



Federal Ministry of Health of Ethiopia

National Framework of Climate Resilient
Health Sector

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Forward

Climate variability and change is being visible all over the world. The adverse effects of climate change revealed in social, economical as well as political aspects. As the climate is changing, the existing diseases will aggravate and new diseases will emerge. For instance, vector borne diseases such as malaria and leishmaniasis being occurred in places where the diseases were not occurred before. Dengue fever emerged for the first time in eastern part of the country.

If our prevention of diseases and promotion of health are not strengthened, definitely the diseases burden will increase beyond the health facilities capacity due to climate change effects. So, it is crucial to build climate resilient health system having a framework and national health adaptation plan and implementing accordingly. I would like to thank WHO-Ethiopia to initiate this idea and support technically to develop this framework.

We will draw the national health adaptation plan this year; and we will implement the selected interventions based on this framework and the national health adaptation plan that will develop this year. In building climate resilient health system, we hope that WHO-Ethiopia and other partners will provide their endeavor support.

Acronyms

AAU	Addis Ababa University
CCH-TWG	Climate Change and Health Technical Working Group
CRGE	Climate Resilient Green Economy
CSA	Central Statistics Authority
DFID	Department For International Development
EDHS	Ethiopian Demographic and Health Survey
ENSO	El Nino Southern Oscillation
EEPA	Ethiopian Environment Protection Authority
EPHI	Ethiopian Public Health Institute
FMOA	Federal Ministry of Agriculture
FMOEF	Federal Ministry of Environment and Forest
FMOI	Federal Ministry of Industry
FMOLSA	Federal Ministry of Labour and Social Affairs
FMOH	Federal Ministry of Health
FMOT	Federal Ministry of Transportation
FMOUDHC	Federal Ministry of Urban Development, Housing and Construction
FMOWIE	Federal Ministry of Water, Irrigation and Energy
FMOWYC	Federal Ministry of Women, Youth and Children
HDAMA	Health Development and Anti Malaria Association
H-NAP	Health National Adaptation Plan
GDP	Gross Domestic Product
GFATM	Global Fund for AIDS, Tuberculosis and Malaria
GIZ	the German Society for International Cooperation
GHGs	Green House Gases
HDAMA	Health Development and Anti Malaria Association
H-NAP	Health National Adaptation Plan
IDSR	Integrated Disease Surveillance and Response
IPCC	Inter-governmental Panel for Climate Change
MDGs	Millennium Development Goals
MoFED	Ministry of Finance and Economic Development
NAPA	National Adaptation Plan of Action
NMA	National Meteorology Agency
UNDP	United Nations Development Programme
UNEP	United Nations Environmental Programme
UNFCCC	United Nations Framework Convention on Climate Change
UNIDO	United Nations Industrial Development Organization
WHO	World Health Organization
WMO	World Meteorology Organization

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1 Background

Ethiopia is one of the Sub Saharan African countries located in East Africa. It lies between latitudes of 3⁰21'N and 14⁰53' N, and longitudes of 33⁰03' E and 48⁰01' E. The total surface area of the country is about 1.1 million square Km. It shares border with Eritrea in north, Kenya in south, Djibouti and Somali in the east, and Sudan and South Sudan in the west. Ethiopia has 9 regional states and 2 city administrations. According to Ethiopian Central Statistics Authority, the total population of Ethiopia is estimated to be around 88 million in 2014 with population growth rate of 2.49% per year.¹

Ethiopia comprises of very rugged and complex topography ranging from Dalol depression, 125 meters below sea level, to about 4620 meter above sea level, Ras Dashen Mountain tip². There are three broad climatic zones of the country depending on the altitude. These are 'Kolla' which is found below the altitude of 1500 meter above sea level; the 'Weyna Dega' zone which is between 1500 and 2400 meter above sea level; and the 'Dega' is 2500 meters and above. The mean annual temperature ranges from 10-16⁰C, 16-29⁰C and 23-33⁰C in Dega, Weyna Dega and Kolla Zones respectively. There are two main rainy seasons in Ethiopia. These are 'Kiremt' (June to September) and 'Belg' (March to June). The mean annual rainfall is about 500-2000 mm in the highlands and 300-700 mm for the Weyna Dega zone. This implies that high altitude areas generally receive higher rainfall than low altitude areas.

Nearly 90% of Ethiopia's population lives at highlands. Around 82% of the total population of Ethiopia lives at rural setting¹ and engaged in agriculture. The agriculture sector contributes 43.1 % to the total GDP of the country³ which is the largest and the backbone to the country economy.

Currently, the country has around 3000 public health centers, 300 public hospitals and 16,018 health posts to provide the required health services and care to the public. Around 30,950 health extension workers and 35,364 other health professionals are engaged in provision of public health Services⁴.

¹ Populations Projection for Ethiopia, 2007-2037, Central Statistics Agency, and retrieved from http://www.csa.gov.et/images/general/news/icps2012pro_report.pdf

² Lesson learned from implementation of climate and Health project of HDAMA by WHO-Ethiopia, 2013

³ Situation Analysis and Needs Assessment of Ethiopia based on the Libreville Declaration on health and environment inter-linkage, Country Report, Ethiopia

⁴ Human Resources for health- Country Profile Ethiopia, and retrieved from http://www.unfpa.org/sowmy/resources/docs/library/R045_AHWO_2010_Ethiopia_HRHProfile.pdf

2 Introduction

Climate change is being observed in the world we live in. Globally, mean temperature has risen by 0.76⁰C and 0.4⁰C out of 0.76⁰C increment was noted since 1970s and will increase by 1.4 to 5.8⁰C in the course of 21st century.^{2,5} The 3rd assessment report of IPCC strengthen the previous report by substantiating with strong evidence that most of the warming observed over last 50 years attributable to human activities.⁵ Similarly; the surface temperature of Ethiopia has increased by 1.3⁰C only from 1960 to 2006 and predicted to increase 1.1 to 3.1⁰C by 2060⁶.

Flood, water storm, wind storm, drought, bushes' fire, expansion of existing communicable diseases and emergence of new diseases are being observed as a result of climate change. Climate change is expected to increase the burden of climate sensitive diseases such as vector-borne diseases, diarrhoeal diseases, acute respiratory tract infection, under-nutrition, and heat related illness and injuries. According to WHO estimate, 140, 000 people die in the world every year due to human caused climate change with highest impacts in Africa² as there is poor capacity to respond to the negative health impacts of climate change by most African nations. This figure is likely to increase as the global warming is being increased and exacerbate the existing environmental health threats around the world. Children, the elderly and those in the disadvantaged communities are most vulnerable to such exacerbation.

The first African inter-ministerial conference on health and environment held in Libreville, Gabon, in 2008 and came with Libreville declaration which deals on inter linkage between and strategic alliance of health and environment. Similarly, the second African inter-ministerial conference on health and environment held in Luanda, Angola, in 2010 and identified management of environmental and health risks related to climate variability and change among the nine top priorities for African health and environment in the years to come. Ethiopia conducted situation analysis and need assessment of health and environment linkage and produced country report co-signed by FMOH and EPA in 2010 as succession of African inter-ministerial conference on health and environment. Moreover; Ethiopia developed Climate Resilient Green Economy strategy and policy in 2011 as means of sustainable development and in response to climate change.

Therefore, FMOH has developed this framework to respond to the argent need of Health sector in adapting the impact of climate change and aiming to serve as policy guidance and provide road map for the realization of National Health Adaptation Plan to be developed following this framework.

⁵ Climate change and human health-Risks and Responses, and retrieved from <http://www.who.int/globalchange/environment/en/ccSCREEN.pdf?ua=1>

⁶ Assessing climate change vulnerability in East Africa ,and retrieved from http://www.care.or.ke/images/PDF/GWI_CVCA_CS_Sept11.pdf

3 Situation Analysis

3.1 Climate change in the country

Ethiopia's contribution to global carbon emission is insignificant as compared to the most polluting industrialized countries. The GHGs emission of Ethiopia was 150 metric tons CO₂ equivalent in 2010. Of which more than 85% came from the agricultural and forestry sectors. They are followed by power, transport, industry and buildings, which contributed 3% each.⁷ Ethiopia's previous forest cover which serves as carbon sink had been cleared for agricultural expansion and energy supply and remains 12.3 %. Almost all, 95%, of Ethiopian energy supply comes from woody biomass mainly fuel wood (77%).^{8,9,10,11}

According to NMA's report of 2007, the average minimum temperature in Ethiopia has been increasing by 0.37 °c per decade in the last 60 years.¹² The IPCC mid-range climate projections also indicate a rise in mean annual temperature from 0.9-1.1°C by 2030, 1.7-2.1°C by 2050 and 2.7-3.4°C by 2080 as compare to the 1961-1990 baseline condition. This rise in mean temperature has been rapid during the main rainy season (July to September).² As a result, this climate change increased the number of 'hot' days by 20% from 1960 to 2003, and a 37.5% increase in the number of 'hot' nights over the same period.¹⁰

A climate trend analysis of Ethiopia indicated a 15-20% reduction in spring and summer rains in parts of the country since the 1970s.² Similarly; another analysis of the climate data of more than five decades indicated that the amount of rainfall has been constant on a national average with a declining trend in the northern Ethiopia, increasing rainfall intensity and variability trend in central Ethiopia, and increasing rainfall in southern Ethiopia^{6,10,13} However; this climate change is also linked with the El Nino and La Nina phenomena, leading to droughts, floods, heavy rain, food insecurity, disease outbreaks and land degradation.¹³

⁷ Ethiopia's Climate-Resilient Green Economy Green economy strategy and retrieved from <http://www.undp-aap.org/sites/undp-aap.org/files/Ethiopia%20CRGE%20Strategy%20Final.pdf>

⁸ International water management Institute, Aster Denekew

⁹ Ethiopia Environmental and Climate Change policy brief, Emelie César Anders Ekbohm, and retrieved from <http://sidaenvironmenthelpdesk.se/wordpress3/wp-content/uploads/2013/05/Ethiopia-Environmental-and-Climate-Change-policy-20130527.pdf>

¹⁰ Resources, risk and resilience: scarcity and climate change in Ethiopia retrieved from http://cic.nyu.edu/sites/default/files/evans_security_ethiopia_2012.pdf

¹¹ Initial National Communication of Ethiopia to the United Nations Framework Convention on Climate Change, and retrieved from <http://unfccc.int/resource/docs/natc/ethnc1.pdf>

¹² CLIMATE CHANGE NATIONAL ADAPTATION PROGRAMME OF ACTION (NAPA) OF ETHIOPIA, and retrieved from <http://unfccc.int/resource/docs/napa/eth01.pdf>

¹³ Local innovation in climate-change adaptation by Ethiopian pastoralists, yohannes Gebremichael and Mebrahtu Kifle, and retrieved from http://www.prolinnova.net/~prolin/sites/default/files/documents/thematic_pages/climate_change_pid/2009/Ethiopia%20pastoral%20climate-change%20adaptation%20FINAL%20 2 .pdf

3.1.1 Major Climate change risks

3.1.1.1 Drought

Temperature warming and increased CO₂ in the atmosphere decrease crop production as they create favorable conditions for weed growth and pest infestation which in turn hamper food production and affect nutrition.¹⁴ It is assumed that Ethiopia's temperature increased 0.2°C annually on average. This has already led to a decline in agricultural production, and cereal production is expected to decline still further by 12% under moderate global warming.¹³ In Ethiopia significant rainfall reductions have already been observed within critical crop-growing areas; and this has been attributed to anthropogenically influenced warming of the Indian Ocean.¹⁵

The impacts of past droughts such as that of the 1972/73, 1984 and 2002/03 are still fresh in the memories of many Ethiopians. Since the 1980s more than 57 million people have been affected by droughts. Still around 10 million people live in areas at high risk of droughts; and these events are expected to become more common due to climate change.⁹

3.1.1.2 Floods

Flood would result from an increased number of heavy precipitation events and overflowing rivers.¹⁴ Floods often cause major damage to infrastructures such as roads, rail lines, airports, electricity supply systems, water supplies, sewage disposal systems as well as destruction of homes, health facilities and other essential services, impacting particularly on people in slums and other marginal living conditions.^{14,16} Flood also contaminates freshwater supplies, creates opportunities for breeding of disease carrying insects such as mosquitoes as well as drive rodents from burrows to move closer to human dwellings.^{10,14,16} Furthermore; climate change intensify floods which eventually force people to abandon where they live in order to seek new homes and livelihoods. Forced displacement is associated with a range of health issues like social isolation, mental disorders, reduced socioeconomic status, etc.¹⁶

¹⁴ Climate change futures: Health, Ecological and Economic dimensions, The Center for Health and the Global Environment, Harvard Medical School, and retrieved from http://coralreef.noaa.gov/aboutcrp/strategy/reprioritization/wgroups/resources/climate/resources/cc_futures.pdf

¹⁵ Climate Change and health Across Africa: Issues and Options, United Nations Economic Commission for Africa, African Climate Policy Centre, and retrieved from http://www.uneca.org/sites/default/files/publications/wp20-climate_change_and_health.pdf

¹⁶ Protecting health from climate change, WHO, 2008, and retrieved from http://www.who.int/world-health-day/toolkit/report_web.pdf

Major floods caused loss of life and property in different parts of the country occurred in 1988, 1993, 1994, 1995, 1996 and 2006.¹² For instance, more than 614 people were died and more than 22, 000 people were displaced in Dire Dawa, 14 villages of South Omo zone and West Shewa zone due to the floods of 2006. Similar situations also occurred in Afar, Western Tigray, Gambella Zuria and the low lying areas of Lake Tana in the same period.¹²

3.1.1.3 Heat Wave

A heat wave is a prolonged period of excessively hot weather and when the daily maximum temperature of more than five consecutive days exceeds the average maximum temperature by 5 °C (9 °F).¹⁷ Excessive heat reduces productivity. Air conditioning is crucial to overcome such excessive heat and it requires electric power which would be stretched severely in such events. Heat wave present great threats to developing countries like Ethiopia as energy resources for cooling are often scarce and people of developing countries live under vulnerable conditions.¹⁶ Furthermore; Heat wave is associated with excessive mortality via several pathways such as dehydration, heat stroke, cardiovascular collapse, and cerebrovascular and respiratory distress.¹⁴ Heat wave associated mortality and morbidity exist at hot areas of Ethiopia though they are not well registered.

3.1.2 Climate sensitive diseases and health conditions

A number of diseases and health conditions that severely affect people in Ethiopia are sensitive to climate variability and change. These include primarily malnutrition, malaria, dengue fever, yellow fever, meningitis, leishmaniasis, shistosomiasis, sleeping sickness, onchocercariasis, diarrhea, respiratory tract infections.²

3.1.2.1 Malnutrition

Malnutrition is one of the leading public health problems in Ethiopia and exacerbates by drought and loss of productivity.² Chronic malnutrition among Ethiopian children is very high though stunting slightly decreased from 52% in 2000 to 44% in 2011^{18,19} Similarly; people that are undernourished has decreased slightly from 47.7% in 2005 to 40.2% in 2011.⁹

3.1.2.2 Water Borne Diseases

Heavy rainfall can wash microbes into sources of water in large quantities; and microbes move easily in wetted soil than dry soil. Thus, water borne diseases exacerbate during rainy season. Similarly; warming affect water quality creating a favorable condition for flourishing of pathogenic microbes resistant to disinfectants.

¹⁷ WMO Definition retrieved from http://en.wikipedia.org/wiki/Heat_wave#Definitions

¹⁸ EDHS 2000, and retrieved from <http://dhsprogram.com/pubs/pdf/FR118/FR118.pdf>

¹⁹ EDHS 2011, and retrieved from <http://dhsprogram.com/pubs/pdf/FR255/FR255.pdf>

Diarrhoea is much more common in Ethiopia and threaten to increase the burden when temperature gets warm since there are inadequate water and sanitation services. A recent health survey showed that one in four children (between 6-23 months) had diarrhoea within a two-week period of the survey.⁹ WHO estimates also show that over 112,000 people die every year due to lack of access to safe drinking water and sanitation in Ethiopia.⁹

Bilharzias is water based disease and common in hot areas of Ethiopia with stagnant water bodies and irrigation schemes. Bilharzias will expand to other areas of Ethiopia as warming ambient temperature favours for snails, reservoirs of bilharzias parasites as well as due to construction of dams and irrigation schemes.

Trachoma is water related disease common in Ethiopia which might increase its incidence and prevalence due to scarcity of water occurring in different parts of Ethiopia. Climate change is causing rainfall shortage in some areas of Ethiopia while it intensifying rainfall in other areas of Ethiopia which in turn cause heavy runoff and do not infiltrate to the ground. These all would result in water scarcity. If there is water scarcity people will face difficulty to keep personal hygiene especially face hygiene. As a result, the prevalence of trachoma will increase.

3.1.2.3 Vector Borne Diseases

Climate changes are expected to affect the lifecycle and modes of transmission of many infectious diseases. Temperature and moisture availability are two environmental factors influenced by climate change that affect pathogen proliferation.¹⁵ Insect borne diseases are strongly affected by climatic conditions such as temperature, rainfall and humidity. These include malaria, dengue fever, yellow fever, etc

Malaria is a highly climate sensitive disease.² Both temperature and humidity affect the survivability and density of mosquitoes population. Similarly, malarial protozoa incubation period will be shorter as the temperature increases to certain limits. These conditions of increasing mosquitoes density and shorten malarial protozoa incubation period increases malaria transmission rate to some extent.¹⁶ There is evidence that a warming trend over the last 30 years has created favourable conditions for mosquitoes breeding at highlands of Ethiopia which in turn increases the probability of malaria transmission and epidemics at highlands.¹⁶ For instance, malaria is ever increasing in Addis Ababa which is one of the most highlands in Ethiopia. Therefore, malaria is circulating among populations living at low altitudes and increasingly in highland areas in Ethiopia.¹⁵

In Ethiopia, over five million cases with around tens thousands of deaths of malaria are estimated to occur per year.² About three-quarters of the country are considered to be either malarious or potentially malarious with two-third of the population at risk of infection; and malaria remains the most important public health concern accounting for 12% of the total outpatient visit.^{3,20} Therefore, there is high risk of malaria epidemic in Ethiopia and may worsen in the future as

²⁰ Public health and weather services—climate information for the health sector, and retrieved from http://www.wmo.int/pages/publications/bulletin_en/archive/57_4_en/documents/57_4_rogers_sub_en.pdf

exposure to mosquito bite in person-month is projected to increase more than 100% in Ethiopia later in this century which in turn could dramatically increase the burden of those suffering with malaria.¹⁶

Dengue fever cases have risen dramatically in the last 40 years worldwide due to unplanned urbanization with standing water in waste and other receptacles which have created mosquito breeding sites. Furthermore, movement of people and goods has spread both mosquito vectors and infections. As Dengue fever is insect borne disease, the distribution of dengue is also highly dependent on climate. In the absence of changes in other determinants, studies suggest that climate change could expose an additional 2 billion people worldwide to dengue transmission by the 2080s.¹⁶ Consequently; a total of 6,192 dengue fever cases were reported from Gode of Somali region, Hadar of Afar region and Dire-dawa city administration till May, 2014 which was never and ever reported before.²¹

According to the available information Ethiopia has reported yellow fever cases before 60 years. After 6 decades for the first time the outbreak was reported from south Omo in 2013. The outbreak is ongoing until today and 159 yellow fever cases were reported till January, 2014.

3.1.2.4 Other Diseases

Meningitis is a climate sensitive disease. Meningitis epidemics are most often reported in years of severe dryness and drought, and in dust laden environments.¹⁵ The place along the Sahel with higher concentration of meningitis is often referred to as the 'meningitis belt' which has 21 countries including Ethiopia. The break out occurs in 5 to 10 years intervals in the meningitis belt. In Ethiopia the outbreaks occurs during dry seasons (December-April) and end at the beginning of the rainy season (May-June). According to the national surveillance data, a total 20,938 meningitis cases were reported to occur from 2001-2008 in a total of 259 districts.²

Asthma is another climate sensitive non communicable disease and allergenic effect to the upper respiratory system. Asthma aggravates with allergenic pollen that boomed and stays for long time during warm temperature and increased CO₂ level in the atmosphere. Similarly; diesel exhaust act synergistically with other allergens to aggravate asthma. Thus, asthma is more common at urban area than in rural areas. Therefore; thermal extremes and shifting weather patterns give rise to increased volumes of dust swept vast distances, more photochemical smog and higher concentrations of CO₂-linked aeroallergens (pollen and mold) drive up rates of asthma.¹⁴ Even though the magnitude of asthma in Ethiopia is not well known, the incidence and prevalence of asthma is increasing alarmingly.

The following logic model summarizes climate change and its potential effect. See Figure 1 below.

²¹ WHO-Ethiopia Report

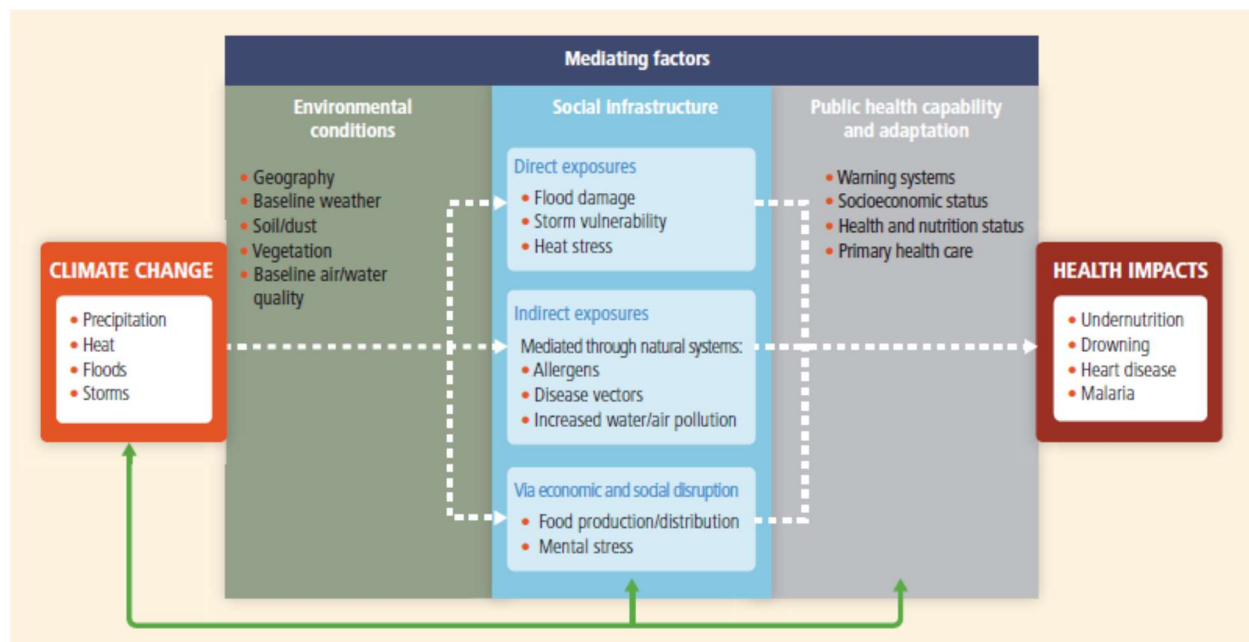


Figure 1: Conceptual diagram showing through primary exposure pathways by which climate change affect health²²

3.1.3 Adaptive Capacity

3.1.3.1 Enabling Environment

Ethiopia has a number of national policy initiatives, sectoral policies, programs and strategies that address climate change adaptation directly or indirectly. The most relevant policies and strategies to climate change adaptation are Environmental Policy of Ethiopia, Agriculture and Rural Development Policy and Strategy, Water Resources Management Policy, Health Sector Development Policy and Program, National Policy on Disaster Prevention and Preparedness, National Policy on Biodiversity Conservation and Research, Science and Technology Policy, Population Policy and National Agricultural Research Policy and Strategy.¹²

Ethiopia developed Climate Resilient Green Economy strategy in 2010 understanding that climate could be a setback for sustainable development; and the CRGE strategy focuses on reducing GHGs emission and using renewable energy resources as major source of energy for the country. Ethiopia has also social protection policy which deals prevention, protection, transformation and promotion including post recovering of disasters victims through establishing

²² IPCC 5th Report

community based social security fund. Through this fund, victims of flooding, fire, drought, land slide and other disasters as well as aged and disabled people will get support to recover from.

In addition, Ethiopia has signed and/or ratified many of the international conventions and protocols directly or indirectly related to climate change mitigation and adaptation. Among these, the United Nations Framework Convention on Climate Change (1994), Kyoto Protocol (1997), the Convention on Biological Diversity (1994), the United Nations Convention to Combat Desertification (1994), the Cartagena Protocol on Bio-safety to the Convention on Biological Diversity (2000), and the Stockholm Convention on Persistent Organic Pollutants are the principal ones.⁹

3.1.3.2 Institutional Arrangements

Basic health service becoming accessible to the grass root level through establishing health extension program at kebele level as well as by establishing of health development army from the ministerial level to women at village level. The ministry has also established a functional public health emergency directorate aiming at preventing and reducing disasters and their outcomes. Moreover; The FMOH has integrated diseases surveillance system from the grass root level to the top federal level which generates reports of diseases under surveillance weekly and monthly. The Federal Ministry of Health has also initiated to use climate information to prevent climate sensitive diseases and to make necessary preparation to tackle the predicted disaster, or epidemic disease with highly focused on malaria.²⁰

There is also named Risk Assessment- Early warning and Preparedness committee which is led by agriculture sector at all levels and deals with assessment of all existing and potential risks but with emphasis to drought and crop production. This assessment is carried out twice a year.

Ethiopia was successful in achieving full health coverage in terms of geo-physical accessibility to health care. In most areas of Ethiopia health facilities (health posts, health centers and hospitals) were built in accordance to the conventional standards for developing countries. This is a good condition in prevention and absorbing the existing and future diseases burden. However; most of the existing health facilities are not equipped with the required resources such as equipments, health professionals and infrastructures (water supply, electricity, means of communication, etc) to hold climate change posed disasters like flooding casualties, drought induced diseases, epidemic diarrhea, epidemic meningitis, epidemic malaria, etc.

3.1.3.3 Community Adaptive capacity

There are various indigenous knowledge and practices at various places of Ethiopia to overcome climate change and variability caused rooted disasters. Though there are no adequate studies on Ethiopian communities coping mechanism to climate change and variability caused disasters especially to climate sensitive diseases, one study showed that there are traditional and contemporary coping mechanisms to climate variability and extremes in Ethiopia which includes changes in cropping and planting practices, reduction of consumption levels, collection of wild foods, use of inter-household transfers and loans, increased petty commodity production,

temporary and permanent migration in search of employment, grain storage, sale of assets such as livestock and agricultural tools, mortgaging of land, credit from merchants and money lenders, etc.¹²

Another study conducted in pastoral communities of Ethiopia also revealed that pastoral households move their livestock to places where they find these resources to overcome the problem of drought induced food and water scarcity,²³ As result of sever and recurrent drought, many pastoralists' livelihood deteriorates and learnt to become agro-pastoralists or agrarian.¹³

3.1.4 Vulnerability

Health sector has been identified as one of the top three most vulnerable sectors to climate change by Ethiopian CRGE, Ethiopia's NAPA and IPCC's regional review.^{7,12,24} The final effects of climate change such as causalities of flooding and drought disasters as well as the increasing of climate sensitive diseases will be reflected in the health sector since the health sector is responsible to manage all health aspects of human being; and such disasters ruin the resources of the health sector which in turn causes strains of resources.

Vulnerability to adverse effect of climate change and variability varies among segments of population as they vary in natural immunity, way of life, resources they have, magnitude of the risk posed, geographical set-up, etc. According to the Famine Early Warning Systems Network, the key population groups at risk of food insecurity in Ethiopia are the pastoral population of the Afar and Somali regions, significant proportion of people in the crop dependent highlands; and the population that live besides to Ethiopia's major rivers¹⁰

Similarly, major cities of Ethiopia have high population densities but inadequate coverage of clean water, sanitation and waste disposal services. These conditions raise vulnerability of the cities to climate-sensitive infectious diseases such as diarrhoea and dengue fever.²¹ High Landers are also vulnerable to malaria since higher temperatures are intensifying the risks of transmission of malaria and high landers lack immunity against such diseases.¹⁶

Children of developing countries are also vulnerable to most important climate sensitive diseases such as malaria, diarrhea and malnutrition. For instance, malaria remains the most common parasitic disease and is the main cause of morbidity and mortality among children in Ethiopia.^{9,16} Elders are also vulnerable to climate change posed disasters such as droughts, floods and heat waves as they have less capacity to protect themselves and to move from as well as they have lower immunity.

3.2 Justification

²³ Climate change impacts on Pastoral Women in Ethiopia: some evidences from the Southern lowlands, retrieved from http://phe-ethiopia.org/pdf/Final_Brief_CC_women.pdf

²⁴ Harari People Regional State Programme of Plan on Adaptation to Climate Change, and retrieved from <http://www.epa.gov.et/Download/Climate/Regional%20Climate%20Change%20Adaptation%20Programmes/Harri%20Regional%20State%20Climate%20Change%20Adaptation%20Program.pdf>

Ethiopia has signed and/or ratified many of the international conventions and protocols directly or indirectly related to climate change mitigation and adaptation. Ethiopia has developed Climate Resilient Green Economy strategy which addresses climate change impacts as set back of sustainable development. This CRGE acknowledge the disease burden increased due to climate change and identified the health sector as one of the most vulnerable to climate change impacts. Furthermore, the Federal Ministry of Health and the then Federal Environmental Protection Authority have conducted Situation Analysis and Need Assessment for Ethiopia in collaboration with partners as part of their strategic alliance and implementation of Libreville Declaration.

However; there is lack of comprehensive sectoral response to address climate change adaptation interventions. Thus; this framework of climate resilient national health system developed.

4 Purpose

The purpose of this framework is to serve as policy guidance and provide road map for the realization of Health National adaptation Plan to be developed following this framework.

5 Goal and Objectives

5.1 Goal

Establishing climate resilient health system

5.2 Objectives

The objective of this framework is to guide the preparation of a comprehensive and practical national health climate change adaptation plan that will guide future health climate change adaptation practices.

The specific objectives are:

1. To guide the assessment of the country's health sector vulnerability and adaptation to climate change
2. To guide the development of H-NAP
3. To enhance health sector's capacity to respond and adapt climate change impact on health
4. To facilitate the implementation of integrated essential public health and environment interventions.
5. To facilitate operational and applied research on local health adaptation needs and solutions.

6 Scope

The health sector will concentrate its effort in adaptation to climate change rather than mitigating to climate change. This health adaptation to climate change initiative will be carried out nationwide and contextually to each regional state. However; the health sector will promote climate change mitigation actions and initiatives. The following figure shows where the health sector to deal to adapt climate change and minimize its adverse effects.

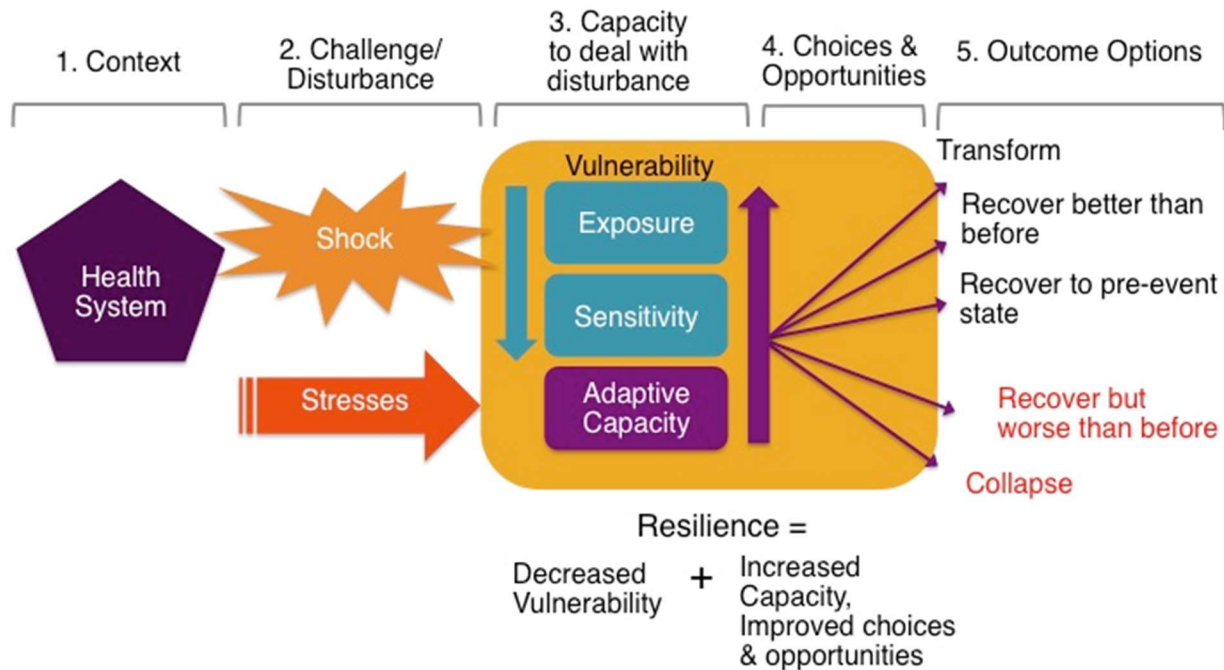


Figure 2: Health Adaptation to Climate Change Adverse Effects

7 Institutional Arrangement for Implementation of the framework

The implementation of this framework will use the existing health sector institutional arrangement from national to community and household level. The existing directorates of FMOH and agencies accountable to FMOH will implement this framework with support of National Climate Change and Health Technical Working Group. The NCCH-TWG members are from relevant directorates of FMOH and agencies accountable to FMOH, relevant line ministries(MoA, MoEF, MoE, NMA, MoWIE, MoLSA, MoCWY, MoUDHCO, MoI) and development partners(WHO, UNICEF, UNDP and UNIDO). It is expected that other government organizations, multi-lateral and bilateral donors will be part of the CCH-TWG in the future.

This technical working group will have maximum 20 members. This technical working group will be accountable to state minister of FMOH, and will have linkage to the national climate

change mitigation and adaptation task force through FMOH. Similar Technical working group can be established at the respective administrative regions. The implementation of this framework will be led by joint steering committee made up of Minister of Health, state ministers of health and directorates, Regional Health Bureau Heads, Heads of agencies accountable to FMOH.

8 Duties of the technical working group

The National climate change and health technical working group will be engaged in provision of technical advisory role to MoH and stakeholders in planning, implementation, monitoring and evaluation of various initiatives, projects and programmes of health adaptation to climate change through which climate change resilient health system will be built gradually.

9 Milestones of Building Climate Resilient health system

Building climate resilient health system is a continuous process as long as the ministry exists. Therefore; the following milestones of the climate resilient health system building process will be carried out in the next 5 years.

Table 1: Milestones, Expected Outputs and organizations to be involved

S.N	Milestones	Expected Output	Time Frame	Leading organization	Involving organizations	Remark
1	Establishing CCH-TWG	Technical capacity established and provide support at national level to guide climate change adaptation to health,	Already established	FMOH		
2	Developing framework	Policy document produced and serves as a road map for climate change and adaptation in health	April-December, 2014	FMOH	CCH-TWG members	
3	Conducting V and A assessment	Base line vulnerability status of the country established and	January-April, 2015	FMOH	CCH-TWG members	

		serve for H-NAP development				
4	Developing H-NAP	Detail priority interventions with required resource developed	March-May, 2015	FMOH	CCH-TWG members, Regional Health Bureaus,	
5	Implementing H-NAP	From national to Regional health bureaus and steckholders build adaptive capacity	April, 2015-June, 2020	FMOH	Regional Health Bureaus	DFID/WHO will support in implementation of the WaSH part of the plan
6	evaluating the implementation	The adaptive capacity gap identified	January, 2017 and July, 2020	FMOH	CCH-TWG members, Regional Health Bureaus, Partners	
7	Documenting lesson learnt	Adaptive capacity scaled up	April, 2014-July, 2020	FMOH	Regional Health Bureaus	

10 Guiding Principles

The guiding principles for the implementation of national climate change health adaptation are:

1. Evidence-Based Planning
2. Public Ownership and Community Participation
3. Intersectoral cooperation and collaboration.
4. Integrating with other public health initiatives
5. Advocacy at international, national and regional levels
6. Focusing primarily to adaptive measures
7. Preferring cost efficient interventions

11 Priority Interventions

These priority interventions are health interventions which strengthen resilience to climate change. These interventions would include:

1. Undertaking baseline risk and capacity assessments.
2. Capacity building
3. Implementing integrated health and environment surveillance
4. Undertaking awareness and social mobilization
5. Promoting public health oriented environmental management
6. Scaling up existing public health interventions
7. Strengthening and operationalizing the health components of disaster risk reduction plans
8. Promoting research on climate change impacts and adaptation

9. Strengthening partnership and intersectoral collaboration

12 Financial Sources

Since climate sensitive diseases and disaster risks posed by climate change are not peculiar rather than already existing, no need to treat them specifically. Therefore, climate sensitive diseases and climate change posed disaster risks have to managed integrately and mainstreamed to all activities of FMOH. Thus, the main financial sources of health adaptation climate change are resources of the existing programmes, projects and initiatives of FMOH. It is possible to use innovative financing mechanisms like extra taxation on alcohol, tobacco, fossil fuel used industries, machines and vehicles, etc. There are also tendencies to support activities like greening ways and recreation areas, wastes management and water supply by municipalities of cities in Ethiopia in the context of decentralization. There is also a vast potential to mobilize resources at national and international levels such as Green Facility Fund, carbon trading fund and other various climate funds made available under UNFCCC process . However, there should be clear legal and regulatory framework; and strong intersectoral coordination mechanisms to optimize such financing strategies..

13 Monitoring and Evaluation

At the national level, the FMOH in collaboration with other relevant partners and through the technical working group to health adaptation to climate change will prepare a monitoring and evaluation framework that will be used by FMOH and its partners in order to ensure harmonization of procedures and comparability of results. The monitoring and evaluation framework will be based on a set of standardized outcome and impact indicators and procedures to track the implementation and impacts of national health adaptation programmes. Here below the overall monitoring and evaluation logic model of health adaptation to climate change.

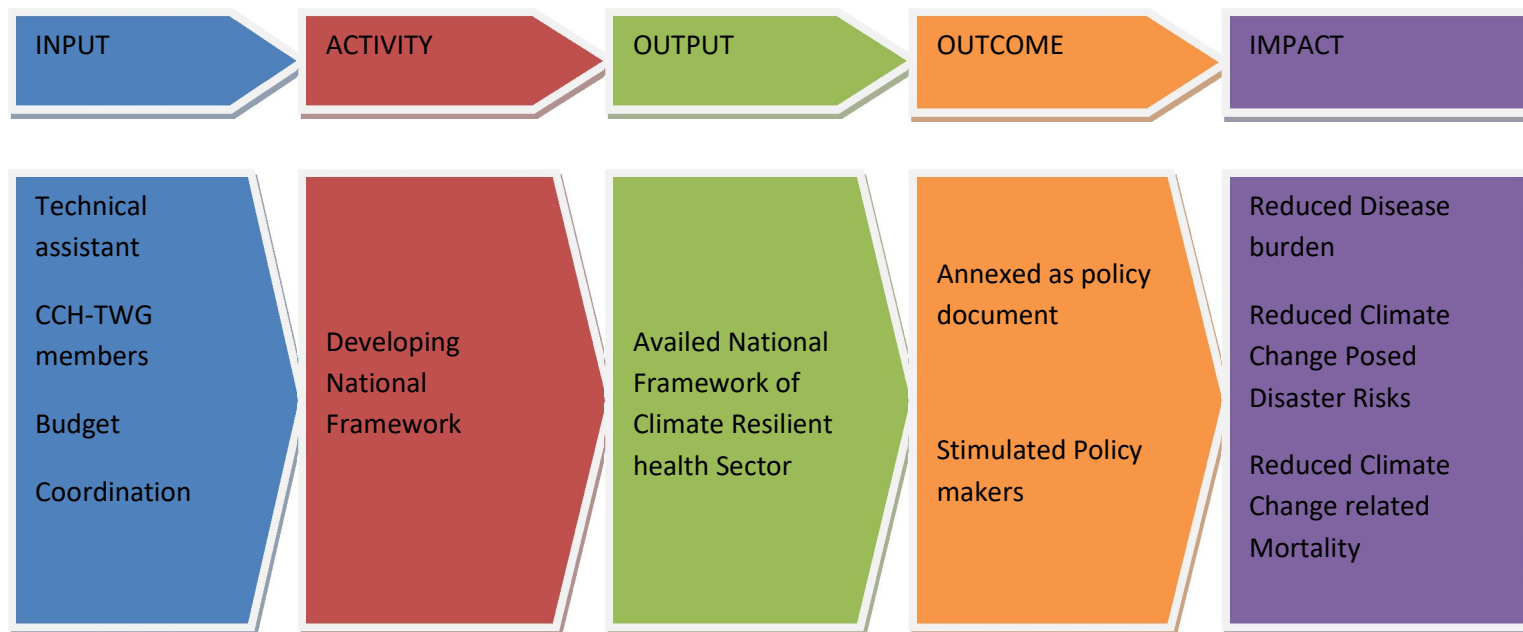


Figure 3: monitoring and evaluation logic model of health adaptation to climate change

At the national level, implementation of building climate resilient health system will be tracked using the following indicators:

- a. Completed document of comprehensive assessments of risks posed by and capacity to care of climate variability and change impacts;
- b. Formulated specific capacity building action plans for public health adaptation to climate change ;
- c. Number of regional states and city administrations draw their own action plan of health adaptation to climate change impacts;
- d. Number of regional states and city administrations that are implementing integrated environment and health surveillance; and
- e. Number of regional states and city administrations that reporting reduced mortality and morbidity attributable to climate variability and change