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*Collaborative Adaptation Research
Initiative in Africa and Asia*

Review of Current and Planned Adaptation Action in Ethiopia

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Titles in this series are intended to share initial findings and lessons from research and background studies commissioned by the program. Papers are intended to foster exchange and dialogue within science and policy circles concerned with climate change adaptation in vulnerability hotspots. As an interim output of the CARIAA program, they have not undergone an external review process. Opinions stated are those of the author(s) and do not necessarily reflect the policies or opinions of IDRC, DFID, or partners. Feedback is welcomed as a means to strengthen these works: some may later be revised for peer-reviewed publication.

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Abstract

In Ethiopia, climate variability and change, including rising temperatures and increasing rainfall variability, challenge 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 this process 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 addressing vulnerabilities in specific sectors, notably health, transportation, and energy. This report provides a snapshot of adaptation action in Ethiopia and is one in a series of country reviews prepared in support of the Collaborative Adaptation Research Initiative in Africa and Asia.

Résumé

Examen des mesures d'adaptation actuelles et prévues en Éthiopie

En Éthiopie, la variabilité du climat, notamment la hausse des températures et l'augmentation de la variabilité des précipitations, complique les efforts du pays visant à réaliser sa vision en matière d'inclusion et de prospérité. L'Éthiopie fait partie des pays les plus vulnérables d'Afrique de l'Est à l'égard des changements climatiques. On s'attend à ce que ce processus nuise aux progrès dans des secteurs comme l'agriculture, le transport, l'énergie et la santé. Les communautés pastorales et agro pastorales d'Éthiopie ainsi que les petits exploitants agricoles sont particulièrement vulnérables aux changements climatiques : des efforts concertés d'adaptation pour réduire la pauvreté et favoriser la résilience devront donc être déployés. Le gouvernement éthiopien s'efforce de reconnaître les changements climatiques comme un risque dans les politiques sectorielles en matière d'agriculture, de santé et d'énergie. La plupart des programmes nationaux et internationaux sont axés sur le secteur agricole, qui comprend le pastoralisme, ainsi que sur la gestion des risques de catastrophe et sur le renforcement des capacités des responsables gouvernementaux et de la société civile. Le plan de croissance et de transformation du pays, ainsi que son programme d'adaptation aux changements climatiques et sa stratégie d'économie verte et résiliente à l'égard du climat sont des feuilles de route nationales essentielles pour orienter ces efforts. Cependant, il existe des lacunes en matière de mesures d'adaptation aux vulnérabilités dans des secteurs précis, comme la santé, le transport et l'énergie. Ce rapport fournit un aperçu des mesures d'adaptation en Éthiopie et fait partie d'une série d'examen des pays préparés dans le cadre de l'Initiative de recherche concertée sur l'adaptation en Afrique et en Asie.

Acronyms

ACCRA	Africa Climate Change Resilience Alliance
BRACED	Building Resilience and Adaptation to Climate Extremes and Disasters
CARIAA	Collaborative Adaptation Research Initiative in Africa and Asia
CDKN	Climate & Development Knowledge Network
CIA	Central Intelligence Agency
CRGE	Climate Resilient Green Economy
DFATD	Department of Foreign Affairs, Trade and Development [Canada]
DFID	Department for International Development [United Kingdom]
ENSO	El Niño Southern Oscillation
EPA	Environmental Protection Authority
EPACC	Ethiopia's Programme of Adaptation on Climate Change
FDRE	Federal Democratic Republic of Ethiopia
GDP	Gross Domestic Product
GIZ	Deutsche Gesellschaft für Internationale Zusammenarbeit
GTP	Growth and Transformation Plan
HSDP-IV	Health Sector Development Programme IV
IDRC	International Development Research Centre
IPCC	Intergovernmental Panel on Climate Change
IPMM	International Partnership on Mitigation and Monitoring, Reporting, and Verification (MRV)
ITCZ	Inter-Tropical Convergence Zone
MDG	Millennium Development Goal
MoA	Ministry of Agriculture
MoFED	Ministry of Finance and Economic Development
MoH	Ministry of Health

MoWE	Ministry of Water and Energy
MoWR	Ministry of Water Resources
NAPA	National Adaptation Programme of Action
NORAD	Norwegian Agency for Development Cooperation
NORHED	Norwegian Programme for Capacity Development in Higher Education and Research for Development
NPC	National Planning Commission
OECD	Organisation for Economic Co-operation and Development
ORDA	Organization for Rehabilitation and Development
PIF	Ethiopia's Agricultural Sector Policy and Investment Framework
SDC	Swiss Agency for Development and Cooperation
SNNPR	Southern Nations, Nationalities, and Peoples' Region
UKAID	United Kingdom Agency for International Development
UNDP	United Nations Development Programme
UNEP	United Nations Environment Programme
UNFCCC	United Nations Framework Convention on Climate Change
USAID	United States Agency for International Development

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Synopsis

Climate risks	<ul style="list-style-type: none"> • Soil degradation and erosion • Increasing temperatures 	<ul style="list-style-type: none"> • Increasing rainfall variability • Increased intensity of drought 	Key sources of vulnerability	<ul style="list-style-type: none"> • Reliance on crop production and pastoralism for livelihoods • High food insecurity • Challenges in sustainable management of land and water resources
Vulnerable sectors	Potential impacts on vulnerable sector	Priority adaptation measures in each sector		Projects in sector ¹
Agriculture	<ul style="list-style-type: none"> • Increased incidence of fires, droughts, and floods • Decreased water availability • Loss of crop production • Increased environmental degradation • Increased soil erosion • Changes in agricultural calendar • Increased incidence of pests and diseases 	<ul style="list-style-type: none"> • Reduce impacts of severe drought by cloud seeding to induce rain • Store food and animal feed in good years for use in bad years • Identify and prevent worsening of existing and emergence of new animal diseases • Identify and prevent worsening of existing and emergence of new crop and wildland plant diseases and pests • Counter the agricultural productivity reduction that emanates from climate change through effective research and development 		60%
Water	<ul style="list-style-type: none"> • Decreased water flow • Increased incidence of floods and drought 	<ul style="list-style-type: none"> • Manage water effectively to make it always available to humans, animals, and crops • Reduce the impacts of severe droughts by cloud seeding to induce rain 		13%
Energy	<ul style="list-style-type: none"> • Interruption and reduction in hydropower generation • Damages to energy infrastructure 	<ul style="list-style-type: none"> • Shift homesteads to using renewable energy resources • Shift from fossil fuels to renewable energy for running engines for transportation and other purposes 		0%
Road network	<ul style="list-style-type: none"> • Road washouts • Higher maintenance and recovery costs • Disruption in transportation and related services 			0%
Health	<ul style="list-style-type: none"> • Increased incidence of water-, air-, and vector-borne diseases 	<ul style="list-style-type: none"> • Identify and prevent worsening of existing and the emergence of new human diseases 		3%

¹ Percentage of total identified discrete adaptation projects and programs based on research undertaken as part of this review. Note that individual projects may address more than one sector.

<ul style="list-style-type: none"> • Increased expenditure in health care • Damages to health infrastructure • Interruption in health services 	<ul style="list-style-type: none"> • Create a nationwide health extension program on preventive health care at the household level • Identify high-risk <i>woredas</i> (districts) based on prevalence and recurrence of vector-borne diseases • Emphasise the needs of vulnerable groups (women, the marginalized, the disabled, the elderly, and children) • Increase the number of healthcare workers 	
Particularly vulnerable regions	Particularly vulnerable groups	Status of climate governance (policies, institutions)
<ul style="list-style-type: none"> • Arid and semi-arid areas 	<ul style="list-style-type: none"> • Individuals living in drought- and flood-prone areas • Poor women in rural areas • Pastoral communities • Smallholder rain-fed farmers 	<ul style="list-style-type: none"> • Climate change recognized in country's guiding development vision/plan • National-level coordinating entity for climate change established and active • Climate change policy and/or law in place • Climate change action plan published • Adaptation plan published • Climate Change Fund operational • Climate change units established in key ministries • Climate change integrated into national sectoral policies

Introduction

Ethiopia is a landlocked East African country that shares 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). The country has achieved significant economic growth over the past decade, resulting in its becoming one of the top-performing countries on the continent in terms of economic development. Despite this progress, rates of multi-dimensional poverty remain high, and an estimated 7 million Ethiopians are chronically food insecure (Zerihun, Kibret, & di Falco, 2014), predominantly in pastoral and farming communities in drought-prone areas (FDRE, 2013a).

The country seeks to achieve middle-income-country status by 2025 but needs to overcome various hurdles to do so, including the country's high vulnerability to climate change. Ethiopia's climate is highly variable, both spatially and temporally, and projections suggest that this variability will continue alongside rising temperatures. This has significant implications for efforts to reduce poverty and food insecurity, particularly for women, people living in drought- and flood-prone areas, and those who are dependent on crop production and pastoralism for their livelihoods. To address these challenges, and to achieve economic growth and prosperity, the country will need to reduce vulnerability in key sectors such as agriculture, water, and health, while also improving the adaptive capacity of poor individuals and communities. Through the introduction of its Climate Resilient Green Economy (CRGE) Strategy and efforts to integrate climate change into the national development strategy, Ethiopia has demonstrated strong political will to address climate change and its impacts through adaptation and mitigation measures.

This paper provides a snapshot of current and planned efforts in Ethiopia to advance action at the local, subnational, and national levels to adapt to the impacts of climate change. Drawing upon available literature, it has been prepared to support the contribution of the Collaborative Adaptation Research Initiative in Africa and Asia (CARIAA) to adaptation policy and practice. CARIAA is jointly funded by the United Kingdom's Department for International Development (DFID) and the International Development Research Centre (IDRC), with the aim of building the resilience of vulnerable peoples and their livelihoods in three "hot spots" of climate change vulnerability in Africa and Asia: semi-arid areas, deltas in Africa and South Asia, and glacier- and snow-fed river basins in the Himalayas. To achieve this goal CARIAA is supporting four consortia to conduct high-calibre research and policy engagement activities that will inform national and subnational planning processes in 17 countries.

This report is one in a series of country reviews prepared to provide CARIAA with a picture of the policies, programs, and projects designed and implemented specifically to address the current and projected impacts of climate change in its countries of engagement. It begins by providing an overview of the current and projected climate risk context in Ethiopia, followed by a discussion of the factors that contribute to its vulnerability to climate change

and of its most vulnerable sectors, regions, and groups. A review of the critical policies and plans shaping Ethiopia’s efforts to address climate change adaptation at the national and subnational levels is then provided. To assess the extent to which efforts are presently underway to address the country’s critical adaptation priorities, section 5 paints a general picture of the scale, type, and focus of current adaptation-focused programs and projects in Ethiopia, as well as the level of climate finance flowing into the country to support this work. A profile of in-country efforts to advance adaptation learning and knowledge sharing is then provided in section 6 through the identification of networks and communities of practice active in this field. The paper concludes with an assessment of the general status of adaptation action at the national and subnational levels.



Figure 1 – Map of Ethiopia

Source: University of Texas Libraries, University of Texas at Austin, n.d.

1. Current climate and projected changes

This section provides an overview of the climate risk context in Ethiopia, beginning with a general description of the country’s current climate and eco-climatic zones. This description is followed by a discussion of observed trends and projected changes to its climate over the remainder of this century.

1.1 Current climate

Ethiopia's climate is strongly influenced by its topography. It is a mountainous country covering over 1,104,300 square kilometres (CIA, 2015), with 45% of its land mass made up of high plateaus with mountain ranges divided by the East African Rift Valley. The majority of the population is concentrated in highland regions with elevations greater than 1,500 meters above sea level. The lowlands are more sparsely populated, mainly with nomadic and semi-nomadic pastoralist communities (World Bank, 2010a). Ethiopia's drylands are located in the south, east, and north of the country, with arid and semi-arid regions covering 63% of the territory (Few et al., 2015). Ethiopia has eight main climatic zones at different altitudes, ranging from warm and semi-arid to cold and moist, as shown in Table 1. Mean annual temperatures are around 15°C to 20°C in the highlands, while the lowlands experience average temperatures of 25°C to 30°C (World Bank, 2010a).

Table 1 – Ethiopia's climatic zones			
Zone	Altitude (m)	Mean rainfall (mm)	Temperature (°C)
<i>Bereha</i> (dry-hot)	500–1,500	<900	>22
<i>Weinadega</i> (dry-warm)	1,500–2,500	<900	18–20
<i>Erteb Kola</i> (submoist-warm)	500–1,500	900–1,000	18–24
<i>Weinadega</i> (submoist-cool)	1,500–2,500	900–1,000	18–20
<i>Erteb Weinadega</i> (moist-cool)	1,500–2,500	>1,000	18–20
<i>Dega</i> (cold)	2,500–3,500	900–1,000	14–18
<i>Erteb dega</i> (moist-cold)	2,500–3,500	>1,000	10–14
<i>Wurch</i> (very cold or alpine)	>3,500	>1,000	<10

Source: Mengistu, n.d.

The Inter-Tropical Convergence Zone (ITCZ) influences Ethiopia's seasonal patterns as it oscillates from northern Ethiopia during the months of July and August to its position south of Kenya in January and February (McSweeney et al., 2010a). Between mid-June and mid-September, as the ITCZ is at its most northern point, most of Ethiopia experiences the main rainy season, *Kiremt*, receiving up to 350 mm of rainfall per month (Few et al., 2015; McSweeney et al., 2010a). In parts of northern and central Ethiopia, a second wet season, known as *Belg*, occurs between February and May. Rainfall during the *Belg* season is lower and more sporadic than during the *Kiremt* rains. In the southern parts of Ethiopia, the rains are influenced by the southward migration of the ITCZ (McSweeney et al., 2010a). In these regions, the *Belg* is the main rainy season, occurring between March and May and yielding 100 mm to 200 mm of rainfall per month. A second, less significant wet season, known as

the *Bega*, occurs between October and December, with an average of 100 mm of rainfall per month. Ethiopia's easternmost corner receives very little rain (Few et al., 2015; McSweeney et al., 2010a).

The sea-surface temperatures of the Indian Ocean are another element influencing East Africa's climate (Daron, 2014), causing a reduction in onshore moisture travel while increasing continental atmospheric stability (Funk et al., 2008). This affects the start and length of rainy seasons in Ethiopia, and varies considerably on an interannual basis, causing frequent drought (McSweeney et al., 2010a). Ethiopia's climate is also influenced by the El Niño Southern Oscillation (ENSO). However, to date, the factors that link ENSO and East Africa's climate are yet to be fully understood (Daron, 2014). The warm El Niño phase is associated with a reduction in rainfall during *Kiremt* in northern and central Ethiopia, which historically has been associated with severe drought and famine. On the other hand, enhanced rainfall typically occurs in El Niño years in the earlier February to April rainy season, mostly affecting southern Ethiopia (McSweeney et al., 2010a). The La Niña phase, which occurs when the ocean surface is cooler than average, is associated with drier than normal conditions (Daron, 2014). The various factors influencing Ethiopia's climate result in considerable seasonal and annual variability. This creates high uncertainty in Ethiopia's rainfall patterns and higher risk of extreme climate events such as droughts and floods (Conway & Schipper, 2011).

1.2 Observed climate trends

A temperature increase of 1.3°C between 1960 and 2006 has been observed in Ethiopia, representing an average change of 0.28°C per decade. In the same period of observation, the period of July to September had the fastest warming rate of 0.32°C per decade. The upward temperature trend has been evident as well in an estimated 20% increase in the average number of hot days (73 days), with June to August having the highest increase, at 32% (9.9 days per month). On the other hand, the number of cold days has decreased in all seasons, with the exception of December to February, while the frequency of cold nights has decreased more rapidly and significantly in all seasons (McSweeney et al., 2010a).

In terms of precipitation, some studies note no statistically significant trend in mean rainfall in any season due to the large interannual and interdecadal variability in Ethiopia's rainfall (Conway & Schipper, 2011; McSweeney et al., 2010a). Daron (2014), on the other hand, notes that between 1963 and 2012 two areas in central Ethiopia received much higher than average rainfall in the 1970s, but lower than average in the 1980s and 1990s. There is no significant evidence of consistent changes in the frequency or intensity of extreme climate events. However, in recent years, an increase in floods has been reported, which have caused significant socioeconomic disruptions (Conway & Schipper, 2011).

1.3 Climate projections

As summarized in Table 2, climate model projections indicate continuation of the observed trend of temperature rise in the coming decades. Some studies project an increase in all seasons of 1.4°C to 2.9°C by the 2050s² (Conway & Schipper, 2011, as cited in FDRE, n.d.-a). Other studies project an increase in temperatures across Eastern Africa, with Ethiopia potentially experiencing temperature increases that range from less than 2.5°C to greater than 3°C by the 2040s, with greater rates of warming likely to take place in western and northern Ethiopia (Daron, 2014).³ A rise in temperatures can lead to an increase in the number of heat waves and higher evapotranspiration rates (FDRE, n.d.-a).

Rainfall patterns are harder to model due to challenges in creating realistic simulations that capture the complex dynamics of the ENSO, sea surface temperatures, moisture sources, and land cover change (Conway & Schipper, 2011). Coupled with these issues is a lack of reliable historical data, yielding higher uncertainties when modelling the future distribution of rainfall timing and intensity. Of the modelling work undertaken, some projections indicate an increase in precipitation during the *Bega* rains in the months of October to December (FDRE, n.d.-a; McSweeney et al., 2010a), particularly impacting southern Ethiopia, and with proportional increases in the driest, easternmost parts of the country (McSweeney et al., 2010a). During the months of April to June and July to September, projections are mixed, with increases in some regions and decreases in others, but there is an overall trend toward a slight increase in the southwest and a decrease in the northeast (McSweeney et al., 2010a). Increased precipitation may lead to an increase in extreme climatic events related to flooding, particularly during the July to September and October to December periods (McSweeney et al., 2010a). However, these are harder to project as they are closely tied to variations in the ENSO and sea surface temperatures in the Indian Ocean (FDRE, n.d.-a).

Analysis by Daron (2014) using three models found no consistent indication of the potential changes in future rainfall patterns in Ethiopia. While one model suggests that the Ethiopian highlands will become progressively drier in the decades ahead, another projects that this region could become wetter. Overall this research suggests that current patterns of decadal and multi-decadal variability will remain a primary driver of rainfall variability (Daron, 2014).⁴

² Conway & Schipper (2011) used 18 global climate models from the Programme for Climate Model Diagnosis and Intercomparison with two Intergovernmental Panel on Climate Change emission scenarios, A2 and B1. Base years used were 1961–2000 and 99 years from A2 and B1 runs (2001–99).

³ As part of the Coordinated Regional Downscaling Experiment project, Daron (2014) used a combination of two general circulations models (HadGEM2 and ICHEC) and two regional climate models (KNMI and CCLM4) to provide 50 km resolution projections up to the year 2100 compared to a baseline of mean temperatures between 2050 and 2000. Using the 8.5 Representative Concentration Pathway scenario, projections were based on three modeling combinations: HadGem2-CCLM4, ICHEC-CCLM4, and ICHEC-KNMI. The warmest projections were generated by the HadGem2-CCLM4 model runs.

⁴ Precipitation projections were based on the use of two general climate models (HadGEM2 and ICHEC) and two regional climate models (KNMI and CCLM4) in combination: HadGem2-CCLM4, ICHEC-CCLM4, and ICHEC-KNMI. The analysis used the Representative Concentration Pathway 8.5 scenario compared to the 1950 to 2000 mean annual rainfall totals. The ICHEC-CCLM4 model generated the driest projections, while the wettest conditions were generated by the ICHEC-KNMI model (Daron, 2014).

Table 2 – Observed and projected climate change in Ethiopia⁵			
	Temperatures	Rainfall	Extreme events
Historical Trend	Mean temperature increase of 1.3°C from 1960 to 2006 More hot days and nights; fewer cold days and nights	Highly variable from year to year, season to season, and decade to decade No significant trend	Regular severe flood and drought events No evidence of change in frequency or intensity of extremes
2020s	+1.2°C (0.7°C to 2.3°C)	+0.4%	Greater increase in rainfall in the south and east
2050s	+ 2.2°C (1.4°C to 2.9°C)	+1.1%	Future El Niño behaviour brings large uncertainties
2090s	+3.3°C (1.5°C to 5.1°C)	Wetter conditions	Heat waves and higher evapotranspiration

Source: FDRE, n.d-a, p. 3.

2. Vulnerability to climate change

Ethiopia's vulnerability to climate change is shaped not only by historical and future climate trends, but also by its capacity to adapt to these changes. Ethiopia's adaptive capacity depends strongly on economic and social dimensions that enable or constrain responses to current and future climate risks. This section provides an overview of the factors contributing to the country's vulnerability, including an analysis of vulnerable sectors and population groups.

2.1 Current drivers of vulnerability

Analysis of Ethiopia's development context reveals a number of issues that influence the country's vulnerability to climate change. High numbers of people still live in poverty and food insecurity, both chronic and acute. The population is concentrated in rural areas, and livelihoods are highly dependent on rain-fed agriculture, including both crop and livestock production. Capacity to provide basic services, including health care and energy, remains low. These underlying causes of vulnerability must be addressed to facilitate effective adaptation into the future.

⁵ Information synthesizes analysis conducted by Conroy and Schipper (2010) and McSweeney et al. (2010a) using multiple General Circulation Models.

In the last decade, Ethiopia has enjoyed a healthy economic growth rate, averaging 10.6% per year between 2006 and 2013 — making it among the top-performing economies in Sub-Saharan Africa. Compared to its neighbouring countries, Ethiopia’s growth rate slightly surpasses that of Kenya and Tanzania, both in the recent past and in projections for the next three years (World Bank, 2015a; 2015b). In 2013 its national GDP was US\$47.53 billion; however, its GDP per capita was US\$505, almost four times lower than the average in (developing) Sub-Saharan Africa (World Bank, 2015b). While the country is on track to meet the Millennium Development Goal (MDG) of reducing poverty and hunger by half between 1990 and 2015, there remain over 22 million people who were living under the poverty line in 2013 to 2014, and the severity of poverty increased between 2005 and 2011 (FDRE, 2015b). Table 3 provides a snapshot of Ethiopia’s indicators of development progress.

Table 3 – Key indicators of development progress for Ethiopia				
Category	Indicator	Year	Value	Source
Human development	Human Development Index (score ^d /rank ^d out of 187 countries)	2013	0.435/173	UNDP (2014b)
	Population in multi-dimensional poverty (%)	2013	88.2%	
	Under-five mortality rate (per 1,000 live births)	2013	68	
	Adult literacy rate (15 years of age and above)	2013	39.0 ^c	
	Improved water source, rural (% of population with access)	2012	42%	World Bank (2015b)
	Improved sanitation facilities (% of population with access)	2012	24%	
	Access to electricity (% of population)	2010	23.0%	
Gender	Gender Inequality Index (value ^e /rank ^d out of 187 countries)	2013	0.547/73	UNDP (2014b)
Demographics	Total population (in millions)	2013	94.100 ^a	UNDP (2014b)
	Average annual population growth rate	2010	2.7%	
	Population, urban (% of population)	2011	17.5% ^b	
Economic development	GDP (in current USD, millions)	2013	47,525.18	World Bank (2015b)
	GDP growth (annual %) (average of period of 2010 to 2013)		10.7%	
	Agricultural land (% of land area)	2012	36.5%	

Governance	Corruption Perceptions Index (score ^f)	2014	33	Transparency International (2014)
	Corruption Perceptions Index (rank ^d out of 174 countries)	2014	110	
	Fragile States Index (score out of 120 ^g)	2014	97.9	Fund for Peace (2014)
	Fragile States Index (status)	2014	Alert	
	Expenditure on education, public (% of GDP)	2012	4.7% ^c	UNDP (2014b)
	Expenditure on health (% of GDP)	2011	4.7%	
Environment	Population living on degraded land (%)	2010	72.3%	UNDP (2014b)
	Change in forest area, 1990/2011	2013	-20.0%	
<p>^a Projections based on medium-fertility variant</p> <p>^b Because data is based on national definitions of what constitutes a city or metropolitan area, cross-country comparison should be made with caution</p> <p>^c Data refers to the most recent year available during the period specified</p> <p>^d Where 1 or first is best</p> <p>^e Where 0 is best</p> <p>^f Where 0 is highly corrupt and 100 is very clean</p> <p>^g Where 120 is very high alert and 0 is very sustainable</p>				

Ethiopia is home to over 96.6 million people (CIA, 2015), making it the second most populous country in Sub-Saharan Africa (World Bank, 2010a). The country's population growth rate is estimated at 2.7% (2010 figures), with an expected population of just under 140 million by 2030. Currently, 64% of the population is under 25 years of age (CIA, 2015), and the national median age is 18.6 (UNDP, 2014a). With a young and growing population, Ethiopia faces an increasing demand for resources to address the needs of the many (Few et al., 2015). With only 17.5% of the population living in urban centres (2011 figures) (UNDP, 2014a), the majority of people reside in rural areas and have a high dependence on natural capital resources such as land and water. Rural communities also face barriers in access to education; adequate living standards; and other resources, such as health, markets, and financial credit.

Agriculture, including crop and livestock production (MoARD, 2010), is the main economic sector in the country, contributing 47% of GDP, followed by services and industry, comprising 42.2% and 10.8% respectively (CIA, 2015). Key crops affected include barley, wheat, maize, and sorghum (World Bank, 2010a). Although agriculture contributes just under half of the country's GDP, it employs 85% of the workforce (CIA, 2015), with 95% of the agricultural GDP composed of small-scale farming (MoARD, 2010). Also, Ethiopia has the largest livestock population in Africa (Few et al., 2015). The pastoral sector supplies 40 to 50% of the cattle and goats for the domestic market and is also the prominent supplier for export markets (Aklilu & Catley, 2014).

As indicated earlier, the vast majority of Ethiopia's population is dependent on crop agriculture and livestock for their livelihoods. Crop production is mostly practised in the middle hills and highlands, which hold 95% of total crop area and produce more than 90% of agricultural output. Crops are primarily rain-fed and use traditional technologies, such as ox-drawn wooden ploughs and minimal tillage practices (World Bank, 2010a). Due to its high population growth, Ethiopia has witnessed a decline in per capita land holdings. Lower slopes are becoming areas of conflict for access to natural resources (Yirgu et al., 2013).

Although Ethiopia's assessment on the Human Development Index has increased over the past few years, from 0.338 in 2005 to 0.435 in 2013, it is still among the lowest ranked globally, at 173 out of 185 countries in 2013 (UNDP, 2014b). In 2011, an estimated 88.2% of the population lived in multi-dimensional poverty, which indicates that the vast majority of the population experiences multiple deprivations at the household and individual levels in health, education, and standard of living. Of those living in multi-dimensional poverty, 67% are classified as living in severe poverty (UNDP, 2014a), and an estimated 10% of the population faces chronic food insecurity (FDRE, 2013a). Food insecurity is prevalent among pastoralists and smallholder farmers, and is particularly common in drought-prone areas, where an estimated 7 million people are chronically food insecure (Zerihun et al., 2014).

Ethiopia's health sector faces many challenges. In 2012, an estimated 68 out of 1,000 children died prior to reaching their fifth birthday (WHO, 2015), and 44.2% of children under the age of five were malnourished (UNDP, 2015b). Adult mortality also runs high among both males and females, with 306 and 265 deaths per 1,000 people respectively (2011 figures) (UNDP, 2014b). In 2013, the average life expectancy was 63.6 years (UNDP, 2014b). Factors influencing these maternal and perinatal mortality rates include a lack of adequate access to health facilities, equipment, medications, and healthcare professionals (Berhan & Berhan, 2014). For example, for every 10,000 people there are only 0.3 physicians, leaving many with limited or no access to certified healthcare professionals. As a further indicator of the challenges facing this sector, only 4.7% of the country's GDP was allocated to health care in 2011 (UNDP, 2014b).

The vast majority of Ethiopia's national energy needs are met through fuel wood, crop, and animal waste, along with human and animal power. Nearly 60 million tonnes of biomass are used for energy purposes each year, with firewood supplying 81% of household biomass use (Geissler et al., 2013). Only 5% of the national energy supply comes from electricity, of which 95% is generated through hydropower (FDRE, n.d.-a). Therefore, both traditional and modern energy generation in the country is highly dependent on the natural environment and climatic factors. To meet growing demand, the Government of Ethiopia has plans to expand dam construction and increase generation capacity from approximately 2,000 megawatts to 3,270 megawatts — which would provide energy to 50% of the households in the country (World Bank, 2010a). To support the envisioned increase in hydropower, a total of 19 new dams are planned from 2011 to 2046 (World Bank, 2010a).

According to the University of Notre Dame Global Adaptation Index (ND-GAIN), Ethiopia is the 34th most vulnerable country, ranking 148 out of 178 countries included in the index. Its vulnerability score is 0.514, lower than its neighbours Kenya and Uganda, but higher than Tanzania (see Table 4). According to the ND-GAIN analysis, the key factors contributing to Ethiopia's vulnerability include its low dam capacity, low access to reliable drinking water, and limitations in availability of medical staff. With respect to its readiness, Ethiopia is ranked the 150th most ready country, suggesting that it has low capacity to cope with the impacts of climate change, particularly in terms of its social readiness. Factors contributing to its low readiness scores include its low tertiary education levels, low availability and use of information and communication technology infrastructure (e.g., mobile phones and Internet), and low innovation within the country (measured by patent applications). Positive factors include the fact that its economic and governance levels have been stabilizing over time (ND-GAIN, 2015).

Table 4 – Comparison of Global Adaptation Index scores for Ethiopia and neighbouring countries

Country	Vulnerability*		Readiness**	
	World rank	Score	World rank	Score
Ethiopia	146	0.514	150	0.328
Kenya	148	0.516	162	0.311
Tanzania	141	0.493	125	0.370
Uganda	166	0.554	147	0.335

* A lower score indicates lower vulnerability. The vulnerability score is determined based on indicators of exposure, sensitivity, and adaptive capacity, taking into consideration indicators related to six life-supporting sectors: food, water, health, ecosystem services, human habitat, and infrastructure.

** A higher score indicates a higher degree of preparedness. The readiness score takes into account measures of economic readiness, governance readiness, and social readiness to pursue adaptation actions.

Source: ND-GAIN, 2015.

2.2 Vulnerability of key sectors

The Government of Ethiopia has identified agriculture, water, roads, energy, and health as the sectors in the country that are most vulnerable to climate change, the risks of which are summarized in Table 5. The agricultural sector is already particularly vulnerable to climate variability. Most of the country's productive areas face water shortages and waterlogging due to their dependency on rain-fed crop production (World Bank, 2010a). Increased frequency and intensity in rainfall may lead to higher rates of soil erosion and a higher incidence of crop damage (FDRE, n.d.-a; World Bank, 2010a). Soil degradation is of great concern for Ethiopia based on its already high levels of erosion due to existing socioeconomic pressures and land degradation (FDRE, n.d.-a). In Ethiopia, 79% of the land has a slope greater than 16%, while 25% of the land has a slope greater than 30% (CDKN,

2014; FDRE, n.d.-a, 2013a). In the lowlands, soil and grassland degradation, as well as recurrent droughts, erratic rainfall, floods, and invasive vegetation that destroy rangelands, already threaten the sustainability of pastoral communities (MoARD, 2010; World Bank, 2010b), and these challenges may increase with projected climate change and variability. Changes in the seasonality, timing, and distribution of rainfall, along with higher evapotranspiration rates and potentially more frequent extreme weather events (e.g., floods and drought), may increase the frequency and alter the distribution of pests and diseases, as well as affect the viability of production systems, crop area, and cropping patterns (FDRE, n.d.-a, 2013a).

Livestock yields, including annual growth, milk and wool production, and reproduction, are directly correlated with temperature (FDRE, n.d.-a, 2013a). Future production is also expected to be indirectly impacted by the availability and quality of pastures, forage, and grass, as well as negatively impacted by a potential increase in the incidence of parasites and diseases (FDRE, n.d.-a). Production is already a problem in the eastern arid regions due to the very limited rainfall received, putting the livestock sector at risk (World Bank, 2010a), as well as the communities' food security and livelihoods. Apart from climate change, public interventions that limit mobility for pastoralists may increase their vulnerability to climate change, affecting one of their key coping strategies (World Bank, 2010b).

Energy use by Ethiopians may be affected by climate change, in terms of either use of biomass by rural communities or use of hydropower in urban centres by industry and service sectors. Biomass as a source of energy increases land degradation, which in turn increases vulnerability to soil erosion through heavy rainfall; the rate of soil erosion may be exacerbated with increased frequency of extreme weather events. As hydropower generation is vulnerable to fluctuations in rainfall, temperatures, and evaporation, climate change could positively or negatively impact hydropower production, depending on whether rainfall levels increased or decreased. The country's industrial and service sectors dependent on this energy source could experience negative impacts on their outputs if there is a future increase in interruptions in power generation and use (FDRE, n.d.-a). Reduction in electricity generation can have negative impacts on the economy as whole, affecting GDP generation and interrupting basic services, such as schools and hospitals (FDRE, n.d.-a). This risk could be more significant by the 2040s should there be more dams and power capacity installed that could be at a gain or a loss due to climate change, as well as competing demands for water use (World Bank, 2010a).

Only 13.7% of Ethiopia's road system is paved (CIA, 2015). Both the paved and the unpaved roads are vulnerable to an increase in rainfall and temperatures, resulting in washed-out roads or damaged road surfaces (FDRE, n.d.-a). Recovery and maintenance costs may escalate with climate change, with estimates ranging from US\$10 million to US\$21 million depending on the climate model used (FDRE, n.d.-a). In addition to the direct economic costs related to road damage, indirect costs are also incurred through disruption in the

transportation system and its related sectors, such as agriculture and industry, ultimately affecting communities that become disconnected and face food insecurity and the disruption of basic services.

Ethiopia's health sector already faces many challenges, and climate change may further increase health-related risk among Ethiopians. For example, increased temperatures may lead to a higher incidence of heat waves, resulting in higher mortality and morbidity rates (FDRE, 2013a). Vector-borne diseases such as malaria and bilharzia may be on the rise (FDRE, 2013a), where higher temperatures may create more favourable conditions for higher malaria rates in the highlands (Siraj et al., 2014), coupled with a greater incidence in flood events. A rise in extreme events may lead to higher crop losses and road blockages, affecting food availability for communities (FDRE, 2013a). It is estimated that by 2030, floods may be among the greatest climate risk in Ethiopia, followed by a greater incidence of malaria cases (FDRE, 2013a). Already an estimated 68% of Ethiopians reside in areas that are at risk for malaria epidemics. In 2003, a malaria outbreak resulted in 2 million cases and 3,000 deaths (FDRE, 2013a).

Sector	Likely impacts of climate change
Agriculture	<ul style="list-style-type: none"> • Increased incidence of fires, droughts, and floods • Decreased water availability for crops and livestock • Loss of crop and livestock production • Increased soil erosion • Changes in the agricultural calendar • Increased incidence of pests and diseases for crops and livestock • Degradation in rangelands due to soil erosion, droughts, and floods
Water	<ul style="list-style-type: none"> • Decrease in water flow • Increased incidence of flooding and drought
Roads	<ul style="list-style-type: none"> • Washing-out of roads • Higher maintenance and recovery costs • Disruption of transportation services
Energy	<ul style="list-style-type: none"> • Interruption and reduction in hydropower generation • Damages to energy infrastructure • Loss in biomass due to increased soil erosion and extreme weather events
Health	<ul style="list-style-type: none"> • Increased incidence of water-, air-, and vector-borne diseases • Increased healthcare expenditures • Damage to healthcare infrastructure • Interruption in health services

2.3 Vulnerable regions and groups

Of particular concern with respect to climate change impacts in Ethiopia are the implications for communities that depend on crop agriculture, agro-pastoralism, and pastoralism for their livelihoods (Adenew, 2010; IFAD, 2014; Naess et al., 2010). Farming communities face increasing risk of crop losses due to higher variability in rainfall, changing seasonal patterns, and more frequent extremes. Losses 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 degradation in rangelands, invasive species that affect grazing lands, reduction in water availability for human and animal consumption, and livestock diseases (World Bank, 2010b). It is estimated that there are 10 million pastoralists in Ethiopia, the largest pastoral population in Africa (Few et al., 2015). As noted above, one of the acute challenges the country faces is food insecurity, which is associated with climate variability and environmental degradation (Few et al., 2015).

From a regional point of view, vulnerability to drought is highest in the pastoral areas in the lowlands and in the densely populated, food-insecure areas in the highlands (MoARD, 2010). Within the arid and semi-arid areas of the country, the regions of Somali, Oromia, and Tigray are among the most vulnerable to climate change, given low levels of service provision and infrastructure development, and the frequency of droughts and floods (Deressa et al., 2008). In the social structure within the pastoral communities, women take care of the productive and reproductive work, such as cooking, cleaning, feeding family members, caring for cattle, and farming, yet have lower decision-making power than men (MoA, 2014). The situation is similar in farming households. This creates barriers in access to resources and information, and reduces adaptation potential (Berga, Bryan, & di Falco, 2014). Children, particularly girls; the elderly; and disabled people are among the most vulnerable to climate risks due to limitations in mobility, limitations in access to economic opportunities and social services, and dependency on close relatives, among other factors (MoA, 2014).

Overall, these communities have coped reasonably well through the years with the shocks and stresses imposed on them by climate variability. Some adaptive measures include migrating to find work, storing seeds and cereals, cultivating alternative crops, controlling grazing, and regulating the livestock stocking rate (Naess et al., 2010; World Bank, 2010b). The ability of vulnerable individuals to achieve food security and escape poverty despite climate change will rely on their ability to overcome issues that limit their adaptive capacity, including conflicts; lack of access to markets; volatile food prices; and access to other resources, such as technology, new knowledge, and financial resources (Naess et al., 2010).

3. Adaptation planning context

This section provides an overview of the policies, plans, and strategies that have the potential to advance adaptation efforts in Ethiopia. This includes national development policies and plans that establish the broad vision and goals of the country, as well as climate change plans and strategies, including those specifically addressing adaptation. Also discussed is the extent to which current strategies and plans relevant to particularly vulnerable sectors address climate change and progress by subnational governments to prepare for climate change. A general assessment of Ethiopia's progress on adaptation planning is provided in Table 6.

Table 6 – National adaptation planning context: Summary of progress as of May 2015	
Indicator	Progress
Climate change recognized in country's guiding development vision/plan	Yes, in both of the main national strategies, the <i>Growth and Transformation Plan</i> and the <i>CRGE Strategy</i>
National-level coordinating entity for climate change established and active	Yes, the Environmental Protection Authority
Climate change policy and/or law in place	Yes, the <i>National Climate Change Policy</i> was released in 2011
Climate change strategy published	Yes, the <i>CRGE Strategy</i>
Climate change action plan published	Plan has not been published, but the <i>National Environmental Policy</i> of 1997 provides environmental markers for climate change action in the country
Adaptation plan published	Yes, <i>Ethiopia's Programme of Adaptation on Climate Change</i> of 2012, which replaced its 2007 <i>National Adaptation Programme of Action</i> ⁶
Climate change fund or adaptation fund operational	Yes, the CRGE Facility, established in 2012
Climate change units established in key ministries	Some, namely Ethiopia's Environmental Council, the CRGE ministerial steering committee, the CRGE technical committee, and the CRGE sub-technical committee
Climate change integrated into national sectoral policies	Some, such as policies focused on agriculture, energy, and disaster risk management

⁶ Reference to the EPACC is made in the CRGE document but a copy of this document could not be accessed.

3.1 National-level development policy context

Building from previous development policies and strategies, namely the *Sustainable Development and Poverty Reduction Program* (2002–05) and *Plan for Accelerated and Sustainable Development to End Poverty* (2005–10), in 2010 Ethiopia released its current five-year development plan, *Growth and Transformation Plan (GTP)*, for 2010–15 (MoFED, 2010). The plan anchors Ethiopia’s development on achieving all MDG targets for the country by 2015 and achieving a middle-income-country economic status by 2020–23 (MoFED, 2010; César & Ekbom, 2013). More explicitly, it seeks to maintain at least an average real GDP growth rate of 11%; expand and ensure quality education and health services, and achieve the MDGs for the social sector; create a stable democratic and development state to ensure sustainable nation building; and achieve all the objectives in a stable macroeconomic framework. To meet its vision, the *GTP* has five strategic pillars: sustaining rapid and equitable economic growth, maintaining agriculture as an important source of economic growth, creating enabling conditions for industry to play a role in the economy, expanding and increasing quality in infrastructure development; building capacity and deepening good governance; and promoting gender and youth empowerment and equity (MoFED, 2010, p. 22).

Climate change is acknowledged as a threat in the *GTP*. The document indicates that Ethiopia’s economy already suffers annual losses between 2 and 6% due to climate change impacts on total production (MoFED, 2010). Both climate adaptation and mitigation measures are identified as important elements toward a green development pathway for the country. Mainstreaming climate change adaptation is mentioned in the document, but a pathway on how it will be implemented is not provided. Rather, it makes reference to the development of a plan of “action, strategies, laws, standards, and guidelines to implement measures that are designed to lessen the effect of future climate change impacts” (MoFED, 2010, p. 121). It also notes that measures to support climate change action in the country will include capacity building for private and public stakeholders for fundraising, allocation of local and foreign technologies for climate change mitigation, increased awareness of and knowledge sharing on environmental management practices, and ratification of international environmental laws and protocols (MoFED, 2010). Though it identifies priorities, these are geared more toward environmental management and economic development, with no specific focus on adaptation, particularly for vulnerable communities. The budget for the implementation of the *GTP* is estimated at 123 million Br annually, mainly financed by tax and non-tax sources, private savings and investment, international financial assistance, and foreign direct investment.

A new five-year national development plan, *GTP II*, covering the period of 2015–16 to 2019–20, will be released in the coming months (“USAID to support,” 2015). A draft of this document identifies objectives that will further enable Ethiopia to achieve its goal of

becoming a lower-middle-income country by 2025. Among these objectives is building a climate resilient and green economy. The draft plan suggests that the Government of Ethiopia's climate adaptation priorities will focus on improving food security, improving the incomes of farmers and pastoralists, expanding renewable electricity production, and protecting and rehabilitating forests. The draft *GTP II* also identifies objectives related to improving productivity in the agricultural sector, addressing critical infrastructure gaps, strengthening public institutions and governance, and empowering women and youth (FDRE, 2015c).

3.2 National-level climate policy context

Parallel to the *GTP*, in 2010 Ethiopia released the *Environmental Management Programme of the Plan for Accelerated Sustainable Development to Eradicate Poverty: 2011–2015* (EPA, 2010). Among its goals was enhancement of national, subnational, and sectoral capacity to mainstream actions that will build a carbon neutral and climate resilient economy. To achieve this goal, the plan seeks harmonization of all national policies, strategies, laws, programs, and governmental documents, to the extent possible, with efforts to address climate change adaptation and mitigation (EPA, 2010). The environmental management plan also includes the integration of scientifically sound solutions for manufacturing industries and the infrastructure needed for poverty eradication to adapt to climate change impacts; the evaluation of climate change vulnerability in a number of freshwater resources and formulation of adaptation actions to reduce their sensitivity; and the development of measurable and verifiable targets identified by each regional and government level for the development of a climate resilient, carbon neutral economy during 2010–15 (EPA, 2010). The other two goals include the creation of carbon credits to diversify renewable energy generation and reforestation, and the enhancement of socioeconomic goods and services through enforcement of and compliance with environmental laws (EPA, 2010).

Both the *GTP* and the environmental management plan reference a climate resilient and green economy pathway for Ethiopia. The national *CRGE Strategy* was developed as a way to connect the goals and objectives of the *GTP*, to streamline development priorities with Ethiopia's risks and opportunities in a changing climate, and to harmonize its adaptation and mitigation efforts to address climate change (FDRE, n.d.-a). The strategy was released in 2011 (FDRE, 2011), and in 2012 the *CRGE vision* was published. Within the vision more than 60 initiatives have been identified as priorities across seven sectors (IPMM, n.d.). In both the vision and the strategy, the need to integrate and mainstream adaptation across Ethiopia's development agenda is recognized (FDRE, 2013a). The vision highlights that the "key route to climate resilience is increased income and more diverse livelihoods, better healthcare and education, better access to technology and agricultural inputs, and greater social equity, particularly for women and marginalized groups" (FDRE, n.d.-a, p. 11).

Therefore, under the *CRGE Strategy*, the main economic development and adaptation strategies come together. As described in the *CRGE vision*, achievement of the *GTP* is

“dependent on action to build resilience, whilst greater resilience will also be a product of the benefits brought by national economic and social development” (FDRE, n.d.-a, p. 11), highlighting the need for adaptation mainstreaming and greater climate resiliency at the national, regional, and local levels (FDRE, n.d.-a). The *CRGE Strategy* has identified four priority sectors as instrumental for reaching middle-income status by 2025, namely agriculture; forestry; power; and industry, transportation, and buildings. Sectoral plans for development and climate change adaptation and mitigation needs have also been developed. Under the *CRGE Strategy*, an energy and water sector resilience strategy has been developed (FDRE, 2015a), as well as an agricultural sector resilience strategy. The leading agency conducting the efforts of the *CRGE Strategy* is the Environmental Protection Authority (EPA), backed by the National Environment Policy Organs Establishment No. 295/2002 (FDRE, n.d.-a).

The *CRGE vision* references the development of *Ethiopia’s Programme of Adaptation on Climate Change (EPACC)*, identified as a grassroots initiative that focuses on identifying climate change adaptation needs and priorities (FDRE, n.d.-a). *EPACC* replaces the country’s National Adaptation Programme of Action (NAPA), which was first submitted to the United Nations Framework Convention on Climate Change (UNFCCC) in 2007 (César & Ekbom, 2013). *EPACC* marks a move away from meeting its adaptation needs and priorities on a project-based approach toward an adaptation mainstreaming framework at the government, sectoral, and local levels (FDRE, 2013a; César & Ekbom, 2013). Through *EPACC*, climate change adaptation is to be integrated into national, subnational, and sectoral plans (Solomon, 2014; MoFED, 2010, 2013a). Prime examples are the subnational adaptation programs in 8 of its 11 subnational governments and the elaboration of the *Health Adaptation Programme* (MoFED, 2010; FDRE, 2013a). *EPACC* recognizes the importance of the agricultural sector to Ethiopia’s economy, as well as the country’s infrastructure sensitivity to climate change, high community vulnerability, and low adaptive capacity (Solomon, 2014). *EPACC* outlines 29 adaptation objectives, listed in Table 7, which are included under the *CRGE*’s 60 objectives.

As the overarching structure, the *CRGE Strategy* has a number of climate change response pillars that shape its direction and implementation in Ethiopia. These include *EPACC*; emission abatement initiatives, such as Nationally Appropriate Mitigation Actions; the *CRGE Strategy*; the *National Environmental Policy*, and the Constitution (see Figure 2).

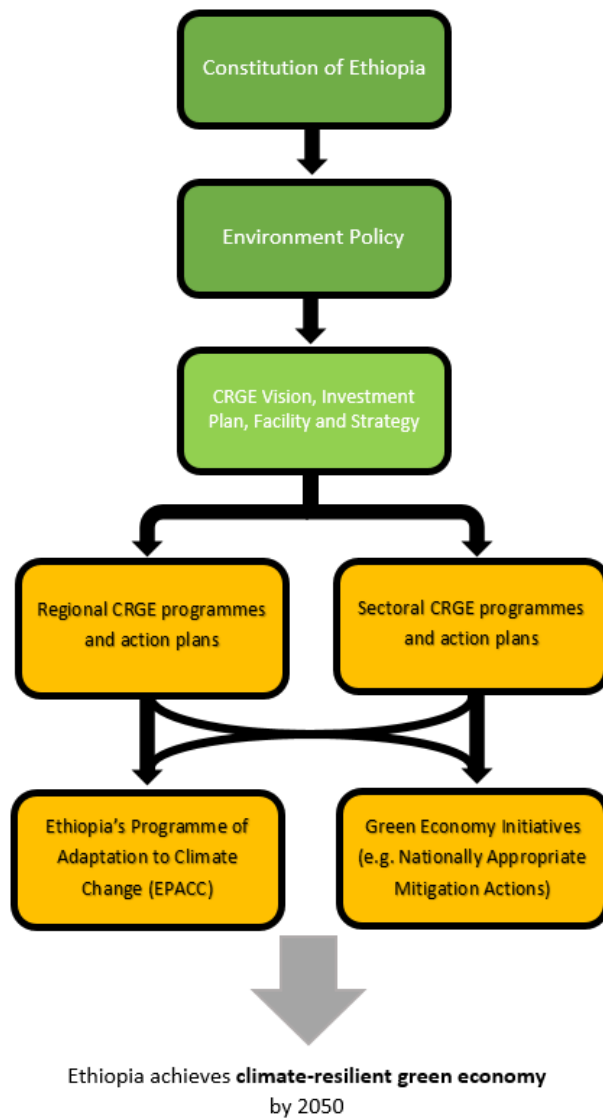


Figure 2 – Pillars of Ethiopia’s response to climate change

Source: FDRE, n.d.-a, p. 1.

Table 7 – Priority adaptation actions by sector identified in the GTP and EPACC	
Policy	Adaptation priorities
GTP	<p>Agriculture</p> <p>Improve adaptation to climate variability and ensure food security through the following:</p> <ul style="list-style-type: none"> • Intensify use of the country’s water and natural resources through prioritizing the expansion of small-scale irrigation schemes with attention to medium- to large-scale irrigation • Expand water shade management and carry out effective water and moisture-retaining works

	<ul style="list-style-type: none"> • Strengthen conservation and management of natural resources — primarily through improving farmer and government capacity
Agriculture	<ul style="list-style-type: none"> • Reduce impacts of severe drought by cloud seeding to induce rain • Store food and feed in good years for use in bad years • Identify and prevent worsening and emerging of animal diseases • Identify and prevent worsening and emerging of crop and wildland plant diseases and pests • Counter the agricultural productivity reduction that emanates from climate change through effective research and development
Health	<ul style="list-style-type: none"> • Identify and prevent worsening and emerging of human diseases
Water	<ul style="list-style-type: none"> • Manage water effectively to make it always available to humans, animals, and crops • Reduce the impacts of severe droughts by cloud seeding to induce rain
Natural resource management	<ul style="list-style-type: none"> • Prevent land degradation and thus reduce soil loss to its natural equilibrium rate, equivalent to the rate of soil formation from bedrock • Reduce biodiversity loss to achieve an equilibrium with the natural rate of diversification
Energy	<ul style="list-style-type: none"> • Shift homesteads to using renewable energy resources • Shift from fossil fuels to renewable energy for running engines for transportation and other purposes
Waste	<ul style="list-style-type: none"> • Prevent biomass and soil nutrient accumulation as waste in urban areas by taking the waste back to farmlands as fertilizer
Buildings	<ul style="list-style-type: none"> • Establish building and construction codes that can withstand extreme climate events
Transportation	<ul style="list-style-type: none"> • Ensure that transportation access to disaster-prone areas is always available
Disaster risk reduction	<ul style="list-style-type: none"> • Develop an insurance scheme for compensation from damage from bad weather • Organize and train local communities for quick response to extreme weather events • Resettle people from disaster-prone areas before disasters materialize • Map and delineate areas likely to suffer from climate change and extreme weather events • Develop an accessible information network on climate change • Develop an early-warning system to alert people of impending extreme weather events

EPACC

Vulnerable groups	<ul style="list-style-type: none"> • Ensure that gender equity is achieved • Ensure that the physically handicapped are enabled to fend for themselves • Prepare to receive and cater to environmental refugees driven away by climate change
Governance	<ul style="list-style-type: none"> • Mainstream awareness on climate change into development and service activities • Ensure that research and development efforts in all sectors focus on adaptation to climate change • Establish an effective monitoring and evaluation system for the implementation of <i>EPACC</i> • Involve the whole population in planning and implementing adaptation to climate change
Education	<ul style="list-style-type: none"> • Mainstream adaptation to climate change into education curricula
Research	<ul style="list-style-type: none"> • Forecast climate change through country-level and subcountry-level climate change modelling

Sources: MoFED, 2010; FDRE, 2012

Although the *CRGE Strategy* seeks to make Ethiopia a climate resilient country, most of its priorities are geared toward mitigation efforts, primarily in achieving high crop and livestock production, maintaining and creating carbon sinks, and achieving higher energy efficiency (FDRE, 2011). In addition, although structures are in place, enforcement is weak, and the country still faces challenges in implementation, including capacity constraints, monitoring and implementation, reporting and verification of abatement measures, weak networking between different national stakeholders, and limited integration of local knowledge in the policy-making process (Adenew, 2010; César & Ekbom, 2013). In addition, most of the objectives and priorities are tied to international funding, which creates uncertainty as these funding streams are neither predictable nor secure (César & Ekbom, 2013).

3.3 Institutional structure for climate governance

Between 2001 and 2007 the National Meteorological Agency, under the Ministry of Water Resources, was the focal point to the UNFCCC and responsible for Ethiopia's submissions of its First National Communication and its NAPA. After 2007 the EPA took the lead in climate change planning and coordination in the country and became Ethiopia's representative at the UNFCCC. The EPA was initially created under the Ministry of Natural Resources Development and Environmental Protection in 1994, and became independent in 2002 as the environmental regulatory and monitoring body in Ethiopia (EPA, 2011).

As noted previously, the governing framework and strategy for Ethiopia's development and climate agenda is the CRGE. Ethiopia's Environmental Council, which comprises the prime

minister's office, various members of federal ministries, presidents of national regional states, and representatives from civil society, carries the overall responsibility and oversight of the *CRGE Strategy* (FDRE, 2011). The Environmental Council is responsible for recommending laws and regulations for approval by the Council of Ministers. The EPA and the Ministry of Finance and Economic Development (MoFED) are the responsible governmental bodies spearheading the efforts of the Ethiopian government to achieve its vision (FDRE, 2011). The EPA coordinates the technical components of the *CRGE Strategy* (FDRE, 2011), and liaises and coordinates with regional governments and national ministries on work at the regional and sectoral levels (FDRE, n.d.-a). To facilitate cross-governmental cooperation the Ethiopian Government created the CRGE Ministerial Committee (whose chair is appointed by the Environmental Council [FDRE, 2011]), which is supported by a technical working group, and itself delegated into a series of subsectoral working groups (FDRE, n.d.-a). At present this structure is temporary, and is intended to be replaced by permanent institutional arrangements (FDRE, n.d.-a).

To financially support initiatives under the *CRGE Strategy*, the Ethiopian CRGE Facility was set up in 2012 as the national financial mechanism to mobilize funds from national, private, and international sources. It is to support initiatives that reduce emissions and vulnerability, as well as enhance the capacity of implementing and executing agencies. There are two windows under the allocation of funds: a strategic window for the implementations of actions and a responsive window that provides demand-driven support for capacity building (FDRE, n.d.-b). The CRGE Facility is housed under the MoFED, where the ministry provides the financial integrity and management and institutional capacity, while the EPA establishes the registry of investment proposals and plans, as well as reports on results from these initiatives. The CRGE Facility is governed by the CRGE ministerial steering committee, chaired by the prime minister's office. Supporting the steering committee is the CRGE management committee (chaired by the MoFED, with representatives from the EPA), the facility secretariat, and the CRGE technical committee (chaired by the MoFED and the EPA, with representatives from various ministries), who will assess and approve investment plans. A facility advisory group will review investment plans and provide suggestions to the technical and management committees. The facility advisory group is composed of representatives from multilateral organizations, international NGOs, civil society, private sector, and academia. Implementing facility-funded initiatives are the national implementing entities from federal and regional institutions in partnership with civil society, private sector, and academia (MPFT, 2015).

3.4 National-level sectoral policies

Strengthening adaptation action in Ethiopia requires mainstreaming climate change into the policies and plans guiding the management of vulnerable sectors, including those focused on water, agriculture, health, disaster risk management, and energy. As captured in Table 8, the government has made some progress toward this goal. However, gaps remain with respect to some key policies, such as water, transportation, and industry.

Developed prior to the current national development plan, the 2001 *Ethiopian Water Sector Strategy* outlines the direction for the country's water management toward "efficient, equitable, and optimum utilization of the available water resources of Ethiopia for significant socioeconomic development on a sustainable basis" (MoWR, 2001, p. 1). The objectives of this strategy are to develop water resources for economic and social benefits on an equitable and sustainable basis; to allocate water sources to ensure efficient use, equity of access, and resource sustainability; to manage and combat drought and associated disasters; to combat and regulate floods through mitigation, prevention, rehabilitation, and related measures; and to conserve, protect, and enhance water resources and "the overall aquatic environment on a sustainable basis" (MoWR, 2001, p. 1). Though the document recognizes that a sustainable approach toward water management, protection, and development is paramount, climate change is not specifically identified, nor are adaptive measures to reduce vulnerability in the sector. This is not surprising given that the policy pre-dates the country's efforts to enhance and mainstream climate change adaptation.

In 2010, the Ministry of Agriculture and Rural Development (MoARD) introduced its 10-year plan, *Ethiopia's Agricultural Sector Policy and Investment Framework (PIF), 2010–2020*.⁷ This strategic framework for the agricultural sector prioritizes and plans investments in the sector, which was identified in the *GTP* as being key to its success and implementation. The *PIF* is aligned with the *GTP* in its aim to support achievement by Ethiopia of middle-income status by 2020–23, as well as the objectives of the *GTP* for the agricultural sector. The main objective of the *PIF* is to "sustainably increase rural income and national food security" (MoARD, 2010, p. i). It has four thematic areas: productivity and production, rural commercialization, natural resource management, and disaster risk management and food security (MoARD, 2010). Climate change adaptation is addressed under the natural resource management theme, particularly under sustainable land use management, as well as through recognizing that the agricultural sector is vulnerable to its hazards and impacts. In addition it identifies the need for research on new crops and farming that are capable of thriving under drier and hotter conditions, as well as water harvesting, agroforestry, improved weather forecasting, and risk management measures to cope with increasing climate variability (MoARD, 2010).⁸

In 2010 Ethiopia released its *Health Sector Development Programme IV (HSDP-IV)* as the Ministry of Health's (MoH's) five-year plan from 2011 to 2015. This program falls under Ethiopia's national health policy framework, which emphasized decentralizing the health system, increasing accessibility of health services, and promoting and enhancing national self-reliance in health development, to name a few of its objectives. The *HSDP-IV* is the government's renewed commitment to achieving the MDGs and has three strategic themes: excellence in health service delivery and quality of care, excellence in leadership and

⁷ The *PIF* is designed to operationalize Ethiopia's Comprehensive Africa Agriculture Development Program and was submitted to the UNDP for funding (MoARD, 2010).

⁸ Under the *CRGE Strategy*, the agricultural sector resilience strategy has been prepared (Solomon, 2014), but a copy could not be obtained.

governance, and excellence in health infrastructure and resources. Though this document has no direct focus on climate adaptation, it does acknowledge a direct link between the health sector and climate change, and identifies it as a threat to achieving the health-related MDGs. Among the top risks associated with climate change are heat stress; heat stroke; and air-, vector-, water-, and food-borne diseases. To address these challenges the program proposes to raise awareness, increase training among health professionals and researchers on the health effects of climate change, implement systems to detect and track climate change-related illnesses, and ensure preparation measures to respond and manage these health risks. Supporting the MoH in these measures will be the EPA (MoH, 2010). The only specific target mentioned under the program in relation to climate change is to “respond to health impacts of climate change through up-to-date information tracking” (MoH, 2010, p. 59).

As a supporting program, under the *EPACC*, the MoH developed the *Health Sector Programme of Adaptation to Climate Change* geared to increase access to preventive health care at the household level. It aims to identify high-risk districts, or *woredas*, based on prevalence and recurrence of vector-borne diseases, and to emphasize the needs of vulnerable groups (women, the marginalized, the disabled, the elderly, and children). In addition the program seeks to strengthen local adaptive capacity by increasing the number of healthcare workers and link improvements to the health sector to attainments of the MDGs and health equity (FDRE, n.d.-a).

In 2013, the *National Policy and Strategy on Disaster Risk Management* was released. The document seeks to increase the country’s capacity to withstand disaster-related impacts and hazards as well as to significantly reduce the damage caused by disasters by 2023. A framework is presented for the establishment of a transparent and decentralized disaster risk management system that focuses on multi-hazard and multisectoral approaches, taking a both proactive and reactive approach (FDRE, 2013b). Climate variability and change are recognized as a risk, and the document notes that disaster risk management should contribute to environmental protection and climate change adaptation-related activities (FDRE, 2013b). Liaising with various ministries is an important element of the strategy, including with the Ministry of Agriculture (MoA); the Ministry of Environment and Forestry; the MoH; and the Ministry of Water, Irrigation and Energy. These interactions are to focus on issues such as crop and livestock diseases, forest and bush fires, and climate change, as well as environmental pollution, food shortages inducing malnutrition, floods, and other water supply disasters (FDRE, 2013b). Since it is a strategy, the *National Policy and Strategy on Disaster Risk Management* provides an overarching framework but does not outline specific adaptation actions.

As noted previously, Ethiopia’s energy is primarily generated by renewable sources (biomass and hydropower) and its vulnerability to climate change has been identified by the Ethiopian government. To support expansion of its renewable energy production, the *Scaling-Up Renewable Energy Program — Ethiopia Investment Plan* was released in 2012.

The plan supports the objective of the *GTP* to increase energy generation and consumer base, and achieve universal electricity access by 2015 (MoWE, 2012). It strives to ensure that at least 80% of households will have access to modern energy systems, such as improved cook stoves and renewable energy, which will have co-benefits related to reducing deforestation rates and improving the health and well-being of women and girls (MoWE, 2012).⁹ However, no specific measures to address the sector’s vulnerabilities to climate risks such as drought or floods are identified.

To address bioenergy needs, the Government of Ethiopia released its *Biomass Energy Strategy* in 2013 with a vision to “improve access to sustainable and affordable biomass energy for all by 2030” (Geissler et al., 2013, p. 31). Despite the direct impact of climate change on biomass production, the strategy does not reference climate change, other than identifying the *CRGE Strategy* and its objective to reduce demand for fuel wood through efficient energy technology and improved forest and land management. The only other reference to climate change is the risk of drought and storms affecting biomass production (Geissler et al., 2013).

Though transportation was identified as a vulnerable sector, there is little evidence of a developed sectoral policy to support either the *GTP* or the *CRGE Strategy*. This sector, along with industry, is referenced in the *CRGE Strategy*, but with a focus on mitigation measures such as a higher use of renewable energy sources and energy-efficient technologies (FDRE, 2011). The only adaptation measures identified are outlined in the *EPACC* objectives in the *CRGE vision* document (see Table 7).

Table 8 – Integration of climate change into national sectoral strategies, policies, and plans: An assessment of progress				
Policies	Absent	Climate change mentioned as potential risk	Possible actions for reducing risk identified	Targets identified for specific adaptation measures
<i>Ethiopian Water Sector Strategy</i> (2001)	✓			
<i>Scaling-Up Renewable Energy Program</i> (2012)		✓		
<i>Biomass Energy Strategy</i> (2013)		✓		
<i>HSDP-IV, 2010–2015</i>		✓	✓	✓

⁹ Under this plan, an estimated 9.415 million wood-saver stoves will be distributed, and expansion of solar energy generation through photovoltaic cell installations are expected to reach various rural localities, particularly schools and health centres (MoWE, 2015).

<i>PIF, 2010–2020</i>	✓	✓	✓
<i>National Policy and Strategy on Disaster Risk Management (2013)</i>	✓	✓	
National transportation strategy	✓		
National industry strategy	✓		

3.5 Subnational policies

There are nine administrative regions in Ethiopia: Afar; Gambella; Amhara; Benishangul/Gumuz; Harari; Somali; Oromia; Southern Nations, Nationalities and Peoples' Region (SNNPR); and Tigray. In addition, there are two major municipal administrations, Addis Ababa and Dire Dawa. Among these 11 administrations, a total of 8 have produced their own climate change adaptation plans, with technical and financial support from the EPA. Table 9 illustrates some of the adaptation priorities identified in the six plans that are available in English.

Table 9 – Adaptation priorities identified in subnational climate change plans								
Regional government	Agriculture and food security	Disaster risk reduction	Energy	Freshwater	Human health	Livestock and pastoralism	Natural resource	Other priorities
Afar	✓	✓		✓	✓	✓	✓	Livelihood diversification, market and infrastructure development, and conflict management and resolution
Dire Dawa	✓	✓	✓	✓	✓		✓	Biodiversity, waste, capacity building, and access to information and services
Gambella	✓		✓	✓	✓	✓	✓	Capacity building and institutional governance
Harari	✓			✓	✓	✓	✓	Solid waste, heritage, culture, and tourism
Oromia	✓			✓	✓	✓	✓	Livelihood diversification, market and infrastructure development, conflict management and

					resolution, community capacity building, and awareness creation
Somali	✓	✓	✓	✓	Dryland degradation, rangeland development, social services and infrastructure development, community capacity building, and awareness creation

Sources: Biru et al. (2010); Mohammed et al. (2011); Behailu et al. (2011); Temam et al. (2011); Hussein et al. (2011); Somali Regional State, EPEMDA (2011)

All of the plans identify agriculture and food security as a priority, along with freshwater and natural resource management. Other important priorities include human health, livestock, and pastoralism. However, adaptation priorities are shaped by a region’s reality. For example, in the arid Somali region, dryland degradation and rangeland development were identified as key priorities. In Harari and Dire Dawa, where the majority of the population is concentrated in urban areas, solid waste management is identified as a priority. The latter, however, is more of a development priority than an adaptation measure, perhaps reflective of weak adaptation planning capacity at the regional level, where differentiating adaptation and development priorities may be challenging.

4. Current and planned adaptation programs and projects

This section looks at adaptation projects and programs in Ethiopia to provide a picture of the extent to which action is being taken to address understood climate vulnerabilities. An overview of ongoing projects is provided, followed by a brief analysis of the climate finance provided to support adaptation efforts through domestic and international sources.

4.1 Adaptation projects and programs

We undertook an assessment of ongoing or recently completed discrete adaptation projects and programs in Ethiopia using online sources. Projects and programs were selected and classified in terms of their type and sector of focus in accordance with the methodology contained in Annex A. As summarized in Table 10, a total of 32 adaptation-focused projects were identified through this review. Details on the identified projects can be found in Annex B.

Table 10 – Sector of focus of current adaptation projects and programs identified in Ethiopia

Sector of focus	Priority sectors for adaptation	Number of projects active in sector*	Percentage of total projects identified**	Geographical scale	
Agriculture	✓	18	60%	National projects	16
Pastoralism		11	37%	Regional projects	9
Forestry		3	10%	Global projects	5
Ecosystems (conservation and restoration)	✓	2	7%	Total	30
Freshwater supply	✓	4	13%		
Disaster risk management	✓	7	23%		
Gender	✓	1	3%		
Governance		6	20%		
Private sector (industry/business)	✓	3	10%		
Insurance		2	7%		
Urban areas		1	3%		
Health	✓	1	3%		
Civil society		3	10%		
Social protection	✓	3	10%		
Multisectoral		2	7%		
*Individual projects may address one or more sectors.					
**Calculated by the number of projects active in this sector relative to the total number of projects identified. Sums to more than 100%, reflecting the potential for a single project to address adaptation needs in more than one sector.					

As indicated in Table 10, a number of discrete adaptation projects are underway in Ethiopia, many of which are national in scope and therefore have been tailored to specifically meet needs within the country. A number of these are multi-year, multi-million-dollar projects that have been supported by a range of bilateral donors, including the United States Agency for International Development (USAID), the DFID, the European Union, the Swiss Agency for International Development, and the Governments of Germany and Norway. These projects are often being executed by consortiums led by international NGOs (such as CARE International, Mercy Corps, Farm Africa, and Project Concern International) that have

partnered with local NGOs, or directly by governmental ministries with the support of agencies such as Deutsche Gesellschaft für Internationale Zusammenarbeit (GIZ). The identified projects are being implemented across Ethiopia, including in the regions of Afar; Amhara; Oromiya; Somali; Tigray; and the Southern Nations, Nationalities, and Peoples' Region.

Reflecting the country's particular vulnerabilities, the majority of ongoing national adaptation projects in Ethiopia focus on increasing the resilience of farmers, agro-pastoralists, and/or pastoralists to climate change. Many of the projects incorporate common elements, such as placing a strong focus on improving the management of water, land, and pasture resources. Efforts often focus on strengthening the capacity of local institutions to manage natural resources. For instance, this is expected to be a primary focus of the project Strengthening Drought Resilience of the Pastoral and Agro-Pastoral Populations in the Lowlands of Ethiopia being implemented in the Somali region. A similar project¹⁰ underway in the Afar region since 2013 is working with the MoA to strengthen institutions at the village, district, regional, and national levels to engage in joint land use planning, safeguard migration corridors, improve pasture lands, and conserve water and soil resources (GIZ, 2015). Another project¹¹ is working to strengthen implementation of Ethiopia's Sustainable Land Management program, including its capacity to promote adaptation through improved water use (Global Climate Change Alliance, n.d.).

Several projects are making technologies available that will promote water and land conservation, such as those related to water harvesting and flood control. To illustrate, the Capacity Building for Sustainable Irrigation and Agriculture project is providing farmers with access to small-scale irrigation systems through an integrated approach. Along with providing training to farmers in the use of this technology, the project is also building the capacity of public and private institutions, such as colleges, to design, build, and manage small-scale irrigation and micro-irrigation systems, and working with public-sector staff to enhance their capacity to manage irrigation projects.

Most of the projects underway include elements that strive to diversify the livelihoods and income of farmers, agro-pastoralists, or pastoralists, often linked to efforts to strengthen access to markets. The Pastoralist Areas Resilience Improvement through Market Expansion (PRIME) project, for example, support households transitioning from pastoralism and provides financial and technical assistance to strengthen markets and connections between actors along livestock value chains (USAID, 2015). Similarly the Financial Models and Economic Opportunities Adaptable to Climate Extremes project is working with private-sector investors to test environmentally and socially responsible investment options, such as the expansion of mobile banking and microfinance. It is also

¹⁰ The Capacity Development for Strengthening the Drought Resilience of the Pastoral and Agro-Pastoral Population in the Lowlands of Ethiopia project, funded by the German Federal Ministry for Economic Cooperation and Development.

¹¹ The Building the National Capacity and Knowledge on Climate Change Resilient Actions in Ethiopia project, financed by the European Union (Global Climate Change Alliance, n.d.).

supporting the creation of village savings and loans associations (Farm Africa, 2015; BRACED, 2015b). As well, the Graduation with Resilience to Achieve Sustainable Development project includes components focused on strengthening the capacity of households engaged in Ethiopia's Productive Safety Net program to access microfinance and have more effective links to markets.

A cross-cutting theme or principal focus of several of the national-level projects is efforts to improve disaster risk management capacity from the local to national levels. The Resilience through Enhanced Adaptation project, for instance, is working with farmers, agro-pastoralists, and pastoralists to strengthen the capacity of local disaster risk-reduction committees and enable the design and implementation of action plans that will decrease the risk of climate and related disasters. As well, the Restoring Vibrant Villages and Environment project is strengthening community disaster risk reduction and climate adaptation planning and processes at the zonal, *woreda*, and national levels, and the Climate Forecasting and Changing Behaviours using High Impact Communication project is providing training and support for the development of disaster response plans (BRACED, 2015a).

Ethiopia is also participating in a number of regional and global projects focused on agriculture, pastoralism, and disaster risk management. Among these is the *Partners for Resilience* program, which is working in nine countries to climate-proof disaster risk reduction by promoting economic development opportunities, strengthening local organizations, and promoting information sharing between government, civil society, the private sector, and knowledge institutions (Partners for Resilience, n.d.). Ethiopia also participates in the Great Green Wall for the Sahara and Sahel Initiative and the R4 Rural Resilience Initiative, the latter of which strengthens risk management strategies to increase household food and income security.

Participation in multi-country projects is helping Ethiopia address some gaps in focus of the projects being implemented exclusively in Ethiopia. While no national projects identified have a strong focus on health and climate change, Ethiopia is one of four countries participating in the project Building Adaptation to Climate Change in Health in Least Developed Countries through Resilient Water, Sanitation and Hygiene. This project is supporting the development of climate resilient water safety plans and water, sanitation and hygiene policies, and is promoting household-level health interventions that enhance resilience to climate change (WHO, n.d.-a). Similarly Ethiopia is participating in the Resilient Cities program, which is also working in Pakistan and Vietnam, to strengthen the capacity of cities to prepare for and adapt to shocks and stresses, such as those arising as a result of climate change (Global Facility for Disaster Reduction and Recovery, n.d.).

Other sectors that Ethiopia has identified as being priorities for resilience building, but in which there appear to be gaps in adaptation projects and programs, include the buildings

and transportation sectors. None of the projects identified focus primarily on improving the climate resilience of the country's infrastructure.

4.2 Climate finance

Addressing the challenge of climate change in Ethiopia requires significant funding from domestic and international sources. This section provides an overview of the scale, sources, and orientation of domestic and international financial support for adaptation by Ethiopia.

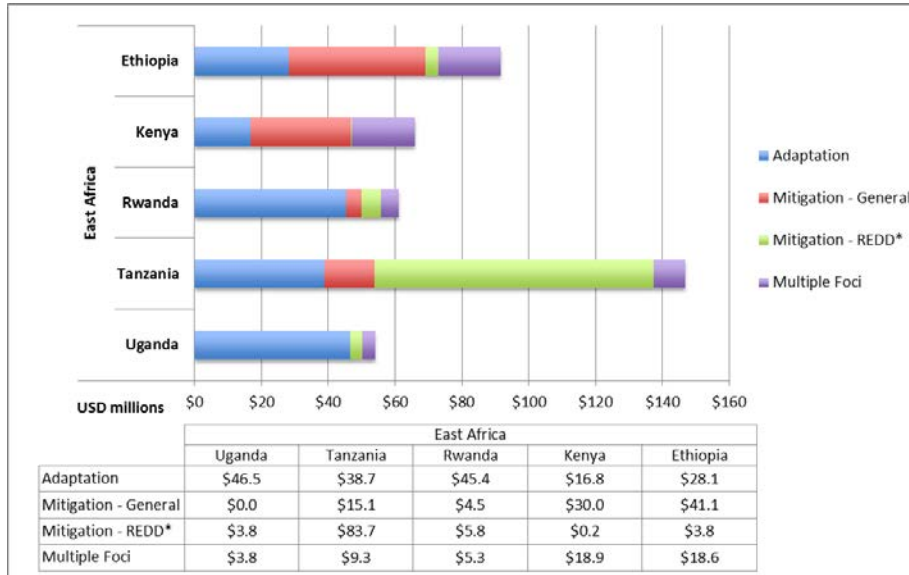
The Government of Ethiopia is already committing its own public resources to adaptation efforts. As documented in the second Africa adaptation gap report, the average annual percentage share of climate change-relevant expenditure by Ethiopia, from 2008 to 2012, was 15% of total government expenses, with 87% of this classified as adaptation spending (Eshetu et al., 2014). As well, as previously indicated, the government has established a facility to pool revenue to build a climate resilient and green economy by 2025 (Schaeffer et al., 2015). The strategy calls for spending US\$7.5 billion per year to ensure Ethiopia can address the challenges climate change poses. That said, given that current national budgetary resources earmarked for climate change-relevant activities are estimated at around US\$440 million per year and current climate-related financial contributions from international sources are valued at US\$432 million,¹² a major financing gap appears (Eshetu et al., 2014).

Ethiopia is receiving international funding from a number of sources to support adaptation planning and action. According to the Climate Funds Update, between 2003 and April 2015, Ethiopia received approval for just over US\$91.6 million in climate finance from dedicated multilateral and bilateral climate funds. Of this amount, US\$28.1 million was allocated to adaptation projects and programs. As illustrated in Figure 3, Ethiopia received less adaptation funding than some of its East African neighbours, with Rwanda and Uganda being the main receivers of climate adaptation-related finance in this time period. Notable multilateral funding sources with respect to climate change adaptation include the Least Developed Countries Fund, the Special Climate Change Fund, and the MDG Achievement Fund. Additionally, Ethiopia received financing from bilateral funds, particularly the United Kingdom's International Climate Fund and Germany's International Climate Initiative. For the timeframe of 2003 to 2015, the Climate Funds Update identified six adaptation-focused initiatives aimed at improving water resource management, coping with drought and climate change, enabling pastoral communities to adapt to climate change, restoring rangeland environments, promoting autonomous adaptation at the community level, and strengthening climate information and early-warning systems.

In contrast, according to the Organisation for Economic Co-operation and Development's (OECD's) Rio Markers, which tracks the contribution of official development assistance and other development funds toward the achievement of climate change mitigation and

¹² The amount is based on current and planned projects related to climate change (Eshetu et al., 2014).

adaptation, Ethiopia was approved to receive an average of US\$101 million per year in climate-related finance between 2010 and 2013. This funding focused primarily on climate adaptation. Major donors included the United Kingdom, EU institutions, Japan, and Germany. Funded adaptation activities were classified as being within the health or business sector, or were classified as multi-sectoral. As disclosed in Figure 6, funding was largely allocated to projects that had adaptation as their significant objective, not their principal objective. While these efforts may contribute to adaptation, the degree to which they may do so is uncertain, suggesting that the results should be treated with caution.



*Reducing emissions from deforestation and forest degradation

Figure 3 – Comparison of approved funding from designated bilateral and multilateral climate funds in East Africa since 2003, in millions of USD

Source: Climate Funds Update, April 30, 2015.



Figure 4 – Bilateral development aid between 2010 and 2013 marked as having as its principal or significant objective¹³ support adaptation in Ethiopia, in millions of USD, constant 2012 prices

Source: OECD, 2015.

5. Networks and communities of practice

Through desk-based research using online sources, a limited number of networks and communities of practice engaged in climate change adaptation and active in Ethiopia were identified. While it is likely that other communities of practice are active in Ethiopia, overall it seems there is limited knowledge sharing across civil society and government actors occurring in the country.

At the national level, knowledge sharing on climate change–related issues is facilitated by the Consortium for Climate Change Ethiopia, which was officially registered in June 2015 and was formally called the Ethiopian Civil Society Network on Climate Change. The network was established in 2007 during the Green Forum and formally launched in 2009 (Green Africa Directory, 2015). Its membership is composed of more than 60 member organizations focused on climate change issues. The founding members include a mix of five international and Ethiopian organizations: Forum for Environment (which hosts the network), Action for Development, Dan Church Aid, Poverty Action Network Ethiopia, SOS Sahel Ethiopia, and Sustainable Land Use Forum. The consortium’s main objectives are to raise awareness of climate change, promote the sharing of experience, build the capacity of member organizations, and engage in international negotiations (Forum for Environment, 2015). While the consortium provides opportunities for knowledge sharing within Ethiopia between Ethiopians on climate change issues, it is unclear how much emphasis the network is presently giving to adaptation.

Ethiopians interested in adaptation can also engage in regional networks such as AfricaAdapt and the PanAfrican Climate Justice Alliance that enable sharing of best practices among neighbouring countries. AfricaAdapt aims to share climate change adaptation knowledge between researchers, policymakers, and civil society organizations across Africa through web-based and face-to-face interactions. The PanAfrican Climate Justice Alliance is a coalition of over 1,000 African civil society organizations in 45 African countries working together to share knowledge between member organizations and advocate to African governments and other stakeholders on fairness and justice in international climate change and sustainable development processes. In Ethiopia its member organization is the Consortium for Climate Change Ethiopia (PanAfrican Climate Justice Alliance, 2015).

¹³ Based on the definitions used by the OECD’s Rio Markers system, activities are considered to have supporting adaptation as their “principal” objective “when promoting the objectives of the UNFCCC is stated in the activity documentation to be one of the principal reasons for undertaking the activity. In other words, the activity would not have been funded but for that objective. Activities marked “significant” have other prime objectives but have been formulated or adjusted to help meet climate concerns” (OECD, 2011, p. 3).

6. Conclusions

Ethiopia is faced with many social and environmental challenges that exacerbate its vulnerability to climate change. These issues jeopardize not only the achievement of its goal of becoming a middle-income country by 2020 to 2023, but also, and most importantly, the well-being of its population. Communities dependent on crop production and pastoralism for their livelihoods are particularly vulnerable. Pastoralists rely on climate-sensitive resources such as pasture and water, while farmers are strongly affected by climate risks, including direct impacts such as crop losses caused by drought, as well as indirect impacts such as soil erosion. Despite these challenges, Ethiopia has put most of its efforts toward mitigation and economic development priorities under its new climate resilient and green economy pathway, with a particular focus on accessing carbon finance.

Under its current low-carbon, climate resilient development pathway, Ethiopia has created various governance structures and policies to support the implementation of the GTP and CRGE Strategy. By linking its national development plan with climate and green initiatives, the Ethiopian government seeks to decrease vulnerability to climate change and move its economy onto a greener pathway. The CRGE Strategy mandates that adaptation to climate change be mainstreamed into sectoral and subnational policies. The EPA spearheads the implementation of the CRGE Strategy and provides technical assistance to regional governments and sectoral ministries on climate change planning and action and support for adaptation mainstreaming. To finance both actions and capacity building, the government has set up the CRGE Facility. Despite its recognition of the need to increase climate resilience in Ethiopia, measures and efforts tend to be focused on mitigation and disaster risk reduction, and mainstreaming of adaptation appears to be lacking. To implement both adaptation and mitigation measures, the government faces gaps in institutional capacity, monitoring and implementation, and reporting and verification of the measures implemented. National networks are lacking to facilitate the exchange of information between governmental and non-governmental actors. In addition, implementation of most of the climate-related objectives and priorities are tied to international funding, which creates uncertainty for the longer term.

The internationally funded adaptation projects and programs underway in the country have the potential to assist Ethiopia in addressing its institutional and capacity gaps, and to increase adaptive capacity in critical sectors such as water, agriculture, and pastoralism. Not surprisingly, most of the initiatives are focused in the agricultural sector, given its importance to the economy and its high vulnerability to climate change. However, a few of the projects identified focus on the water and energy sectors, which also are priority areas for adaptation. Improving climate resilience in the health sector is also among its priorities; however, there are few initiatives addressing this concern. Disaster risk management is tied closely to projects in the agricultural sector, along with capacity development for government and civil society.

The need to strengthen climate resilience is recognized in Ethiopia's current and emerging national development strategies, and the country is making strides toward increasing the adaptive capacity of its citizens and communities through improvements in its health and agricultural sectors. However, continued efforts are needed to address the underlying factors of multi-dimensional poverty, population growth, gender inequality, and resource degradation that leave many Ethiopians vulnerable to the impacts of climate change. Positive indications that these challenges will be addressed are the government's demonstrated political will to respond to climate change as part of a broader green growth strategy, progress to date in establishing a policy framework for climate action at the national and subnational levels, and the country's capacity to attract international financial support.

7. Annexes

Annex A: Methodology

This section presents the research parameters established to guide development of the standardized reviews of current adaptation action in the CARIAA program's countries of engagement. It sets forward definitions used in this study, particularly with respect to the identification, selection, and classification of programs and projects considered in the review. This methodology was previously developed by the International Institute for Sustainable Development to support a review of current and planned adaptation action in 12 regions, which was completed in 2011 for the Adaptation Partnership. Modest updates to this original methodology were made to support the current review undertaken for the CARIAA program. For more information, see Adaptation Partnership (2015).

A.1 Adaptation actions included in the review

Within the review, adaptation action was defined as “policies, programs, and projects designed and implemented specifically to address the current and projected impacts of climate change.” Therefore, the review focused on examining policies, programs, and projects in which specific reference has been made to supporting adaptation to climate change or climate risk reduction.

Consistent with this definition, the review gave attention to discrete, time-bounded programs and projects designed and implemented specifically to support preparation for or implementation of practical adaptation actions within the broader context of achieving development objectives. Therefore, at least one of the following terms appeared in the title, goals statement, or objectives statement of each program or project included in the review: “adaptation,” “climate change adaptation (CCA),” “climate risk management,” or “climate vulnerability reduction.”

Based upon these parameters, the following types of programs and projects were not included in the review: disaster risk reduction, prevention, or management projects, unless they specifically reference that this activity is being undertaken in support of CCA; primary scientific research studies (for example agrology, botany, or meteorology) on the potential impacts of climate change (for example on changes in crop production, glacial melt rates, or typhoon patterns); long-term monitoring efforts (whether climatic or socioeconomic) needed to inform decision-making; stand-alone workshops, conferences, and training programs; and capacity building to support participation in processes related to the UNFCCC (such as training for negotiators, enabling activities to prepare reports).

The following additional parameters were established to guide the selection of programs and projects incorporated in the study:

- *Official start date.* To ensure that only “current” projects were included in review, selected projects needed to have begun on or after January 1, 2012, with the

exception of projects that began before this date but were still ongoing as of January 1, 2015.

- *Official end date.* Ongoing projects are those whose official completion day is on or after January 1, 2015. Projects completed after January 1, 2012, were classified as completed.
- *Funding characteristics.* Projects with a value of US\$100,000 or more were included in the study. However, reflecting the greater level of adaptation action underway in Bangladesh and India, the minimum value of projects included in the reviews for these two countries was raised to US\$250,000. Projects financed by international and domestic sources of funding were considered.

Additionally, identified projects were classified by geographical scale in accordance with the following definitions:

- **Global:** Projects involving countries throughout the world, including the profiled country.
- **Regional:** Multi-country projects within a particular subregion, be it a continent or subcontinental area (such as South Asia or West Africa), that includes the profiled country.
- **National:** Projects occurring within one country.

A.2 Type of project being undertaken

To better understand the orientation of the projects underway in the countries examined as part of the review, projects were classified by type using the following definitions:

- *Research.* Encompassing efforts to develop new knowledge or organize existing information so as to increase understanding of the links among climate change, human society, and ecosystems and inform adaptation decision-making.
- *Assessment.* Encompassing risk, impact, and vulnerability assessments, as well as monitoring of ecological and societal trends.
- *Capacity building.* Encompassing the provision of technical training, technical assistance, institutional strengthening, and education.
- *Knowledge communication.* Encompassing efforts to share information, knowledge, and practices related to CCA, including awareness raising and engagement of media.
- *Policy formation and integration.* Encompassing efforts to inform, develop, and implement CCA plans, strategies, frameworks, and policies at the local, subnational, national, and international levels.
- *Field implementation.* Encompassing physical measures to reduce vulnerability to the impacts of climate change, including the implementation of pilot projects, construction of infrastructure, development and modification of technologies, and management of physical resources.

- *Community-based adaptation*. Encompassing actions that directly engage community members in efforts to understand, plan for, and respond to the impacts of climate change.

A.3 Sector or area of focus

To further inform analysis of the range of adaptation action taking place in each country reviewed, programs and projects examined in the study were classified by sector using the following definitions:

1. **Food, fibre, and forests.** Defined as the management and use of terrestrial natural resources to directly improve human well-being. Its subcategories are:
 - *Agriculture*. Encompassing subsistence agriculture, commercial agriculture, and the rearing of confined domestic animals.
 - *Pastoralism*. Encompassing the use of domestic animals as a primary means for obtaining resources from habitats (UNEP, 2007), particularly in nomadic and semi-nomadic communities.
 - *Forestry*. Encompassing afforestation, reforestation, agroforestry, commercial forestry, community-based forest management, and woodland management.
 - *Fire management*. Encompassing monitoring, planning, and management to address the impact of fires on settlements and ecosystems, including forested and grassland ecosystems.
 - *Aquaculture*. Food production through the rearing of aquatic animals, such as fish, crustaceans, and molluscs, or the cultivation of aquatic plants in natural or controlled marine or freshwater environments.
2. **Ecosystems.** Defined as a system of living organisms interacting together and with their physical environment, the boundaries of which may range from very small spatial scales to, ultimately, the entire Earth (IPCC, 2001). Its subcategories are:
 - *Biodiversity protection*. Encompassing activities related to the maintenance of living organisms at various spatial scales, including the establishment and protection of parks and bioserves.
 - *Ecosystem conservation*. Encompassing efforts to *maintain* the health of particular ecosystems, such as wetlands, grasslands, forests, mangroves, and coral reefs.
 - *Ecosystem restoration*. Encompassing efforts to *restore* the health of particular ecosystems, such as wetlands, grasslands, forests, mangroves, and coral reefs.
3. **Freshwater resources.** Defined as the management and use of freshwater contained in terrestrial ponds, lakes, rivers, and watersheds, among others. Its subcategories are:
 - *Freshwater fisheries*. Encompassing the catching, packing, and selling of fish and shellfish derived from lakes, rivers, and ponds, as well as through freshwater aquaculture.

- *Watershed management.* Encompassing management of the basins that supply water to different streams, rivers, lakes, and reservoirs, including integrated watershed management.
 - *Freshwater supply.* Encompassing efforts to access and preserve freshwater for human consumption and use, including drinking water sources, groundwater resources, rainwater harvesting, and water infrastructure such as wells, dams, and dikes.
4. **Oceans and coastal areas.** Defined as the management and use of coastal areas and oceans. Its subcategories are:
- *Coastal zone management.* Encompassing the management of land and water resources in coastal areas, including through integrated coastal zone management and the establishment and maintenance of coastal infrastructure.
 - *Marine management.* Encompassing the management and use of offshore ocean and sea resources.
 - *Marine fisheries.* Encompassing the catching, packing, and selling of fish, shellfish, and other aquatic resources found in the oceans and seas, including through marine and coastal aquaculture.
5. **Disaster risk management.** Defined by the United Nations International Strategy for Disaster Reduction (2009) as the “systematic process of using administrative directives, organizations, and operational skills and capacities to implement strategies, policies and improved coping capacities in order to lessen the adverse impacts of hazards and the possibility of disaster” (p. 10). It includes emergency response measures, preparation for extreme events and early warning systems. No sub-categories were established in relation to this macro project category.
6. **Migration and security.** Defined as efforts to support the movement of people and maintain their personal security in the face of incremental climate changes or climate shocks.
- *Migration.* Encompassing preparations for and responses to the potential movement of people from one location to another due to climate change impacts.
 - *Security.* Relating to personal security and freedom from violence, crime, and war due to natural and human-induced disasters (UNEP, 2007) and encompassing peace building, conflict reduction, and conflict avoidance.
7. **Gender.** Defined as the social attributes and opportunities associated with being male and female and the relationships between women and men, and girls and boys, as well as the relations among women and among men. These attributes, opportunities, and relationships are socially constructed and are learned through socialization processes (United Nations Entity for Gender Equality and the Empowerment of Women, n.d.). This category includes efforts to understand the vulnerability of women to the impacts of climate change, gender-sensitive adaptation strategies, and measures to improve the

situation of women at the local and policy level, including through gender mainstreaming. No subcategories were established in relation to this macro project category.

8. **Business.** Defined as the purchase and sale of goods and services with the objective of earning a profit. Its subcategories are:
 - *Tourism.* Encompassing the adjustment and development of tourist facilities and operations to account for current and future vulnerabilities, including these actions in relation to ecotourism.
 - *Private sector.* Encompassing potential impacts of climate change and potential adaptation strategies on the diverse activities underway in the portion of the economy in which goods and services are produced by individuals and companies including industry, mining, and other economic sectors.
 - *Trade.* Encompassing the exchange of goods and services within and between countries.
 - *Insurance.* Encompassing the development, testing, and adjusting of insurance and risk-management schemes, including weather-based index systems.

9. **Infrastructure.** Defined as the basic equipment, utilities, productive enterprises, installations, institutions, and services essential for the development, operation and growth of an organization, city or nation (IPCC, 2001). Its sub-categories are:
 - *Energy.* Encompassing energy-related systems and infrastructure, including small-scale and large-scale energy generation through hydroelectric power generation, wind, solar, and other forms of traditional and new energy sources, as well as transmission networks.
 - *Transportation.* Encompassing the components of the system required to move people and goods, including roads, bridges, railway lines, shipping corridors, and ports.
 - *Waste management.* Encompassing sanitation, sewage systems, drainage systems, and landfills.
 - *Buildings.* Encompassing actions related to built structures such as houses, schools, and offices, including changes to building codes, building practices, and green ways of construction.

10. **Human settlements.** Defined as a place or area occupied by settlers (IPCC, 2001). Its subcategories are:
 - *Peri-urban areas.* Encompassing the outskirts of urban centres and the transition zones between rural and urban areas.
 - *Urban areas.* Encompassing municipalities, towns, and cities, as well as areas in these centres (such as slums).
 - *Rural areas.* Encompassing villages and other small settlements, as well as rural landscapes and integrated rural development.

11. **Human health.** Defined as a state of complete physical, mental, and social well-being and not merely the absence of disease or infirmity (WHO, n.d.). It includes efforts to assess vulnerabilities to and the impacts of climate change on human health directly and indirectly, and the development and implementation of appropriate adaptation strategies at the local, regional, and national levels. No subcategories were established in relation to this macro project category.
12. **Climate information services.** Defined as the production and delivery of authoritative, timely, and usable information about climate change, climate variability, climate trends, and impacts to different users at the local, subnational, national, regional, and global levels. It includes efforts to develop, adjust, and provide short- and long-term climate forecasts, including climate change projections, to different audiences. No subcategories were established in relation to this macro project category.
13. **Governance.** Defined as the institutions (laws, property rights systems, and forms of social organization) through which societies define and exercise control over resources (UNEP, 2007). Its subcategories are:
- *Government.* Encompassing efforts to build the capacity of government officials, either at the national or subnational level, to prepare for and facilitate adaptation to climate change, including through the development of policies, plans, frameworks, and strategies, as well as the establishment and operation of climate change trust funds.
 - *Civil society.* Encompassing efforts to build the capacity of the public, including NGOs, to understand, prepare for, and respond to climate change.
14. **Social protection.** Based on DFID's definition of social protection, projects within this category focus on three sets of instruments to address chronic poverty and vulnerability:
- *Social insurance.* Referring to "the pooling of contributions by individuals in state or private organizations so that, if they suffer a shock or change in circumstances, they receive financial support."
 - *Social assistance.* Encompasses "non-contributory transfers that are given to those deemed vulnerable by society on the basis of their vulnerability or poverty."
 - *Workplace safety.* Involves the "setting and enforcing of minimum standards to protect citizens within the workplace" (DFID, 2006, p. 1).
- Adaptation projects that focus on labour market interventions and social assistance would be included in this category. No subcategories were established in relation to this macro project category.
15. **Multisectoral.** Defined as actions that simultaneously address more than one sector in one or multiple locations. It includes efforts that address more than one sector, which are challenging to tease apart, and in the context of this review includes large, multi-

country projects in which the specific sector of focus is nationally determined and, therefore, varies from country to country. No subcategories were established in relation to this macro project category.

16. **Other.** To capture areas of focus not clearly identified in the previous categories.

Annex B: Projects and programs

Projects working to address vulnerability to the impacts of climate change in Ethiopia are presented alphabetically in the table below.

Name of project	Objectives	Funder(s) and budget	Implementing agencies	Type of project	Sectors	Duration	Scale and location(s)
Adaptation at Scale in Semi-Arid Regions	This project will enable proactive, longer-term approaches to climate change adaptation in semi-arid regions, while supporting the management of current risks. It draws on a number of disciplines to address the complex interactions among climatic, biophysical, social, political, and economic dynamics. Research on each of these aspects will be integrated through transformative scenario planning, involving stakeholders throughout. The project will generate credible information that decision-makers and others can use to develop robust adaptation strategies.	DFID and IDRC, through CARIAA CAD\$13.5 million	University of East Anglia; International START Secretariat; Oxfam; Indian Institute for Human Settlements; and University of Cape Town, South Africa	Research, capacity building, and knowledge communication	Multisectoral	2014–19	Global India, Ethiopia, Kenya, Uganda, Ghana, Mali, Botswana, Namibia, South Africa, and Niger
Africa Climate Change Resilience Alliance	The project aims to have governments in Ethiopia, Mozambique, and Uganda change their decision-making and decision-implementation processes to support the resilience of their citizens, and for international and national civil society to implement programs, policies, and processes that increase the adaptive capacity	DFID and the Netherlands through the Climate and Development Knowledge Network £240,000	Oxfam Great Britain, Overseas Development Institute, Save the Children International, Care International, and World Vision International	Research and capacity building	Government and civil society	October 2012–16	Regional Ethiopia, Uganda, and Mozambique

	<p>of vulnerable people. The second phase of this project aims to produce solid evidence of how to incorporate adaptive capacity into development programming to improve all types of development interventions and plans. The research looks at theoretically, what changes are needed in how decisions are made in a changing climate practically, what has been learned through trying to make those changes in local planning processes in Mozambique, Uganda, and Ethiopia.</p>						
Bati Adapts to Climate Change Impacts	<p>To increase food security for 4,660 households in the Bati district, the project undertook activities to improve agricultural resiliency. These included conducting risk assessments; promoting water conservation, dry-season gardening, and climate-responsive crop and livestock management; and rehabilitating small-scale irrigation schemes. It also strove to strengthen the Organization for Rehabilitation and Development (ORDA) in Amhara and the local MoA offices to better support community-based projects that address climate change.</p>	<p>Department of Foreign Affairs, Trade and Development (DFATD)</p> <p>CAD\$1,870,071</p>	CHF	<p>Assessment, capacity building, field implementation, and community-based adaptation</p>	<p>Agriculture, government, and civil society</p>	<p>December 2012– March 2014</p>	<p>National</p>
Building Adaptation to Climate Change in Health in	<p>The project is establishing a framework to protect health and reduce the risk of disease due to climate change in four selected</p>	<p>United Kingdom Agency for International Development</p>	World Health Organization	<p>Policy formation and integration, and field implementation</p>	<p>Freshwater supply and human health</p>	<p>2013–16</p>	<p>Global</p> <p>Bangladesh, Nepal,</p>

<p>Least Developed Countries through Resilient Water, Sanitation and Hygiene</p>	<p>pilot projects. This goal is to be achieved by combining international- and national-level work. At the national level, the project is helping governments in the participating countries integrate climate change into their existing health programs, with an emphasis on water management; water, sanitation and hygiene; water safety; and household interventions. At the international level, it is striving to generate a coherent climate resilient international health policy and to enhance the capacity of health actors to engage in efforts to define the health components of National Adaptation Plans under the UNFCCC. Outcomes of the project will be used to inform efforts to reduce the risk of climate-related disease and the vulnerability of the poor in other low- and middle-income countries.</p>	<p>(UKAID) through the International Climate Fund £8.5 million</p>					<p>Ethiopia, and Tanzania</p>
<p>Building the National Capacity and Knowledge on Climate Change Resilient Actions in Ethiopia</p>	<p>To contribute to the achievement of Ethiopia’s CRGE through capacity building and sustainable land management. The project specifically aims to increase the awareness and capacity of targeted government institutions, both at the federal and regional levels and in the rural population at large, to deal with climate change. A priority focus of this project is ensuring that the Sustainable Land</p>	<p>European Union through the Global Climate Change Alliance €10 million</p>	<p>EPA, MoA, and GIZ</p>	<p>Capacity building, field implementation, and community-based adaptation</p>	<p>Agriculture, forestry, watershed management, and government</p>	<p>January 2012– December 2016</p>	<p>National</p>

	<p>Management program helps improve farmers’ livelihoods and rehabilitates degraded lands. Activities in support of this objective include enabling land registration, using watershed-based approaches to restore and rehabilitate degraded watersheds, and promoting improved practices for soil and nutrient management as well as efficient water use.</p>						
Capacity Building for Climate Smart Natural Resource Management and Policy	<p>The project focuses on building research and academic capacity in the field of climate-smart natural resource management to improve policies on climate change mitigation, adaptation, and food security. The ultimate goal of the project is to enhance farmers’ capacity to adapt to climate change by using climate-smart natural resource management through research-based farming solutions and better informed policy formulations.</p>	<p>NORAD through the Norwegian Programme for Capacity Development in Higher Education and Research for Development (NORHED)</p> <p>18 million kr</p>	<p>Mekelle University (Ethiopia), Lilongwe University of Agriculture and Natural Resources (Malawi), and Norwegian University of Life Sciences (Norway)</p>	<p>Research, capacity building, and policy formation and integration</p>	<p>Agriculture</p>	<p>2013–18</p>	<p>Regional</p> <p>Ethiopia and Malawi</p>
Capacity Building for Sustainable Irrigation and Agriculture	<p>The project aims to train Ethiopian public and private institutions, including colleges, to better design, build, and manage small-scale irrigation and micro-irrigation systems. The project also aims to introduce improved water and soil management and crop irrigation practices to smallholder farmers and water user associations. Small-scale irrigation systems, which</p>	<p>DFATD</p> <p>CAD\$15 million</p>	<p>Agriteam Canada</p>	<p>Capacity building</p>	<p>Agriculture, freshwater supply, private sector, and government</p>	<p>October 2013–December 2017</p>	<p>National</p>

	cover less than 2 square kilometres of land, and micro-irrigation systems, which cover small areas such as garden plots, have significant potential to contribute to agricultural growth in Ethiopia. They help increase farmers' incomes and strengthen farmers' resilience to drought by providing access to more reliable sources of water. The project also aims to promote the role of the private sector as a key provider of services relating to irrigation.						
Capacity Development for Strengthening the Drought Resilience of the Pastoral and Agro-pastoral Population in the Lowlands of Ethiopia	The project seeks to ensure that the semi-nomadic population (pastoralists) in the Afar region has reliable access to natural resources such as water, land, and pastures, including land that can be used more intensively, and to strengthen resilience to drought.	German Federal Ministry for Economic Cooperation and Development €4,333,333	MoARD and GIZ	Field implementation and community-based adaptation	Pastoralism	March 2013–August 2018	National
Catalyzing Forest and Landscape Rehabilitation for Climate Resilience and Biodiversity Conservation in East Africa	The aim of the project is to support the restoration of forest ecosystems and natural landscapes in Kenya and Ethiopia as they support critical livelihood activities as well as act as a carbon sink.	German Federal Ministry for the Environment, Nature Conservation, Building and Nuclear Safety €1,498,593.58	William J. Clinton Foundation and Clinton Climate Initiative Partners: Ethiopia Ministry of Environment and Forests, and Kenya Ministry of	Assessment, Capacity building	Ecosystem restoration	February 2014–January 2016	Regional Ethiopia, Kenya

			Environment, Water and Natural Resources				
Climate for Development in Africa	The program aims to increase the climate resilience of Africa's population by addressing the need for improved climate information in Africa and strengthening the use of such information for decision-making. Climate for Development in Africa is an initiative of the African Union Commission, the United Nations Economic Commission for Africa, and the African Development Bank.	European Union, Finland, Nordic Development Fund, Sweden, UKAID, USAID €8 million	African Climate Policy Centre	Research, capacity building, and knowledge communication	Climate information	January 2012–December 2015	Regional Ethiopia, Kenya, Tanzania, Uganda, Burkina Faso, Ghana, Mali, Senegal, Botswana, Namibia, South Africa, and Egypt
Climate Forecasting and Changing Behaviours using High Impact Communication	Working in high-risk locations in Ethiopia, the program is building resilience to climate extremes and disasters such as drought, floods, extreme precipitation, and extreme temperatures, by making reliable climate information available through radio and text messaging; maximizing livestock production and other key assets through activities such as improved livestock health practices, participatory watershed management, and small-scale irrigation; providing training in and developing plans for disaster response; and improving understanding of the specific impact of climate extremes on	DFID through the Building Resilience and Adaptation to Climate Extremes and Disasters (BRACED) program	Christian Aid (lead), BBC Media Action, King's College London, National Meteorology Agency, and the UK Met Office	Capacity building, knowledge communication, and field implementation	Agriculture, pastoralism, gender, and climate information	January 2015–December 2017	National

	women and girls, and supporting risk-reduction strategies.						
Climate Smart Initiative	The Climate Smart Initiative was designed to strengthen two important food security programs in Ethiopia: the Productive Safety Net Program and the Household Asset Building Program. It is currently in its second phase, which is designed to ensure that these programs become “climate smart” through the systematic integration of the implications of climate change in program activities. It is piloting climate-smart activities and processes and will draw together lessons to ensure that the next generation of food security programs will enable the Government of Ethiopia to better manage risks related to climate change.	World Bank through a multi-donor trust fund	Government of Ethiopia with technical assistance from CARE, the Netherlands Development Organization, Farm Africa, ORDA, Relief Society of Tigray, Mercy Corps, ITAD, the Institute for Development Studies and Cornell University	Capacity building and field implementation	Agriculture, pastoralism, government, and social protection	2013–15	National
Climate-Smart Villages	The project aims to sustainably increase productivity and incomes, build resilience to climate change, reduce greenhouse gas emissions, and enhance national food security and development goals. It will do this by establishing climate-smart villages that will act as models of local actions that ensure food security, promote adaptation, and build resilience to climatic stresses. Researchers, local partners, farmers’ groups, and policymakers will collaborate to select the most	CGIAR Research Program on Climate Change, Agriculture and Food Security	Led by the International Center for Tropical Agriculture and Earth First	Assessment, capacity building, knowledge communication, and community-based adaptation	Agriculture and climate information	2011–unknown	Global Bangladesh, India, Nepal, Ethiopia, Kenya, Tanzania, Uganda, Burkina Faso, Ghana, Colombia, Guatemala, Honduras, Nicaragua,

	appropriate technological and institutional interventions that support climate-smart agriculture, taking into consideration global knowledge and local conditions.						Vietnam, Laos, and Cambodia
Complementary Livestock Redistribution, Production and Animal Health Interventions Support to Improve Pastoralists Livelihood	The project aimed to impact the livelihoods of pastoralist communities in the greater Isiolo District through the redistribution of small ruminants and camels, which was seen as an adaptive strategy for pastoralist communities impacted by climate change. This change was expected to provide communities with short- and long-term solutions to providing milk to selected households, improve household food security, and increase income through sales.	Swiss Agency for Development and Cooperation CHF 700,000	Vétérinaires sans Frontières Suisse	Community-based adaptation	Agriculture and pastoralism	April 2012– March 2014	Regional Ethiopia and Kenya
Financial Models and Economic Opportunities Adaptable to Climate Extremes	The project seeks to test innovative market-based tools to improve the resilience of economic and social systems in the lowlands of Ethiopia. These will enable vulnerable pastoral and agro-pastoral households and communities in rural and peri-urban areas to manage risk, and to successfully transform their livelihood base should they choose to. More specifically the project seeks to work with private-sector investors to address climate change impacts and test approaches for environmentally	DFID through the BRACED program £6.9 million	Farm Africa, Mercy Corps, Lion’s Head Global Partners, and the Long Term Support Initiative (LTSI)	Assessment, capacity building, knowledge communication, field implementation, and community-based adaptation	Agriculture, pastoralism, disaster risk management, and private sector	2015–17	National

	and socially responsible investment.						
Graduation with Resilience to Achieve Sustainable Development	The project is designed to help the Government of Ethiopia find sustainable solutions to chronic food insecurity. It supports households currently enrolled in the government’s Productive Safety Net Program so that they may access microfinance, improve on- and off-farm productivity, and have more effective links to markets. In addition, the project improves household and community resilience by increasing women’s empowerment, improving nutritional practices, and introducing local climate change adaptation mechanisms.	USAID US\$23.4 million	CARE Ethiopia, Relief Society of Tigray, ORDA, Catholic Relief Society, Agri-Services Ethiopia, the Netherlands Development Organization, and Tufts University	Field implementation and community-based adaptation	Agriculture and social protection	2011–16	National
Great Green Wall for the Sahara and Sahel Initiative	The overall goal of the Great Green Wall initiative is to strengthen the resilience of people and natural systems in the Sahel and Sahara regions with sound ecosystem management, sustainable development of land resources, protection of rural heritage, and improvement of living conditions of the local population. The initiative has three main objectives: improve the living conditions of populations in the arid zones of Africa and reduce their vulnerability to climate change, climate variability, and drought; improve the state and	World Bank, Least Developed Countries Fund, Special Climate Change Fund, African Development Bank, Food and Agriculture Organization, the European Union, and Global Mechanism of the United Nations Convention to	African Agency of the Great Green Wall	Capacity building, policy formation and integration, and field implementation	Agriculture, pastoralism, forestry, ecosystem conservation, private sector, and green infrastructure	2011– Unknown	Regional Ethiopia, Burkina Faso, Ghana, Mali, Senegal, Egypt, Algeria, Benin, Chad, Djibouti, Mauritania, Niger, Nigeria, Gambia, Sudan, and Togo

	health of ecosystems in the arid zones of Africa and their resilience to climate change, climate variability; and drought; and mobilize resources for the implementation of the Great Green Wall Initiative through the establishment of efficient partnerships between national, regional, and international stakeholders.	Combat Desertification US\$3.1 billion					
Improving Climate Change Resilience in Farmer's Co-operatives	The project sought to increase economic, social, and ecological resilience to climate change for 12,000 resource-poor smallholder farmers by promoting sustainable farming techniques. Training was offered to farmers in the use of new technologies to mitigate soil erosion, improve crop yields, and conserve water. Access was provided to affordable high-yielding seed varieties and to credit through farmers' cooperatives.	DFATD and the Co-operative Development Foundation of Canada CAD\$2.1 million	Canadian Co-operative Association	Capacity building, knowledge communication, and field implementation	Agriculture	April 2012– March 2014	National
Pastoralist Areas Resilience Improvement through Market Expansion	The overall goal of the project is to increase household incomes and enhance resilience to climate change among pastoralist communities in Ethiopia. It applies market-driven approaches to livestock production and livelihood diversification that simultaneously support dryland communities to adapt to a changing climate. The project's major objectives are improved productivity and	USAID US\$52 million	Mercy Corps, CARE International, Kimetrica, Haramaya University, Pastoralist Concern, Aged & Children Pastoralists Association, SOS Sahel Ethiopia,	Field implementation and community-based adaptation	Pastoralism and rural areas	October 2012– October 2017	National

	competitiveness of livestock and livestock products; enhanced adaptation to climate change by pastoralists; strengthened alternative livelihoods for households transitioning out of pastoralism; enhanced innovation, learning, and knowledge management; and improved nutritional status of targeted households through targeted, sustained, and evidence-based interventions.		and Afar Integrated Sustainable Development Association				
Partners for Resilience	To increase citizens' resilience against natural disasters, climate change, and the deterioration of ecosystems through various intervention strategies: stimulating sustainable economic developments; strengthening the capacity of local organizations and authorities, by making a risk assessment, natural disaster risk management plans, and warning systems, among other things; and promoting advocacy and stimulation of knowledge sharing between governments, civil society, knowledge institutes, and the private sector in the fields of natural disaster reduction and climate adaptation.	Government of the Netherlands €40 Million	Dutch Red Cross (secretary), the Red Cross Climate Centre, CARE Netherlands, Cordaid and Wetlands International	Capacity building, knowledge communication, policy formation and integration, and field implementation	Agriculture, freshwater supply, disaster risk management, government, civil society, and social protection	2011–15	Global India, Ethiopia, Kenya, Uganda, Mali, Guatemala, Nicaragua, Indonesia, and the Philippines
R4 Rural Resilience Initiative	To enable vulnerable rural households to increase their food and income security in the face of increasing climate risks. It aims to	USAID, Norwegian Ministry of Foreign Affairs,	World Food Programme and Oxfam America	Community-based adaptation	Agriculture and insurance	2011–17 (estimated)	Regional Ethiopia, Senegal,

	develop innovative tools and strategies to reduce and mitigate risk due to climate variability and shocks so as to overcome hunger, achieve food security, and enhance resilience. Four risk management strategies are being pursued: “improved resource management through asset creation (risk reduction), insurance (risk transfer), livelihoods diversification and microcredit (prudent risk taking), and savings (risk reserves)” (World Food Programme, 2015).	Swiss Agency for Development Cooperation, Swiss Re, Rockefeller Foundation, and ELMA Relief Foundation					Malawi, and Zambia
Regional Capacity Building for Sustainable Natural Resource Management and Agricultural Productivity under a Changing Climate	The project’s overall goal is to strengthen the human and institutional capacities of southern institutions to better respond to climate change for improved agricultural productivity and livelihoods. Its objectives are to review and strengthen academic programs with respect to climate change and natural resource management in the three partner institutions in the South; strengthen research capacities in climate change and natural resource management; generate knowledge of and technologies for development and policy formulation; improve educational and research management capacity at the doctoral and post-doctoral levels to strengthen research and teaching infrastructure, specifically for the	NORAD through NORHED 18 million kr	Makerere University (Uganda), University of Juba (South Sudan), Addis Ababa University (Ethiopia), and Norwegian University of Life Sciences (Norway)	Research and capacity building	Agriculture and post-secondary education	2013–18	Regional Ethiopia, Uganda, and South Sudan

	University of Juba; and strengthen north–south, and south–south linkages through staff exchange, joint collaborative research, and outreach activities.						
Resilience through Enhanced Adaptation, Action Learning and Partnerships	The project is supporting over 100 farming, agro-pastoralist, and pastoralist communities in six <i>woredas</i> in the Oromia region of Ethiopia to design and implement action plans that will decrease the risk of climate and related disasters, and increase resilience to shocks when they occur. This goal is to be achieved through a community-managed disaster risk–reduction process led by local disaster risk–reduction committees that builds community knowledge and skills while highlighting the links and interdependence between livelihoods, food security, nutrition, and natural resource management. Activities are linked to the Government of Ethiopia’s food security, agricultural growth, and disaster risk management efforts. Cross-cutting themes of the project are disability inclusion, knowledge management, the use of information and communication technologies for development, and empowerment of women.	USAID (Office of Foreign Disaster Assistance, the Global Climate Change Initiative, and the Feed the Future Initiative) Part of over US\$11 million	Catholic Relief Services (lead), Ethiopian Catholic Church Social Development Coordinating Office of Harar, Handicap International, and Cordaid	Capacity building, field implementation, and community-based adaptation	Agriculture, pastoralism, and disaster risk management	October 2014–September 2017	National
Resilient Cities Program	Strengthening cities’ ability to prepare for and adapt to changing conditions, and to withstand and	Global Facility for Disaster Reduction and		Assessment	Disaster risk management	December 2013–unknown	Global

	recover rapidly from disruptions related to climate change, natural disasters, and other systemic shocks.	Recovery and the World Bank			and urban areas		Pakistan, Ethiopia, and Vietnam
Restoring Vibrant Villages and Environment	The project supports long-term resilience to climate change and climate-related shocks through community-managed disaster risk-reduction interventions in nine <i>woredas</i> of Bale Zone, and intends to benefit over 620,000 people. Its work focuses on three strategic objectives: improving access to scientific data, information, and indigenous knowledge to inform pastoralists' and agro-pastoralists' decisions, and to strengthen risk management planning and policy-making; improving the capacity of households and communities to adapt to climate variability and change by implementing sustainable land use management practices and diversifying their livelihoods; and strengthen community disaster risk-reduction and climate adaptation planning and processes at the zonal, <i>woreda</i> , and national levels.	USAID Ethiopia Part of over US\$11 million	Project Concern International (lead), Agri Service Ethiopia, Hundee Oromo Grassroots Development Initiative, and Rift Valley Children and Women Development Organization	Capacity building, field implementation, and community-based adaptation	Pastoralism and disaster risk management	September 2014–September 2017	National
Rural Resilience Enhancement Project	The project was launched to enhance the resilience of rural communities in the Oromia and Somali regions against the impacts of climate change, such as droughts. The project's three components work with target	Japan International Cooperation Agency JPN¥11.09 million	MoA, Natural Resource Management Directorate, Oromia Bureau of Agriculture, and Somali Livestock	Capacity building, field implementation, and community-based adaptation	Agriculture, pastoralism, disaster risk management, and insurance	April 2012–February 2015	National

	communities to strengthen their resilience by building small-scale infrastructure (e.g., water facilities, livestock markets, and feeder roads); constructing irrigation systems to extend irrigation agriculture; and providing Weather Index insurance for those more vulnerable to agricultural disaster due to climate change. The project also will build the resilience of target communities in times of drought.		Crop Rural Development Bureau				
Steps Toward Sustainable Forest Management with the Local Communities in Tigray, Northern Ethiopia	The project aims to contribute to climate change adaptation and food security through improving the use of forests as a means of income diversification for local communities in Ethiopia. This will be achieved through research on sustainable management of forests in northern Ethiopia in the context of climate change. Project activities focus on strengthening international collaboration in research and teaching, increasing the capacity of academic staff, enabling delivery of high-quality study programs, and improving administrative and management skills.	NORAD through NORHED 18 million kr	Mekelle University (Ethiopia) and Norwegian University of Life Sciences (Norway)	Research and capacity building	Forestry and post-secondary education	2013–18	National
The Strategic Climate Institutions Programme	The fund is designed to build Ethiopia's capacity to cope with climate change across the public, private, and civil society sectors and to respond to the challenges of	DFID, Norway, and Denmark £9.7 million	KPMG	Capacity building, and policy formation and integration	Multisectoral	2012–16	National

	transitioning to a climate resilient green economy. Flexible grants will be provided to government agencies, civil society organizations, the private sector, and academia for projects that have a clear multiplier effect and support critical institutions charged with delivering Ethiopia's <i>CRGE Strategy</i> .						
Strengthening Drought Resilience of the Pastoral and Agro-pastoral Populations in the Lowlands of Ethiopia (Somali Region)	Through capacitating local natural resource management institutions, the project aims to ensure resilient and sustainable livelihoods and food security of drought-affected pastoralist and agro-pastoralist communities in the Somali region of Ethiopia.	Swiss Agency for Development and Cooperation CHF 17,600,000	GIZ, local governments, and NGOs	Capacity building	Agriculture, pastoralism, and disaster risk management	February 2015–January 2026	National
Synthesis of IWMI previous work in the Volta and Blue Nile Basins on Water Storage Evaluation under Future Climates, and examination of technical, socioeconomic and environmental criteria for evaluation of	This activity aims to analyze the current status of storage in the Volta and Blue Nile Basins and to suggest criteria and guidelines for such planned development. It will develop recommendations on how to consider climate change in evaluation of water storage options, basin-wide water storage planning in river basins, and assessment of the need for storage for different uses.	CGIAR Climate Change, Agriculture and Food Security Program US\$250,000	International Water Management Institute, Postdam Institute, Water Research Institute, University of British Columbia, University of Ghana, and German Centre for Development Research	Research	Watershed management and freshwater supply	January 2012–June 2013	Regional Ethiopia, Burkina Faso, and Ghana

various storage
options

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