change into policies, plans, and strategies. The EFCCC will need to work closely with NPC to check that the mainstreaming has been successful at the national level.

Unlocking Synergies

Due to the current piecemeal approach to planning and implementing adaptation, the synergy required for climate change adaptation at federal level has not been achieved. Therefore, the NAP-ETH is expected to address these limitations through a programmatic, multi-sectoral, multi-level, and long-term planning approach. To unlock synergies and achieve the required outcome of enhancing adaptive capacity of the government in climate change mainstreaming, local institutions and individuals who are directly affected by climate change (in terms of impacts on their livelihoods and the environment in which they live) should be considered in the planning process of any climate change adaptation initiatives.

There are some common concerns behind mitigation efforts undertaken in the context of the GE strategy. Hence, due attention should be given during the planning stages to look into potential areas of synergies to avoid duplication of efforts and contradictions between the mainstreaming of climate change adaptation and mitigation.

Implementation Needs

There are existing facilities and institutional capabilities to facilitate the mainstreaming of climate change adaptation into Ethiopia's development policies, plans, and strategies. The country has acquired capacity to plan and implement adaptation actions and is expected to continue to increase its overall adaptive capacity. Ethiopia's NAP initiative is part of its grand ambition of mainstreaming climate change mitigation and adaptation into its national development plans, in particular its Growth and Transformation Plan (GTP). As noted elsewhere in the document, capacity gaps persist and need to be filled for effective implementation of the NAP.

Gender Considerations

The NAP has identified the following key gender considerations for the mainstreaming climate change adaptation into development policies, plans, and strategic priority.

- Increase the political will and institutional commitment for gender-responsive approaches at all levels of government

- Adapt and/or strengthen institutional arrangements to facilitate the mainstreaming of gender-responsive adaptation in national, sectoral, and sub-national development frameworks, plans, and strategies
- Review and update relevant national, regional, and sectoral development guidelines and checklists to integrate gender-responsive adaptation and NAP-ETH priorities
- Allocate sufficient resources (financial, human, etc.) for gender mainstreaming in adaptation initiatives
- Clarify roles and responsibilities of actors engaged in mainstreaming
- Establish systematic coordination and review mechanisms at national and sub-national levels to effectively monitor and evaluate the integration of gender issues in adaptation plans and actions
- Ensure participation of MoWCY, the EFCCC Gender Units, and gender and adaptation technical specialists and CSOs working on gender issues
- Develop guidelines and mechanisms for the implementation of mainstreamed approaches

Short-Term Priorities (2020-2022)

Table 25. Short-term priorities for mainstreaming climate change adaptation into development policies, plans, and strategies

Priorities	Key activities	Timeframe	Gender considerations
Provide capacity building on mainstreaming climate change to sector ministries and regional entities	Preparation of a long-term training plan including identification of relevant institutions and directorates from ministries. Prepare training materials and trainers Conduct trainings	2020–2021	Include gender mainstreaming and consideration in the capacity building
Technical support to ministries in developing a sector-level mainstream plan	Work with ministries and regional entities in preparing plans incorporating climate AOs and actions	2020–2022	Gender issues are adequately addressed in the mainstreaming
Provide capacity and assistance to policy-makers/ parliament to mainstream climate change into policies	Identify entry point to engage with policy-makers Develop an engagement strategy	2020–2021	Provide targeted awareness and training on gender issues
Prepare relevant information on currently operationally activities for monitoring mainstreaming of climate change adaptation	Stocktaking of pipeline and operationally active projects so as to be able to monitor the extent climate change has been mainstreamed and adaptation actions are integrated	2020	Include information on women beneficiaries to track progress

Long-Term Priorities (2023–2030)

Table 26. Long-term priorities for mainstreaming climate change adaptation into development policies, plans, and strategies

Priorities	Key activities	Gender considerations
Mainstreaming adaptation into policy processes	Integrating adaptation issues into ongoing policies such as the GTP-III and 10-year plan, future sector-level strategies, and regional plans	Adequately check to see if gender issues are addressed in policy
Access to up-to-date and reliable information about current and future climate changes, the impacts of such changes	Continuously conduct regional- and national-level climate risk assessment and impacts. Feed climate risk assessment into policy-making and planning.	Include gender data on information to be gathered
Provide solutions to implementation challenges	Address budgeting and financing challenges Provide relevant monitoring and results data for improvement of policies and plans	Address gender-related implementation challenges
Partnership for adaptation mainstreaming	Stakeholder engagement throughout policy-making and planning	

6.2 Strategic Priority #2: Building long-term capacities of institutional structures involved in NAP-ETH

Overview of the Strategic Priority

The GoE has recognized that extra effort and investment are needed to empower institutions and individuals to achieve CRGE targets. Capacity building at federal, regional, woreda, and kebele levels is critical for successful climate change adaptation. At the international level, capacity building has also been recognized as an important factor for long-term climate change adaptation—it is explicitly mentioned in the UNFCCC, including Article 11 of the Paris Agreement.

Knowing that capacity building is essential for successful implementation of climate actions, the CRGE Facility has prepared a comprehensive CRGE National Capacity Development Strategy (NCDP) designed to address gaps identified at federal, regional, and woreda levels. The CRGE Capacity Assessment Matrix (CAM) was first constructed and then used to assess the existing level of competency against the four CRGE capacity areas and three dimensions. The three dimensions are: organizational capacity, system capacity, and human capacity and competence. The four capacity areas were identified as:

- Planning—the capacity to understand and be able to mainstream CRGE into policy responses.

- Resource mobilization—the capacity to attract international and domestic resources, disburse funds to priority actions and apply effective financial management to ongoing activities.
- Delivery—the expertise and infrastructure to deliver plans and resources; to monitor results and feed results and lessons into national (and international) reporting and information systems.
- Institutions—the capacity to have a strong CRGE institution for management of CRGE systems, for building and coordinating arrangements for delivery.

The long-term capacity-building activity under the NAP strategy needs to be aligned with and build on the current CRGE National Capacity Development Strategy. By doing so, it will not only contribute to the overall national strategy but also get buy-in from donors who are (and will be) contributing to national capacity-building activities.

Policy Context

The CRGE National Capacity Development Strategy (NCDP) has clearly defined and articulated the policy framework for building the capacity of institutions in order to implement essential climate actions. Though the document has focused on the CRGE, the institutional structure and capacities built will be able to accommodate adaptation actions or the NAP. However, it is important to note that the NCDP did not specifically address adaptation but focused on the CRGE strategy. Therefore, it is essential that the NCDP be updated to look specifically at climate adaptation and integrating adaptation issues into the NCDP.

The benefits of integrating adaptation issues into the NCDP is that the NCDP will be implemented through existing structures and mechanisms for coordination, and the CRGE Facility will be the lead institution for coordination and financial management of the capacity-building activities. EFCCC will continue to have a technical role to play. Sector ministries will also have a leading role in implementation. As such, rather than establishing a separate capacity-development program, integrating the NAP capacity building into the NCDP will not only strengthen both the NAP and NCDP but provide a buy-in from the GoE as the NCDP is already an accepted program.

Current Status

The CRGE NCDP is in the early stage of implementation. The capacity development program has been planned to be implemented over a period of five years, with a total estimated budget of about USD 40 million. The CRGE Facility will play a key role in the organization, facilitation, and implementation of the program. The program will have the same institutional structure as the CRGE Facility, and oversight will be provided by the CRGE Management Committee. The capacity-development program addresses the individual, organizational, and system needs of entities at federal, regional, and woreda levels, which will have a direct role in the implementation of the CRGE. As no direct funding has been secured for the program, it has not yet been fully implemented. However, some elements of the program have received funding, such as the MRV capacity building, which has received funding from the European Union. Likewise, there have been different capacity development programs funded by donor partners such as the Climate-Smart Initiative, Strategic Climate Investment Programme

(SCIP), Climate High-Level Investment Programme (CHIP), Africa Climate Change Resilience Alliance (ACCRA), etc.

In terms of institutional setup, over the past few years, there have been attempts to establish CRGE units that integrate CRGE objectives with sector development. The rationale for establishing these units within the relevant sector ministry is to build a sustainable institutional entity with strong technical expertise that has the capacity to design, develop, and implement CRGE initiatives aimed at realizing Ethiopia's CRGE vision. Ideally, the CRGE units would be composed of experts drawn from the different departments/directorates and sub-sectors of the ministry in question.

The CRGE unit within each ministry has been engaged through a multi-institutional sub-technical committee throughout the CRGE strategy development process. There have been lax moments where these units are either lost or overtaken by routine work in the sector institutions. In some instances, they have remained strong, carrying over a sector mission to the overall CRGE process. In some cases, the units remained without human resources, and, when experts have been assigned, they operate with diluted mandates and without a clear vision. Overall, there is a need to assess where sector ministries stand in terms of the capacity to mainstream climate change adaptation objectives and direct the proper functioning of the units. It is when this objective is met that the momentum for supporting the implementation of climate-focused initiatives of a given sector could be sustained. This would require the establishment of a stronger CRGE unit that has the required resource base and technical competence for coordinating and monitoring achievements.

Many senior leaders have shown a great deal of interest and commitment to mainstreaming CRGE into their sectors and support the establishment of CRGE Directorates/units that have the required skilled human resources to follow up on the implementation of prioritized interventions as stipulated in their respective CR strategies. Some ministries (e.g., MoA) managed to develop CSA mainstreaming guidelines to harmonize the implementation of prioritized interventions. In the meantime, the mainstreaming process has been constrained by the following factors: the non-existence or non-functionality of CRGE sub-steering committees; weak vertical and horizontal coordination; frequency of restructuring; and irregularity of steering committee meetings. Most of the ministries do not share their plans with their regional counterparts, thereby complicating the process of the CRGE in sectors.

The establishment of CRGE Directorates is a reflection that institutional structure (as part of capacity) has been built to implement the NAP. Though experts at these directorates may lack specific knowledge about climate change (including the NAP), use of climate information for planning, integrating climate change into existing and new programs, mainstreaming of gender considerations, and the establishing of the directorates will allow the facilitation of specific topic capacity building for experts.

Vision for the Strategic Priority

Because the capacity-building strategy needs to be aligned with the NCDP, its vision of strategic options should be similar. The objectives of CRGE NCDP are as follows:

1. CRGE-relevant systems strengthened at all levels

2. Organizational capacity to deliver CRGE enhanced at all levels
3. Human capacity to implement CRGE built.

Accordingly, the GoE has developed a National Capacity Development Programme to address problems associated with climate change mitigation and adaptation capacity gaps by building long-lasting foundations in the organizational systems and human capacity of institutions. The implementation of NAP-ETH benefits from continuous capacity assessment work and targeted capacity-building activities (FDRE, 2019). One of the limitations of the NCDP is that it is weak in identifying climate adaptation issues and specifically addressing the process to fill those gaps. For example, while it points out gaps in GHG accounting for mitigation, it fails to identify specific capacity gaps in the use of climate information for planning. Other key adaptation issues—such as processes and tools for conducting vulnerability assessment, monitoring, and reporting as well as mainstreaming climate adaptation—are missing. Thus, one of the tasks that can be implemented early on is strengthening the NCDP by specifically adding adaptation issues. This can be done in relation to the 18 AOs.

Nevertheless, the utility of the NCDP is that it has taken a unique approach to capacity building. Business-as-usual capacity-building programs have focused on capacitating government experts, particularly at the federal level, through short-term trainings and workshops. However, staff turnover and the chaining of working and institutional structures have made short-term trainings and capacity building inappropriate. The NCDP takes a new approach to building institutional structures through trainings of trainers and capacitating universities to provide local-level capacity building over time. This will allow the creation of local systems to build capacities of government institutions rather than seeking international experts to carry it out.

Roles, Responsibilities, and Mechanisms for Implementation

The CRGE Facility will have overall responsibility for the implementation of the NCDP involving all the major CRGE delivery institutions. The NCDP will engage the technical services of various institutions, notably universities local to each region, NGOs (local and international), and individual consultants to provide the necessary expertise to achieve implementation and mainstreaming of the NCDP in the CRGE and other sector policies.

The NCDP actions will be implemented at the federal, regional, and woreda levels. Coordination among various government agencies, districts/woredas and federal levels, and relevant stakeholders will be achieved through respective sector ministries/ regional sector bureaus, which are described as implementing entities (IEs) in the CRGE Facility Operation Manual. The federal IEs are the interfaces within the facility and receive funds and report results. For additional capacity-building and technical support, the federal IEs (FIEs-Line Ministries) will coordinate the implementation of sectoral-, regional-, and local-level capacity-building activities. For example, the Ministry of Agriculture will be responsible for building the capacities of regional-, zonal-, woreda-, and kebele-level BoAs.

Unlocking Synergies

Having the required individual and institutional-level capacity as well as structures, will allow the smooth and successful implementation of the NAP at all levels of government. As such, capacity building reinforces not only the implementation of the AOs but also execution of the strategic options. For example, introduction and use of new technology, along with application of climate information for planning or early warning require strengthening of individual and institutional capacity. At the same time, such capacity building should be an ongoing rather than one-time effort. Thus, having a national program that provides a strategic framework for ongoing capacity building is essential. Integrating the NAP into the NCDP will provide a framework and platform for establishing and sustaining ongoing capacity building. By doing so, the country will move away from short-term and one-time capacity-building programs that have failed to provide long-term individual and institutional strengthening.

Implementation Needs

Budgetary and technical supports are essential for the implementation of NCDP, as their absence has been the main constraint so far. Identifying and obtaining appropriate funding will be crucial to the implementation and success of the NCDP. One of the main core activities in the short term is preparing project proposals for further consideration by donor partners and domestic funding organizations. Aside from financial resources allocated by GoE, donors are expected to make a significant contribution to the overall funding of the CRGE NCDP. One of the key elements of the capacity-building program will be to put in place a coordinated and organized response. Thus, the CRGE Facility will play a central role in coordinating donor funds and partnerships.

The GoE has received GCF readiness funding to strengthen the national implementing entity (NIE) as well as the MoF, CRGE Facility, which has been accredited to access up to USD 50 million from the GCF. Though the fund was initially given through the EFCCC, it has now been channelled through the Global Green Growth Institute (GGGI). The support from GGGI will help allow the NIE and MoF to build their capacity in project management, finance, procurement administration, and management. The support will also include organizing high-level stakeholder consultations, as well as enhancing the engagement of the private sector and other non-state actors in program management and delivery (EFCCC, 2018). In addition, a proposal has been submitted for specific readiness funding to support the NAP process, which will contribute to putting in place the systems and capacities needed for NAP implementation. The GCF readiness proposal to build capacity to facilitate the integration of the NAP process in Ethiopia will work on systematically integrating climate change adaptation into existing policies, strategies, and plans, as well as the shift away from project-based planning into an integrated strategic approach to adaptation. The implementing institution for this proposal is also GGGI.

Gender Considerations

The NAP has also identified the following key gender considerations in *building long-term capacities of institutional structures and strategic priorities.*

- Provide assessment-based, long-term, technical and institutional capacity building for government actors at the national and sub-national levels, to advance the integration of gender into policies, plans, and strategies
- Focus on enhancing understanding of the gender–climate change nexus among all actors
- Engage top-level decision-makers, project staff, and middle- and low-level experts in tailored training programs on gender and climate change adaptation
- Promote capacity-building strategies that support cross-sector learning on gender and climate change adaptation
- Ensure capacity-building efforts are not fragmented and project-driven.

Short-term Priorities (2020–2022)

Table 27. Short-term priorities for capacity building for implementation of the NAP

Priorities	Activities	Gender considerations
Develop database and knowledge-management system to track impact of climate change	Devise a database and knowledge-management system to feed into policy-making and project planning Improve institutional memory mechanism to enhance climate change adaptation and mainstreaming	Focus on enhancing understanding of the gender and climate change nexus by all actors
Collaboration with development partners for resource mobilization for capacity building of actors at all levels	Integrate climate change into current discussion at the CRGE Forum as well as Development Assistant Group (DAG) Establishment of partnership/network among bilateral and multilateral organizations as well as non-state actors for funding and better coordination of project prioritization.	Engage top-level decision-makers, project staff, and middle- and low-level experts in tailored training on gender and climate change adaptation
Conduct capacity gap assessment focusing on climate adaptation to enhance the NCDP	Federal-, regional-, and woreda-level capacity gap assessment on climate information use, mainstreaming, M&E etc. to feed/ update the NCDP Involve professionals and civil society actors in preparation of training materials and manuals and capacity building of actors in adaptation planning, implementation, and monitoring.	Implement continuous, assessment-based capacity building for climate finance and gender actors
Develop a critical mass of capacities	Conduct capacity building training of trainers to have the base for long-term capacity building on identified issues. Enhance the capacity of sectors through the training of trainers (NCDP) program.	Promote capacity-building strategies that support cross-sector learning on gender and climate change adaptation
Experience sharing on best climate change adaptation best practices	Organize experience-sharing visits within/ beyond the country to accelerate the implementation of the NAP-ETH	Focus on enhancing understanding of the gender and climate change nexus by all actors

Long-Term Priorities (2023–2030)

Capacity development is a process of change through which the system, organization, and individuals are strengthened in order to better perform particular functions. In line with this principle, the long-term strategy is not only to meet the gaps identified and the objectives of the NCDP but also to establish institutions and systems that can implement the AOs identified. This is in addition to building the human capacity and strengthening the organizations. At the organizational level, the capacity-development program will focus on the overall performance and functioning capabilities of institutions. At the systemic level, the capacity-development program will work on creating enabling environments, coordination, linkages, and alignment with the overall policy and economic framework of Ethiopia.

Table 28. Long-term priorities for capacity building for implementation of the NAP

Priorities	Activities	Gender consideration
Professionals' capacity in collecting and processing of model input data and use of an appropriate model/ tool to analyze climate change impacts and vulnerability	Build up the capacity of the FDRE hydro-meteorological professionals in selecting and using models for analyzing climate change impacts and vulnerability Training of hydro-meteorological professionals in the use of the selected modelling tool/software for vulnerability assessment of the priority sectors/areas	Focus on enhancing understanding of the gender and climate change nexus by all actors
Capacity on climate vulnerability analysis	Building national capacity in using modelling tools for climate change vulnerability and climate impact assessments Build the capacity of Ethiopia's NMA to produce precise and reliable information	Engage top-level decision-makers, project staff and middle- and low-level experts in tailored training on gender and climate change adaptation
Links among federal government agencies and between national, regional, woreda, and community levels in capacity-building programs	Design a national climate change capacity-building system that promotes inclusive approaches in policy development and strengthens vertical and horizontal flows of communication	Ensure participation of MoWCY, the EFCCC Gender Unit, as well as gender and adaptation technical specialists and CSOs working on gender issues

6.3 Strategic Priority #3: Implementing effective and sustainable funding mechanisms

Overview of the Strategic Priority

As a developing country, Ethiopia can access a range of financing sources (i.e., domestic or international, and public or private) to support its NAP processes and thereby contribute to the achievement of the adaptation component of its NDCs. A key challenge for countries like Ethiopia is to determine how to best combine these different sources to meet financing needs, taking into account national capacities and circumstances. Therefore, a comprehensive resource-mobilization strategy is required to enable the NAP process to progress without delay. The term "resources" here refers to both financial and non-financial resources, such as human resources.

In relation to the implementation of adaptation activities, any resource-mobilization strategy will need to take into account the need differential between rural and urban areas as well as the general need to increase access to financial services, noting that responsibility for rural and urban affairs falls between different ministries. Current investment in sectors from the federal budget has shown that there is substantial overlap between development investment and spending on climate change adaptation. There are also various sources of international adaptation finance, and there might be some overlap between different funding sources. For instance, several dedicated climate funds are managed by multilateral organizations; international NGOs receive part of their funding from bilateral donors, etc. Hence, consideration should be given to developing a national system to track climate change spending on adaptation within the federal budget.

One entry point for developing such a system could be through its integration with the GTP II/ GTP III planning and budgeting process. Therefore, the financing and implementation of NAP-ETH should be led by existing CRGE mechanisms, which are in place at national, regional, and woreda levels, but with an increased and specific emphasis on finance for adaptation.

The EFCCC and MoF are primarily responsible for mobilizing funding both from domestic and international sources, in collaboration with counterparts in the various sectors and stakeholders. The CRGE Facility authorizes the release of funds from the national and international accounts for approved priority resilience activities from the CRGE Facility Account, and MoF releases funds from the CRGE Facility Account to line ministries and regional Bureaus of Finance and Economic Development (BoFED), pursuant to the decision of the Management Committee and in compliance with the National Regulatory Framework.

NAP-ETH 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 DRM and integration among different sectors.

The overall indicative resource cost to implement the NAP-ETH over the period 2020–2030 is estimated to be USD 90 billion. This figure is calculated from the NAP, which had indicated that the annual funding requirement for NAP between 2016 and 2030 is USD 6 billion—a total of 90

billion. This figure is also calculated based on input from sectoral adaptation cost estimations for the agriculture, forest, water, and energy sectors, GTPII, urban poverty reduction project budget, PSNP and SLMP budgets, disaster risks response budget, and annual budget allocated for the SDGs.

There will also be an increased role for the private sector in delivering the sector climate-resilient strategy (e.g., for the agriculture sector, it is projected to double by 2030, making up 40% of the projected USD 5 billion of total investment per annum in 2030). It is also hoped that the country will have better access to global climate finance following the preparation of a dedicated resource mobilization strategy for NAP-ETH, which will feed into broader resource-mobilization strategies under the CRGE structures.

Policy Context for the Strategic Priority

The CRGE strategy recognizes that most bilateral and multilateral climate funds are channels through which funds may be funnelled to support climate-related activities. The establishment of the CRGE Facility and particularly the mandates of the MoF are to mobilize and manage climate funds. As such, the objectives of the CRGE Facility are as follows:

1. Financial mobilization and allocation: Mobilize, access, and combine domestic and international, public and private sources of finance to support the institutional building and implementation of Ethiopia's CRGE strategy
2. Stakeholder coordination: Provide a single engagement point where the government, development partners, academia, the private sector, civil society, and other stakeholders can engage and make decisions about how best to utilize available finance in the pursuit of the CRGE vision and goals; and
3. Unlock capital at scale: Through blending investment sources and leveraging resources, the Facility will use climate finance to complement other existing forms of investment to bolster Ethiopia's core climate-compatible development activities, thereby promoting the full integration of CRGE with the GTP.[4]

In addition, the Facility (particularly the MoF) has been accredited to access financing from such sources as the GCF and the Adaptation Fund. This accreditation has strengthened MoF's credibility among donors as well as the ability to manage climate funds.

The following are potential finance sources for the NAP:

- Government budget
- Bilateral & multilateral partners (World Bank, UNFCCC, GCF, UNDP, GEF, etc.)
- Private investment
- CSOs
- Community contributions

[4] Adopted from the CRGE Operational manual

Current Status of the Strategic Priority

The GoE has set up the CRGE Facility as a financial mechanism to support the implementation of the CRGE strategy, including adaptation actions. The main role of the Facility is to mobilize domestic and international sources of finances for the implementation of CRGE strategy and to manage result-based disbursements as required. The CRGE facility is also expected to facilitate greater coordination among climate change activities, by providing a single engagement point where stakeholders can engage and make decisions about climate change issues, minimizing duplication and increasing overall effectiveness (FDRE, 2014).

The CRGE Facility plays the lead coordination role in collaboration with EFCCC. Other line ministries are also heavily involved in project development where climate change adaptation is mainstreamed. International organizations, CBOs, as well as multilateral and bilateral development partners, are also contributing in the resource-mobilization process. There is duplication of effort and implicit competition for resource mobilization that has to be further explored and fine-tuned through CRGE Facility coordination. Existing capacity to support the implementation process is encouraging but requires additional capacity-building efforts along with the development of a resource-mobilization strategy dedicated to NAP-ETH implementation.

Vision for the Implementation of the Strategic Priority

The vision is to mobilize resources from public and private (domestic and international) climate finance sources that enable the country to implement its climate change adaptation initiatives and to develop appropriate technical, material, and expert capacities. In addition to mobilizing resources, the vision is to create and deploy market-based solutions, robust financial policy frameworks, and innovative financial mechanisms. These approaches have the potential to successfully blend public and private funding while unlocking greater private sector investment in climate finance. The Facility will regularly review funding gaps and provide recommendations for filling them.

Roles, Responsibilities, and Mechanisms for Implementation

The CRGE strategy recognizes that most bilateral and multilateral climate funds need a medium through which to channel funds to support climate-related activities: this must be provided for by instituting activities through and accrediting the CRGE Facility. As per the *CRGE Operational Manual,* The CRGE Facility is the government's vehicle to mobilize, access, and combine domestic and international, public and private sources of finance to support implementation of CRGE actions, both mitigation and adaptation. It also provides a single engagement point where the government, development partners, research, academia, the private sector, civil society, and other stakeholders can make decisions about how to best utilize available finances in the financial mobilization and allocation process.

Because climate change is an economy-wide issue, the inter-ministerial collaboration between the MoF and EFCCC

> in managing the CRGE climate finance in Ethiopia is a key institutional arrangement that will underpin the effective implementation of the programmes set out in

> the CRGE strategy. . . . . Implementing the CRGE strategy will require a major transformation of the institutional architecture of the government administration structure (both horizontally and vertically) and the scale of this transformation should not be underestimated. Considerable public investment is now required to strengthen the capacity of the various government ministries and agencies charged with the responsibility for implementing climate change programs at all levels of government." (Eshetu et al. 2014, p. 26)

EFCCC leads and provides strong coordination role for the implementation of NAP-ETH and also contributes to the mobilizing of funding from both domestic and international sources, in collaboration with counterparts in the various sectors, CBOs, academia, and development partners that are directly engaging in climate change adaptation implementation or provide support in capacity building and research.

Unlocking Synergies

The effectiveness of climate finance delivery depends on the well-formulated associations between policies, institutional structures of implementing agencies, and the national budgetary system. Sufficient capacity and inter-institutional linkage are necessary to secure the successful implementation of climate action. The establishment of the CRGE Facility is a reflection that progress has been made in developing an overarching policy framework for managing climate finance and climate change in Ethiopia. While international donors and agencies and national governments play important roles in establishing effective enabling environments and channelling resources and technical supports, ultimately effective adaptation takes place through the dynamics of local governance, civil society engagement, and economic development, building from the actions of local authorities, CSOs, and private sector businesses (Shaw et al., 2010, p. 354). Thus, the CRGE Facility will need to go beyond interaction with donors and add local organizations, civil society, and private sector actors to synergize climate finance.

It is also important to note that climate finance addressing mitigation actions can also be linked to climate adaptation since activities that enhance the former may also contribute to the latter. For example, planting agro-forestry tree species in area enclosures leads to carbon sequestration in biomass and soils (mitigation) but also stabilization of erodible slopes, diversification of dietary needs, and new income opportunities for communities (adaptation). As Jirka et al. (2015, pp. 17–18) point out,

> When carbon sequestration can be achieved while also improving the food security of communities and building their resilience to climate change, a win-win situation is created that is the very definition of being "climate smart"—mitigating climate change while simultaneously building resilience and adaptation.

It is, therefore, important to evaluate the impacts of development projects on adaptive capacities and climate change mitigation in order to find measures to improve projects in the face of climate change. Adaptation measures with strong synergies in mitigation could be financed by carbon credits.

Implementation Needs

There are ongoing expenses incurred throughout the development and implementation of the NAP process. These include human resources, information, knowledge, and capacity; investments in infrastructure, equipment, and technology and communication. Administrative costs of NAP-related activities, such as those for financial oversight and managing, M&E, and projects and initiatives should also be considered. When the NAP process begins, national governments must invest human and financial resources to coordinate it and facilitate adaptation planning across sectors and levels of government that, in the long term, are expected to integrate the costs associated with the development and implementation its phases into national budgets.

There is currently a mandated overlap between the two coordinating entities i.e., EFCCC and MoF. This imposes problems reporting on the overall progress of CRGE at the national level which could be solved by strengthening the technical wing in the EFCCC and MoF to focus only on tracking the financial aspects—while IEs focus on reporting on outputs and outcomes of achievements.

Investing in cross-cutting measures, such as climate services and adaptation M&E systems, would enable sound implementation of adaptation actions. To harmonize the implementation of the climate change adaptation interventions, barriers and actions were identified by participants of the stakeholder consultation workshops organized for federal and regional participants (Table 29).

Table 29. Barriers, actions, and responsible entities on sustainable funding mechanisms for NAP-ETH

Barriers	Actions	Responsible agencies
Detaching climate change adaptation spending from the GTP II planning and budgeting process	"Consideration should be given to develop a national system to track climate change spending on adaptation and mitigation within the federal budget" (Eshetu & Bird, 2015, p. 2).	MoF/CRGE-Facility, NPC, EFCCC and implementing agencies
Lack of reliable information on climate change spending from non-government sources	"Climate change-relevant spending that does not pass through the federal budget (from both domestic and international sources) should be collated in a manner consistent with the federal budget to allow for a comprehensive assessment of all relevant funding" (Eshetu & Bird, 2015, p. 2).	MoF/CRGE-Facility, EFCCC, non-government organizations
Weak/non-existence of a platform for micro and small business entrepreneurs and community leaders to participate in policy influencing platforms around climate finance	"Climate change policy development would benefit from creating additional space for non-government actors" (Eshetu & Bird, 2015, p. 2) and the community.	Federal Micro and Small Enterprise Development Agency

Barriers	Actions	Responsible agencies
Lack of capacity to develop the budget system at lower levels of the government administration to capture climate change relevant program/project spending	"Awareness raising and technical support relating to planning for and reporting on climate change are identified gaps; and these should be provided to Regional, Zonal and Woreda level staff" (Eshetu & Bird, 2015, p. 2).	MoF
Lack of technical capacity to develop bankable projects to garner international commitments on climate finance	Collaboration with non-state organizations to increased financial support from the international community that is needed to complement the significant domestic resources being allocated to climate change actions.	MoF, NPC, CRGEE-Facility, EFCCC, and non-state organizations involving in climate change adaptation issues
Weak linkages between policy formulation, the institutional architecture of implementing agencies and the national budgetary system	Enhance the working relationship among stakeholders (networking) to increase the effectiveness of climate finance delivery	EFCCC and CRGE-Facility

Gender Considerations

The NAP has also identified the following key gender considerations for the *implementation of effective and sustainable funding mechanisms* strategic priority.

- Reinforce the role of gender actors in mechanisms for the mobilization and allocation of financial resources for the implementation of NAP-ETH, including the CRGE Facility
- Develop a strategy for gender-responsive resource mobilization for the implementation of NAP-ETH, addressing national and international sources of finance
- Design bankable project documents on gender-responsive and community-based adaptation
- Implement continuous, assessment-based capacity building for climate finance and gender actors
- Earmark pool funds to finance gender-responsive climate change adaptation programs
- Develop and make use of gender equality marker scorecards during government budget planning and appraisal processes
- Devise a gender-responsive budget tracking system.

Short-Term Priorities (2020–2022)

The integration of the NAP-ETH implementation process into government processes that already exist is vital. It is also important to establish a consortium to help coordinate the integration of climate change adaptation issues into operationally active projects or programs (see Appendix 2) to supplement the standard government systems that are contributing to the NAP-ETH.

Priorities and measures were identified during the consultative workshops targeting experts from federal sectors and regional bureaus.

Table 30. Short-term priorities for sustainable funding mechanisms for NAP-ETH

Priorities	Key activities	Timeframe	Gender considerations
Resource mobilization strategy	Identify financial gaps Identify funding sources	2020–2021	Gender issues must be integrated into the resource mobilization strategy for NAP-ETH to facilitate gender-responsive allocation of finance and other resources for implementation.
Strengthen fund mobilization and managing capacity	Prepare capacity development programs for federal-, regional-, and woreda-level experts Strengthen reporting mechanisms between federal and lower-level government bodies	2020–2022	Providing targeted capacity building for women and vulnerable groups to facilitate meaningful participation and influence in decision making related to water resource management, forest and biodiversity management, and energy and infrastructure development
Prepare a proposal for bilateral and international donors		2020–2021	Specifically, target women and children as beneficiaries of projects
Prepare a private sector engagement strategy	Conduct assessment with regard to availability of funding from the private sector Develop engagement strategy, including entry point for private sector engagement	2021–2022	Provide specialized support to women-owned business

Long-Term Priorities (2023–2030)

Table 31. Long-term priorities for sustainable funding mechanisms for NAP-ETH

Priorities	Key activities	Gender considerations
Alignment of NAP funding with national plan	Align NAP with Channel One budgeting	Track funding reach women beneficiaries in programs such as PSNP

Priorities	Key activities	Gender considerations
Alignment of NAP funding with funding sources (World Bank etc.)	Ongoing monitoring of changes in funding such as results-based payments Provide awareness and training to government employees on funding proposals	Look for gender-specific funding opportunities Include gender targets in funding proposals
Implement private sector engagement strategy	Identify key private sector actors for engagement as a pilot program Reach out to private sector actors to create awareness on climate adaptation	Include women-owned private sector operators
Monitoring and reporting of funding and implementation	Provide ongoing report to donors and the international community of funding gaps and current status of implementation	Include gender indicators in reports

6.4 Strategic Priority #4: Advancing adaptation research and development in the area of climate change adaptation

Overview of the Strategic Priority

Local adaptation research, in addition to taking into consideration local context, should be aligned with international trends. Adaptation research has been changing to focus on impact and promote interdisciplinary collaboration across the natural and social sciences. At the same time, donors have been focusing on value for money. The Adaptation Futures (2016) conference proposed

> five key areas that need to be changed in order to meet the needs of future adaptation research: … increasing transparency and consultation in research design; encouraging innovation in the design and delivery of adaptation research programmes; demonstrating impact on the ground; addressing incentive structures; and promoting more effective brokering, knowledge management and learning(Jones et al., 2018).

The research strategy in Ethiopia should also be aligned with these five topics—not only to be able to access funding but also to provide relevant lessons.

As Jones et al. (2018, p. 301) observe, in Ethiopia,

> [m]uch of the learning that has carried forward from prior research programmes has remained as individual and institutional knowledge, with few formal platforms for reflecting on the merits of different adaptation funding models. Now, the pressure to demonstrate that the growing investment into adaptation research and practice yields tangible dividends makes these learning and knowledge exchange processes imperative.

Regardless, over the past two decades, interest in climate adaptation has increased substantially in Ethiopia, leading to the emergence of a new field of research aimed at both understanding and informing adaptation, as well as inform the decision-making process on climate change adaptation in the sector/region. Research and development activities will play an important role in raising awareness and improving the management of climate change-related programs with a view to the successful implementation of the NAP. In addition, specific topics such as research on resistant species of crops, trees, will feed into program and policy design.

Policy Context for the Strategic Priority

Research and development strategies and programs of permanent institutions (e.g., EEFRI, EIAR, Ethiopian Development Research Institute [EDRI] and Ethiopian Biodiversity Institute [EBI]) are supporting development-oriented research and technology transfer that help enable adaptation research and development regarding the strategic climate change AOs of NAP-ETH. To further enhance the research and development work in climate change adaptation, there should be a reliable policy guideline and program for organizations and agencies working on climate change-related research. As Klein et al. (2017, p. 19) note:

> growing political support for adaptation and interest in implementation research in Ethiopia has been accompanied by an increasing sense of urgency in the climate change community. More than ever, adaptation experts are suggesting that adaptation is not an activity for the future, but rather a need that must be addressed now. .... [and] the role of adaptation researchers is more diverse, complex and critical. [Hence, e]fforts are strongly needed to coordinate action across the field, so that research everywhere may contribute meaningfully to climate adaptation goals.

Current Status

Sensitive systems such as agriculture, health, and water supply have been affected by climate change, and the effect continues to rise: Simane et al. (2016, p. 28) suggest that

> the effects of climate change will continue to magnify without the right adaptation and mitigation measures. Currently, research on climate change and health is not adequately developed in Ethiopia. Research and other activities appear to be fragmented and uncoordinated. As a result, very few spatially detailed and methodologically consistent studies have been made to assess the impact of climate in the country. There has often been a lack of sufficient collaboration among organizations on the planning and execution of climate change and health activities and lack of trained professionals who can perform climate change and climate change-related research activities [e.g., agriculture, water, health] at various levels.

To address this situation, there should be an organized structure within various organizations and inter-sectoral collaboration, coordination, and communication among different stakeholders. It is also important that the relationship between research and extension works should be clearly defined and supported by a specific policy document. M&E on climate change activities should also be strengthened to address climate change-related issues in the country.

Vision for the Strategic Priority

The vision of this strategy is to set up or strengthen local research capacity to feed into policy and program planning to address climate change and build local adaptive capacity as well as strengthen the implementation of the NAP through evidence-based policy.

Roles, Responsibilities, and Mechanisms for Implementation

The EFCCC and research and academic institutions are playing a leading role in coordinating, undertaking research and development, and facilitating the transfer of knowledge, appropriate technology, and/or innovations. Some national and international research and academic institutions also have a leading role to play in undertaking demand-driven climate change-related problem solving research, useful for socioeconomic transformation of the society. CSOs will also be involved in undertaking basic research and stocktaking of best practices in climate change adaptation, along with the technical support they provide to extension workers.

CBOs can also play a vital role in strengthening public awareness on the need for adaptation and in bridging the gaps between scientific research and policy-making. They can also participate in the gathering and analysis of local-level information relevant to risk, vulnerability, adaptive capacity, and adaptation M&E. International organizations are also expected to contribute to financing research initiatives. For the overall coordination of climate change adaptation, EFCCC is responsible for putting forward new initiatives and proposals designed to improve and incorporate research findings on climate change adaptations into development intervention policies and strategies. At the same time, it will consolidate and aggregate project/program performance data and generate quarterly (progress) and annual (performance assessment) adaptation reports.

Table 32. Major national and international research and academic institutions involved in climate change adaptation-related research

Institutes	Research contribution to climate change adaptation implementation
Ethiopian Institutes of Agricultural Research	• Land and water research • Biotechnology (crop, animal etc.) • Agricultural mechanization • Agricultural and nutrition research • Food security and nutrition research
EEFRI	• Research coordination on climate change adaptation • Capacity building and system development and dissemination of technologies • Significantly contribute to solving major forestry, environment, and climate issues in Ethiopia
EBI	• Conservation and promoting the sustainable utilization of Ethiopia's biodiversity through research • Implement international conventions and agreements on biodiversity to which Ethiopia is a party

Institutes	Research contribution to climate change adaptation implementation
Haramaya University	• Community-based natural research management • Improving agricultural extension advisory services • Impact assessment studies • Scientific and educational research on animal and crop production; rangelands and wildlife, SLM etc.
Mekelle University	• Climate services research
Policy Studies Institute (PSI)/ formerly EDRI	• Analysis of climate change effects in selected key sectors • Research on adaptation strategy options for a climate-resilient production of agricultural commodities in Ethiopia
International Livestock Research Institute (ILRI)	• Sustainable intensification of mixed crop-livestock systems through increasing production and value chain development • Reduced vulnerability through market development, risk mitigation, and livestock development
International Food Policy Research Institute (IFPRI)	• Gender and climate change • Climate change impacts on crop yields in Ethiopia • Research on the triple win of adaptation to climate change for farmers to enhance their production
ATA	• Support research on the agricultural sector • Field pilot on research findings • Strengthen research to practice linkage on findings

Unlocking Synergies

NAP-ETH aligns climate change adaptation initiatives with ongoing development research endeavours. It does so to obtain synergies and achieve the outcomes of enhancing the adaptive capacity of government, local institutions, and individuals directly affected by climate change, in terms of impacts on their livelihoods and their environment. To ensure its effectiveness, the knowledge-management system should be supported by research findings that suit different contexts of the country. Klein et al. (2017, p. 19). observe that

> [a]daptation researchers have a critical role to play in understanding the conditions that make adaptation successful, including the incorporation of climate and risk data into adaptation planning, the meaningful engagement of diverse stakeholders, the role of private-sector actors in promoting adaptation, and how to leverage the technical knowledge of relevant experts on the ground.

They also suggest that to be successful, adaptation must assess the role of silos objectively, "recognizing that stand-alone adaptation research and institutions have an appropriate role, but they cannot operate in isolation" (Klein et al. 2017, p. 13). Climate change and its associated uncertainties imply that agricultural extension services need to regularly access new research

recommendations and disseminate them in an adequate and timely manner to the farmers. Research should also be integrated with policy needs and proactively engage policy actors in the process.

The adaptation research strategy will also need to be aligned with capacity building and knowledge management. Ethiopian research institutions and centres have both financial and technical gaps; therefore, through linkages with international universities and research centres, local universities will not only build their capacity but also be able to do robust research. There are a few current successful examples of such partnership, such as that of the Hawassa University partnership with Norwegian University of Life Science, and the Swedish University of Agricultural Science and Bahir Dar University Department of Disaster Risk Management and Sustainable Development partnership program with UN Partners Enhancing Resilience For People Exposed to Risks. These partnerships are models that can be replicated and scaled up to increase the capacities of Ethiopian universities and researchers as well as to access finance.

Research also needs to be expanded so that findings are transferred into action. Local agricultural research centres and extension agents play an important role in rolling out findings to farmers. This requires close collaboration and coordination among researchers and practitioners. Recognizing the gap both in research and the linkage, the GoE had established the ATA to conduct studies and pilots, and to roll out best practices. Though it had been working under the Prime Minister's office from 2010 to 2018, its mandate and reporting have moved to the MoA. Building on lessons learned from what ATA and local universities have done (and through close partnership with the MoA) best practices on research to practical links—particularly on climate adaptation—should be identified and scaled up.

Implementation Needs

Research is vital to support effective responses to climate change, as well as to support strategies for limiting climate change while building effective information and decision-support systems. However, the human resources to undertake research on climate change are not adequately developed. Hence, capacity-building programs should be widely implemented, and, where possible, climate-related issues should be integrated into the curriculum of higher education and short-term development trainings.

The existing CR strategies and adaptation plans need to assemble the necessary information including climate data, vulnerability analysis, AOs, implementation approaches, and M&E that can provide good information for research and development initiatives. However, the capacity to build and maintain data archives/databases on the impacts of climate change for agro-climatic zones, vulnerable groups, and ecosystems (as well as investment in infrastructure, equipment, and technology) need to be enhanced and institutionalized in existing facilities such as the CSA. In addition, a knowledge management system and institutional memory mechanism for adaptation should also be designed. To overcome possible barriers, an inventory must be carried out to identify major constraints and prioritize them to maximize the opportunities for delivery of climate-related research and development works. To address cross-cutting issues related to gender, food security, and nutrition etc., they need to be considered at all levels of program/project management cycles. Experts and researchers who attended the federal and regional

stakeholder consultation workshops organized identified the following barriers, actions, and corresponding responsible entities.

Barriers, Necessary Actions, and Responsible Actors to Overcome Identified Barriers

Table 33. Barriers to adaptation research & development

Barriers	Actions	Responsible entities
Disintegration in adaptation research in project formulation, planning and implementation	"Promote interdisciplinarity approach across the natural and social sciences"(Jones et al., 2018, p. 297).	NPC, EFCCC, research and extension intuitions
Extension institutions (sectors and regional bureaus) insufficiently involved in the identification and prioritization of adaptation research requirements	"Increasing transparency and consultation in research design, implementation, monitoring, reporting and evaluation" (Jones et al., 2018, p. 297).	EFCCC, research and academic institutions, and extension institutions
Capacity gap to meet the expectations of donors/ funders on ensuring that adaptation research leads to an impact on the ground	Capacity building training on resource mobilization and requirements to meet expectations of adaptation funding agencies and that constantly changing eternal resource environment Encouraging innovation in the design and delivery of adaptation research programs	EFCCC and CRGE-Facility
Inefficiency of linkage between research and extension institutions	Ensure that extension services are able to provide research institutions with information on research requirements and play a mediating role between farmers and researchers to demonstrate impact on the ground	EFCCC, research and academic institutions, and extension institutions
Dysfunction/non-existence of incentive structures	"Supporting more inclusive design of large adaptation research programmes also calls for a rethink of the incentive structures used to manage and evaluate large research consortia" (Jones et al., 2018, p. 300)	Research and academic institutions
Malfunction of Inter-Ministerial Steering Committee to facilitate high-level decision making that determines what is required of NAPET	"Promoting more effective brokering, knowledge management and learning" (Jones et al., 2018, p. 297)	NAP-ETH Inter-Ministerial Steering Committee

Barriers	Actions	Responsible entities
Lack of/weak knowledge sharing platform	"Underscore the importance of learning from past experiences and scaling-up of successful innovations in research funding models" (Jones et al., 2018, p. 297)	EFCCC
Weak monitoring and reporting system	Training on result-based management to fulfill funders requirement to focus on measurable results in the form of outputs or outcomes	EFCCC, research and academic institutions, and extension institutions

Gender Considerations

The NAP has also identified the following key gender considerations for the *advancement of adaptation research and development in the area of climate change adaptation* strategic priority.

- Integrate gender perspectives throughout the adaptation research cycle (design, data collection, analysis, database development, and reporting)
- Involve women and men in adaptation research and development
- Engage MoWCY, gender and climate change research institutions, and academia to fill the gap in gender and adaptation research
- Consider the intersectionality of gender with other socioeconomic variables such as poverty, disability, pregnancy, and age
- Highlight gender-specific adaptive capacities as well as vulnerabilities
- Operationalize research by linking findings to adaptation action, focusing particularly on transforming social norms and unequal power relationships.

Short-Term Priorities (2020–2022)

The priority action for 2020 is to begin implementing the priority strategy, which is to strengthen the working relationship between stakeholders (in particular, the researchers and extension workers) through joint planning, monitoring, and resource mobilization efforts.

PRIORITIES AND MEASURES IDENTIFIED DURING THE CONSULTATIVE WORKSHOPS TARGETING FEDERAL AND REGIONAL EXPERTS

Table 34. Short-term priorities for adaptation research & development

Priorities	Key activities	Timeframe	Gender considerations
Joint planning among researchers, planners, and experts	Identification of key climate change adaptation-related priorities for research	Ongoing	Women have experiential knowledge and unique skills and capacities that are valuable for adaptation planning, and implementation: their participation is thus vital
Capacity building for researchers	Capacity building for university and research centre experts on conducting relevant research	2020–2021	Providing targeted capacity building for women to participate meaningfully in research as well as provide relevant information to researchers
Develop reference materials	Develop extension materials that highlight the importance of climate change adaptation and identify good practices based on current research	2020–2021	Ensure the mainstreaming of gender-responsive adaptation in national, sectoral, and sub-national development frameworks, plans, and strategies and reference and extension materials
Experience sharing	Demonstrations on the findings of best practices in climate change adaptation for planners and policy-makers	2021–2022	Develop and implement a gender-responsive (e.g., agricultural, health) extension program with equitable representation of women in the extension staff

Long-Term Priorities (2023–2030)

Longer-term priorities should prioritize the inclusion of climate change adaptation research interventions into the forthcoming GTP III to secure due attention from the decision-making side. It will also be important that the EFCCC and CRGE-Facility oversee and coordinate the resource mobilization at national and sub-national levels to avoid duplication of efforts and conflicts among implementing agents and to align with the GTP II and the upcoming GTP III objectives.

Table 35. Long-term priorities for adaptation research and development

Priorities	Key activities	Gender considerations
Resource mobilization plan	EFCCC and CRGE-Facility to coordinate the preparation of bankable proposals for submission to development partners willing to support works on CCA research into technology generation, transformation, and dissemination	Engage MoWCY, gender and climate change research institutions, and academia to fill gaps in gender and adaptation research
CCA platforms	EFCCC to coordinate the establishment/ strengthening of the CRGE Forum to include knowledge exchange and collaboration between the climate change adaptation and disaster risk reduction communities This will address gaps and fragmentation challenges, informing and contributing to key research and policy processes	Stakeholder engagement platforms should ensure participation of gender and CSOs working on gender issues and representing women's rights
Develop a technology transfer framework	EFCCC to coordinate the technology needs and needs assessment, information, enabling environments, capacity building, and mechanism to facilitate institutional and financial support to technology cooperation, development and transfer	All technologies for CCA e.g., agriculture and information and communication, among others tailored to ensure that they are accessible to both women and men and that they do not continue to reinforce traditional gender roles

6.5 Strategic Priority #5: Improving the knowledge management system for NAP-ETH

Overview of the Strategic Priority

Knowledge management has increasingly become a key component of improving organizational effectiveness, involving the process through which organizations generate value from their intellectual assets (Girard, Girard, 2015). Knowledge management comprises ingredients such as enhancing research and development, integrating Indigenous and contemporary knowledge, and registering acquired experiences for the successful implementation of a country's climate adaptation efforts. To realize this, the NAP-ETH program will establish structured systems for generating and synthesizing knowledge, documenting the learning in a range of different products, including reports, factsheets, and multimedia projects. Though there are major gaps in the development and implementation of a knowledge-management system in Ethiopia, a starting point could be the use of existing international platforms that have some relevance for the country, including the climate change knowledge portal run by the World Bank.

Policy Context for the Strategic Priority

The GoE has developed the National Information and Communication Technology Policy and Strategy (FDRE, 2009), which provides the standard for knowledge management practices within ministries. However, the effectiveness of KM depends on how processes are aligned with the country's and each ministry's infrastructure and processes, in a manner that supports the achievement of its goals—in this case, the CRGE as well as the NAP. At the government policy level, knowledge management has been weak in Ethiopia. There has not been any government-developed policy, standard, or guideline provided to ministries to develop and run their knowledge-management systems. This was evident with the development of the CRGE Registry and MRV systems, which has never been functional due to the lack of a proper policy mechanism to guide regarding such issues as hosting of IT system and handover during human turnover. However, some ministries such as health, agriculture, and education have developed their own guideline on data management and related IT issues that also address components of knowledge management. The Ministry of Innovation and Technology (formerly Science and Technology) is currently working on developing new data management policy guidelines. At the same time, knowledge management has been rather well developed and managed by NGOs and civil societies in the country.

Current Status

In Ethiopia, a significant relevant amount of information has been generated and experiences gained related to the climate change agenda. For example, most of the organizations dealing with climate change-related and relevant activities like the ATA, CSA, EEFRI, EIAR, Environment and Climate Research Center (ECRC), FCCC, Institute of Biodiversity Conservation and Research (IBCR); National Meteorological Agency (formerly the Nat. Met. Services Agency), NDRMC, and the Soil Research Centres. Non-state agencies (including Action Aid, Agriservice, CARE Ethiopia, DFID, FAO, Farm Africa, GTZ, IFPRI, UNEP, UNIDO, USAID, WFP, UNDP and World Vision and others) are providing either financial or technical support in the development of climate change-related knowledge-management systems. At the national level, knowledge sharing on climate change-related issues is facilitated by the Consortium for Climate Change Ethiopia, which was officially started in June 2015 and is formally known as the Ethiopian Civil Society Network on Climate Change. There is also a consortium whose main objectives are to raise awareness on climate change, promote the sharing of experience, build the capacity of member organizations, and engage in international negotiations (Forum for Environment, 2015). The CRGE Forum was recently (2018) established as well, focusing on sharing information on current climate change projects. Its members are mostly donors and government entities.

Vision for the Strategic Priority

To ensure an equitable and balanced response to climate change for social justice and for generating appropriate knowledge, skills, and actions (and thus the effectiveness of the NAP-ETH at all levels of government) representatives from all types of civil society, religious organizations, and local communities who are particularly vulnerable to climate change across the country will be invited to participate in both the planning and implementation of NAP-ETH. The short-term output will be that all stakeholders will be aware of the negative effects of climate change and their shared interests in climate change adaptation initiatives. The

long-term outcomes will be changes in attitudes toward climate change adaptation that will contribute to proactive participation in the actual implementation of adaptation actions and in mobilizing necessary resources. It will also work on developing action and research that will feed into policy-making.

Roles, Responsibilities, and Mechanisms for Implementation

Researchers and academic institutions will be responsible for the majority of knowledge generation, transformation and building of databases, and gathering of lessons learned from adaptation experiences in different sectors and regional states. Government actors and NGOs (as well as local-level CBOs) will be responsible for translating research into action. Donors will play a role in facilitating finance for both knowledge generation as well as piloting the work of translating research into actions. National-level NGOs (particularly the Ethiopian Civil Society Network on Climate Change) will play a leading role in promoting the sharing of experiences, building the capacity of member organizations, and engaging in international negotiations.

Unlocking Synergies

The knowledge management system will serve all SPs and AOs, as it is connected to the capacity to build and maintain data archives on climate change impacts on different agro-climatic zones, vulnerable groups, and ecosystems that in turn benefits all identified SPs under NAP-ETH. The FAO (2013, p. 25) states that

> [n]ew knowledge, skills and expertise may be needed to enable timely and well-informed decision-making and action. Stakeholders should have sufficient knowledge and expertise to undertake climate-change vulnerability and risk assessments; design and revise management plans; implement actions to adapt to and mitigate climate change; and monitor the impacts of climate change and the outcomes of climate change actions.

In this way, the knowledge-management system provides synergies between adaptation and mitigation efforts in the context of the GE strategy. It is also important to make sure that various disciplines like environmental, social, and political sciences integrate research results into an overall context that improves the management and sustainability of knowledge in the context of climate change adaptation.

Lemi (2019) discusses the role of Traditional Ecological Knowledge (TEK) in climate change adaptation in local communities. TEK is defined as knowledge

> that has been preserved and transferred orally from generation to generation and through cultural expressions such as arts, crafts, and ceremonies. It has a great role in natural resource management, which enhance[s] the adaptation capacity of local people to adverse impact[s] of climate change. On the other hand, it is also important in forecasting the near and long-term climate change by using different techniques that are available in their surroundings. Integrating traditional ecological knowledge and scientific knowledge is very important to adapt [to] climate change impact[s].

TEK is very important in resource management as well as in minimizing the effects of climate change.

The knowledge-management system should also be linked to the CRGE M&E framework. NAP-ETH M&E should adopt a common set of indicators with CRGE Facility M&E and align it with CRGE Facility M&E, particularly indicators related to adaptation projects and program outputs, outcomes, and impacts. Having a robust M&E system will give donors confidence in the monitoring and reporting capacity of the CRGE Facility. Some donors such as DFID, DANIDA, and Norway had indicted their frustration over not being able to get good quality reports from the Facility. This is partly due to the lack of an effective monitoring and reporting system.

Implementation Needs

A major gap in many government ministries and structures is the lack of capacity to develop and manage knowledge-management systems. There is thus no sharing of information either horizontally or vertically in many government ministries. To address this gap in the development of policies, guidelines, and standards, it is necessary that knowledge management systems be developed and managed properly. The development of a knowledge-management system is key for the creation, absorption, and diffusion of information and expertise toward effective implementation of AOs. In addition to developing policies, standards, and guidelines for the knowledge-management system, ministries need infrastructure support in developing and managing it. Developing system guides and templates and providing brief technical trainings on system applications is also required to address knowledge management gaps.

Barriers, Actions, and Responsible Entities for Taking Measures

Table 36. Barriers for NAP-ETH knowledge-management systems

Barriers	Actions	Responsible entity/ies
Weak functional implementation structure across all levels, i.e., sub-national entities (regions, woredas) insufficiently involved in policy development in the execution of knowledge-management system	Use more inclusive approaches to improve the knowledge-management system and strengthen vertical and horizontal flows of communication including innovation and best practices	EFCCC, CRGE-Facility, and NPC
Lack of responsiveness and low commitment to the integration of climate change adaptation into sectors/regional planning	Increase awareness on the need to adapt climate change and harmonize adaptation messages among all stakeholders at all levels	Sector ministries and regional bureaus
Limited technical capacities and finances	Institutional and human capacity building at national and sub-national levels and allocation of adequate financial and material resources required for knowledge management at all levels. Invest in human capacity development	EFCCC, CRGE-Facility in collaboration with sectors and regional bureaus and development partners

Barriers	Actions	Responsible entity/ies
Communication disconnect between experts working at national and sub-national levels	Improve communication and coordination between national and sub-national stakeholders	EFCCC in collaboration with sectors and regional bureaus
Climate change adaptation is still not viewed as a development issue and consequently is not a high priority	Awareness raising of the specific consequences of climate change on development priorities	The same as above
Overlapping in the work of different NGOs and the working relationship between civil and government entities	The local government has the mandate to control the respective implementation areas	Government authorities
Limitation of awareness beside the scientific and some local communities on the importance of TEK	Carry out enough research on TEK's importance, integrating it with scientific knowledge, creating awareness and including it in adaptation strategic plan	Research centres

Gender Considerations

The NAP has also identified the following key gender considerations for the *Improvement of knowledge-management system* strategic priority.

- Improve institutional coordination and partnerships in the generation, analysis, and communication of gender-responsive adaptation knowledge and experiences
- Ensure the analysis and use of consistent gender-disaggregated data and analysis on AOs and SPs throughout NAP-ETH implementation
- Establish structured, gender-responsive systems for knowledge acquisition, development, and sharing, taking into account the needs and capacities of different audiences
- Facilitate learning and advocacy on gender-responsive adaptation
- Improve cross-sectoral learning on gender-responsive adaptation and adaptation mainstreaming
- Establish clear mechanisms for using practical lessons on gender and adaptation to inform policies and practices.

Short-Term Priorities

The short-term priorities should be capacity building or skill upgrading of the staff responsible for handling the knowledge management system and analyzing existing capacity to identify gaps and fulfill basic requirements to begin the service as soon as possible. Gaps in knowledge management, solutions, and responsible entities based on the results of a literature review and stakeholders' recommendations are presented in the tables below.

Table 37. Short-term priorities for NAP-ETH knowledge management systems

Gaps in knowledge management	Solutions	Responsible entity	Timeframe
Lack of skilled human resources	Train experts assigned to CRGE Directorate/unit on the relevance of climate change effects to the livelihood of the vulnerable communities	EFCCC, CRGE-Facility, sectors, and regional bureaus	2020
Lack of basic equipment/facilities	Fulfill necessary financial and materials requirements to enable the functionality of the knowledge-management system at sectoral and regional levels	Donors, EFCCC, CRGE Facility	2020–2021
Absent/inadequate commitment from leadership	The government's commitment should be realized through leadership commitments to achieve the implementation of the NAP-ETH	PMO, EFCCC, CRGE Facility, Sectoral and regional entities	Ongoing

Long-Term Priorities

For the longer term, it will be important to advocate for the inclusion of knowledge management in the imminent GTP III and program/project formulation to ensure the effective and sustainable implementation of the service.

Table 38. Long-term priorities for NAP-ETH knowledge-management systems

Gaps in knowledge management	Solutions	Responsible entity	Timeframe
Weak knowledge sharing facilities	Establish/strengthen a national consortium for knowledge management to raise awareness of climate change, promote the sharing of experience, build the capacity of member organizations, and engage in international negotiations	EFCCC in collaboration with the Consortium for Climate Change Ethiopia	2020–2030
Weak relationship with regional networks that could enable the sharing of best practices among neighbouring countries	Ensure that Ethiopia is benefiting from the membership of the regional networks such as Africa Adapt and the PanAfrican Climate Justice Alliance to share climate change adaptation knowledge between researchers, policy-makers, and CSOs across Africa through web-based and face-to-face interactions	EFCCC and sector and regional entities	2025–2030
Inaccessibility of local Indigenous knowledge in climate change adaptation	Stocktaking of Indigenous knowledge that can be accessed from the national and/or regional repository (which also needs to be established)	EFCCC and Ethiopian Institute of Biodiversity	2025–2030

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Appendix I. Summary of Key Messages From Stakeholder Consultation Workshops

The NAP roadmap stakeholder consultation workshops are a key learning opportunity on how different stakeholders view climate change and the need for urgent organized interventions. By outlining the roles and potential responsibilities of the central government, local government, NGOs and CSOs, development partners, the private sector, and vulnerable groups, stakeholders have demonstrated some level of understanding and appreciation of the need to address climate change. The following are key findings and recommendations from the stakeholder engagement.

1. Over 75% of the stakeholders participated in the NAP Roadmap Stakeholder Consultation Workshop held between May 30 and June 1, 2019, and will be involved in national capacity building activities and the actual implementation of the NAP. About 50% of the stakeholders will complement government efforts to effectively coordinate the NAP development process, while about 25% will be involved in finance/resource mobilization. Academic representatives will mostly be working on research and capacity building.
2. There is a need to undertake a rapid assessment of the extent to which climate change has been integrated into relevant activities, including enforcement of climate change-related legislation
3. Research is needed to demonstrate the different climate-smart agriculture options on a small scale that could be linked to the climate change adaptation practices to strengthen community education along with Indigenous knowledge regarding climate resilience.
4. There is a need for establishment of strong linkages between research and extension systems to ensure timely transfer of appropriate technologies to the end users.
5. There is a need for collaborative systems-oriented research, in which crop, livestock, and natural resource researchers participate in developing multipurpose crop varieties with high-grain and good-quality yields.
6. There is a need for the establishment of stakeholder consultation platforms that bring together public and private sector actors to raise and discuss key climate change-related issues.
7. There is a need for stronger policy, legal and institutional frameworks to support sustainable climate change adaptation initiative at all levels.
8. There is a need for establishment of a dedicated vertical and horizontal coordination unit to ensure that the coordination and governance structures are improved and inter-ministerial steering and management committees meet regularly following the time schedules to improve the NAP process effectively.
9. A critical aspect is the inclusion of vulnerable groups (children, youth groups, and other economically marginalized groups) in the NAP implementation process right from the

start through to the conclusion of the NAP and beyond will be critical to ensure the process "leaves no one behind."

10. There are concerns about gender inclusion/mainstreaming related to lack of awareness and capacity on gender-related issues that require capacity building of the lead ministries at all levels (national, regional, and woreda levels) starting with widespread education and awareness, not only on adaptation but mitigation actions with adaptation co-benefits as well.
11. There is a need for development of a communication strategy for conveying climate change information to all concerned stakeholders as well as an effective repository and feedback mechanism.
12. There is a need for the creation of a knowledge-management platform to facilitate institutional learning between adaptation stakeholders.
13. It is important to maintain and strengthen the working groups established for NDC/Mitigation in lead sectors to enable the government to obtain better results from the NAP implementation.
14. The NAP Working Groups in lead sectors should be supported by EFCCC and CRGE Facility and NPC to strengthen adaptation planning at all levels of development planning.
15. There is a need for capacity building and training manual/training modules on the integration of climate change AOs into national and sub-national development planning.
16. Development of climate change scenarios and conducting of vulnerability assessments are necessary to inform the National Adaptation Plan, as the NAP is responsive to the impacts of climate change in Ethiopia.
17. Effective and timely investment planning and decision making within the infrastructure sector is a critical component of the nation's response to climate change.
18. Capacity building of the NMA to provide accurate and useful information for adaptation strategies as well as integrate the NAP process into the National Framework for Climate Services is necessary.
19. An integrated database management system for climate data collection needs to be developed, allowing for collation of all information stored on institutional climate databases and the systematic storage of climate data.
20. A system to appraise AOs needs to be developed that accounts for the economic, ecological, and social costs and benefits of adaptation measures that should be considered.
21. Finance for coordination and capacity building and implementation of the planned activities is critical. Thus, there is a need for development of a resource mobilization strategy identifying potential resources to possibly fund NAP implementation, addressing the urgent need for mobilization of financial resources dedicated to adaptation research programs.
22. Publicity of the NAP process—including through involvement of high-level officials—in the form of short documentaries, print media articles, and radio programs on the implementation of the NAP process in Ethiopia is extremely important.
23. The need for an information repository to provide to the Standing Committee on Finance by stakeholders involved in climate finance.

Appendix II. Regional Prioritization of AOs

AO		Regions										Total Number of Regions
		Amhara	Oromia	SNNPR	Tigray	Gambella	Benshangul	Afar	Somali	Harai	Dire Dawa	
AGRICULTURE AND WATER												
AO1	Enhancing food security by improving agricultural productivity in a climate-smart manner	X	X	X	X	X	X	X	X	X	X	10
AO2	Improving access to potable water		X			X	X	X				4
NATURAL RESOURCE MANAGEMENT												
AO3	Strengthening sustainable NRM through safeguarding landscapes and watersheds	X	X		X				X	X	X	6
AO4	Improving soil and water harvesting and water retention mechanisms			X				X				2
AO6	Improving ecosystem resilience through conserving biodiversity											0
AO7	Enhancing sustainable forest management	X			X							2
HEALTH, LIVELIHOODS, AND SOCIAL PROTECTION												
AO5	Improving human health systems through the implementation of changes based on an integrated health and environmental surveillance protocol											0

AO		Regions										Total Number of Regions
		Amhara	Oromia	SNNPR	Tigray	Gambella	Benshangul	Afar	Somali	Harai	Dire Dawa	
AO8	Building social protection and livelihood options of vulnerable people	X		X	X							3
AO14	Developing efficient value chain and marketing systems											
CLIMATE SERVICES AND ADAPTATION TECHNOLOGIES												
AO13	Mainstreaming endogenous adaptation practices											0
AO15	Strengthening drought and crop insurance mechanisms											0
AO16	Improving early warning systems								X			1
AO17	Developing and using adaptation technologies					X	X					2
AO18	Reinforcing adaptation research and development											0
INFRASTRUCTURE												
AO9	Enhancing alternative and renewable power generation and management											0
AO11	Building sustainable transport systems											0
AO10	Increasing resilience of urban systems								X	X	X	3

Appendix III. Operationally Active and Pipeline Projects That Will Contribute to the Implementation of Some of the NAP-ETH AOs and SPs

Name of project	Funder(s) and budget	Implementing agencies	Sectors	Duration	NAP-ETH AOs	NAP-ETH SPs
Responding to the Increasing Risk of Drought: Building Gender-Responsive Resilience of the Most Vulnerable Communities	GCF Financing USD 45 Million	MoA, MoWIE	Water	2017–2022	AO2: Improving access to potable water	SP2: Capacities
Strengthening Drought Resilience of the Pastoral and Agro-pastoral Populations in the Lowlands of Ethiopia (Somali Region)	Swiss Agency for Development and Cooperation CHF 17,600,000	GIZ, local governments, and NGOs	Agriculture, pastoralism, and disaster risk management	February 2015–January 2026	AO3: NRM,AO1: Food security, AO17: Adaptation technologies	SP3 Funding
CCA Growth: Implementing climate resilient and GE plans in highland areas in Ethiopia	UNDP Ethiopia USD 4,959,418 GI EUR 4,800,000	EFCCC	Agriculture,	January 2017–December 2021	AO1: Food security, AO8: Social protection & livelihoods	SP2: Capacities
Contribution to the support of the agricultural productiveness in Ethiopia		Ministry of Agriculture	Agriculture	January 2018–January 2021		
SLMP Phase II	World Bank (WB), GEF, GTZ and others USD 257 million	MoA	Cross-sectoral	2013–2020	AO1: Food security, AO8: Social protection & livelihoods	SP2: Capacities

Name of project	Funder(s) and budget	Implementing agencies	Sectors	Duration	NAP-ETH AOs	NAP-ETH SPs
Productive Safety Net Programme 4 (PSNP 4)	Global Affairs Canada, SIDA, Irish Aid, Netherlands Embassy, USAID, DANIDA, World Bank USD 100 million	MoA	Cross-sectoral	9/30/2014–12/31/2020	AO1: Food security, AO8: Social protection & livelihoods	SP2: Capacities
Ethiopia: Biogas Dissemination Scale-Up Project – National Biogas Programme of Ethiopia (NBPE+)	European Development Fund EUR 21 million	MoWIE	Energy	2014–2020	AO8: Social protection & livelihoods	SP2: Capacities
Integrated Approach to Improving Rural Livelihoods, Empowering Communities and Partners	Embassy of Sweden USD 5.6 Million	Farm Africa	Cross-sectoral	2014–2020	AO1: Food security, AO8: Social protection & livelihoods	SP2: Capacities
Participatory Small Scale Irrigation Development Programme II (PASIDP)	IFAD, IFAD, GoE USD 145.3 million	MoANR and regional agriculture bureau	Water	2015–Ongoing	AO1: Food security, AO8: Social protection & livelihoods	SP2: Capacities
AGP Phase II	WB, AECID, a; USAID and others USD 365 million	Ministry of Agriculture	Cross-sectoral	3/26/2015-10/10/2020	AO1: Food security, AO8: Social protection & livelihoods	SP2: Capacities
Land Investment for Transformation	UKAID: GBP 45-68.5 million USD 69 million–105 million through 2020	DAI, GoE, through the Ministry of Agriculture's Rural Land Administration and Use Directorate (RLAUD)	Agriculture	1/1/2016–31/12/2020	AO2: Improving access to potable water	SP2: Capacities

Name of project	Funder(s) and budget	Implementing agencies	Sectors	Duration	NAP-ETH AOs	NAP-ETH SPs
MERET-PLUS	Canada/USD 15 million, U.S./, Denmark, Finland, Norway, Japan, Private Donors/ USD 5,832,981, Russian Federation. USD 151 million	MoANR,WFP	Agriculture	2011–Ongoing	AO1: Food security, AO8: Social protection & livelihoods	SP2: Capacities
Bahir Dar Water Supply Project (new)	JICA USD 20,471,216.34	Amhara Region Water, Irrigation and Energy Dev't Bureau and Bahir Dar City Water Supply and Sewerage Service	Water	2016–2020	AO2: Improving access to potable water	SP2: Capacities
The Project For Development Of Next-Generation SLM Framework To Combat Desertification	JICA USD 3,527,600	Bahir Dar university	Forest	2017–2022	AO1: Food security, AO8: Social protection & livelihoods	SP2: Capacities SP 4: Advancing adaptation research and development in the area of climate change adaptation
Index-Based Crop Insurance Promotion Project For Rural Resilience Enhancement	JICA USD 6,261,490	Food Security and Rural Job Creation Ministry of Agriculture and Natural Resources	Cross-sectoral	2017–2022	AO1: Food security, AO8: Social protection & livelihoods	SP2: Capacities
Project for Supporting Sustainable Forest Management through REDD+ and Certified Forest Coffee Production and Promotion (REDD+FCCP)	JICA USD 4,056,740	Oromia Forest and Wildlife Enterprise	Forest	2014–2020	AO1: Food security, AO8: Social protection & livelihoods	AO1: Food security, AO8: Social protection & livelihoods

Name of project	Funder(s) and budget	Implementing agencies	Sectors	Duration	NAP-ETH AOs	NAP-ETH SPs
The Project For Smallholder Horticulture Farmer Empowerment Through Promotion Of Market-Oriented Agriculture (Ethio-Shep)	USD 4,885,726	Ministry of Agriculture and Natural Resources, Oromia Bureau of Agriculture and Natural Resources	Cross-sectoral	2017–2022	AO1: Food security, AO8: Social protection & livelihoods	SP2: Capacities
Beekeepers Economic Empowerment through Long-term Investments in Entrepreneurship and Value chain in Ethiopia	OXFAM GB/ ACCRA USD 5.332 million	MoA	Livestock	2017–2021	AO1: Food security, AO8: Social protection & livelihoods	SP2: Capacities
Four Towns Water Supply and Sanitation Improvement Program in Ethiopia	African Development Bank Group (AfDB) USD 76.11 million	Ministry of Water, Irrigation and Electricity	Water	1/1/2016–31/12/2020	AO2: Improving access to potable water	SP2: Capacities
Promoting Autonomous Adaptation at the community level in Ethiopia	GEF (USD 5,307,885) USD 24,721,020	EFCCC	Cross-sectoral	2011–ongoing	AO1: Food security, AO8: Social protection & livelihoods	SP2: Capacities
SREP	SREP/USD 69.5 million, AfDB/ USD 54 million, IFC/USD 4 million USD 443.2 million	MoNP, EEPCO	Energy	2011–ongoing	AO9: Enhancing alternative and renewable power	SP2: Capacities
Soil protection and rehabilitation for food security	GIZ EUR 147,552,927	AFC and ODI	Agriculture	November 2014 – June 2023	AO1: Food security, AO8: Social protection & livelihood	

Name of project	Funder(s) and budget	Implementing agencies	Sectors	Duration	NAP-ETH AOs	NAP-ETH SPs
Mainstreaming Climate-Smart Approaches into the Productive Safety Net Program (Climate-Smart PSNP)	European Commission GCCA+	Public Works Coordination Unit, Food Security Coordination Directorate, DAI, Echnoserve	Social protection	2018–2022	AO1: Food security, AO3: NRM, AO8: Social protection & livelihoods AO16: EWS,	SP2: Capacities, SP5: Knowledge management
Climate Action through Landscape Management (CALM)	World Bank USD 1,675.70 million	MoA	Agriculture/ SLM	June 23, 2019–July 7, 2024	AO1: Food security, AO8: Social protection & livelihood	SP2: Capacities
Resilience Landscape and Livelihood Project	World Bank USD 129 Million	MoA	Cross-sectoral	January 30, 2018–July 7, 2018	AO1: Food security, AO8: Social protection & livelihood	SP2: Capacities