# Federal Democratic Republic of Ethiopia

# Ministry of Health

Review of Policy Documents
On Climate Change, WASH and Public Health in Ethiopia

September 2015

Addis Ababa, Ethiopia

## Executive Summary

Ministry of Health has commissioned a "Review of Policy Documents on Climate Change, WASH and Public Health in Ethiopia" with the technical and financial support of WHO through financial support of WHO/ DFID project Building adaptation to climate change in health in least developed countries through resilient WASH from June to September, 2015. The purpose of the review was to generate evidences of whether WASH and public health policy documents are sensitive to climate change; and whether climate change policies prioritize WASH and public health as sectors vulnerable to climate change events. Findings from this review are expected to support informed discussions among key stakeholders resulting in climate resilient WASH and Public Health in Ethiopia.

Climate change, WASH and public health policies, strategies and programs were collected from relevant ministries and reviewed on the basis of checklists prepared for the purpose. Findings from the policy reviews were complemented by informative discussions conducted with representatives selected from relevant ministries and other development partners.

## Key Findings

Ethiopia, the fast growing economy with insignificant contribution to global green house gases emission, has taken considerable steps towards adaptation to climate change because of the opportunity cost of investing otherwise could be high. If Ethiopia fails to move forward with the required speed to adapt to or mitigate climate change, it is expected to loss significant percentages of its economic growth. Hence, Ethiopia has formulated its first kind of Climate Resilient Green Economy Strategy in 2011 which aims to support the country in achieving middle income status by 2025 that is carbon neutral and climate resilient. It has also put new structure to implement climate resilient green economy at national level as well as assigned CRGE implementing agencies. Ethiopia's Prime Minister has been playing a leading role in regional and global responses to climate change. Ministry of Environment and Forest (supervises and regulate implementation of the technical components of CRGE) in collaboration with the Ministry of Finance and Economic Development (the facility is responsible to solicit and manage the financial component of CRGE) and are responsible to coordinate implementation of CRGE.

But, still there are huge assignments with sector ministries to fully own climate change adaptation planning, implementation, monitoring and reporting within the framework indicated in the CRGE vision and strategy. At the time of this review, the status of sectors in terms of mainstreaming climate change within their respective development programs and operational plans remain to be at its infancy. Only CRGE implementing sectors are currently developing

climate resilient strategies and the Ministry of Environment and Forest is finalizing guidance note to help sectors mainstream climate change adaptation in the second Growth and Transformation Plan which will be implemented during the coming five years.

Since climate change policy documents focus on six sectors identified as CRGE implementing agencies, namely, agriculture, energy, industry, transport, construction, and forest, they are not fully prioritizing drinking water supplies, sanitation and hygiene (WASH) and health in adaptation plans being one of the sectors vulnerable to climate change. Even though not considered being as one of the CRGE implementing agency, climate change is identified among other challenges, and adaptation measures are mainstreamed in to the HSTP and disease prevention and control strategies, and planned to be implemented by integrating in to existing health systems.

Similarly, the water sector has recognized the effects of climate change on drinking water supplies and recently has taken management actions including development of climate resilient water safety plan strategic framework, implementation guidelines, climate risk screening for rural water supplies and training manuals. Though not adequate, the national one-WASH program also addresses to some extent adaptation to climate change through environmental screening and management. Both health and water sectors have adequate institutional arrangement with right staffing which create opportunity for implementation of the climate sensitive interventions. Even though ESDP is silent to address issues of climate change, it is mainstreamed in to tertiary education training and intertwined in to biology, geography and general science subjects. Climate change affects every sector and/or every society in the country but the scale and nature of the risks vary largely because of the difference in the shock absorption capacities. If policies and programs are fully sensitive to climate change, it is possible to minimize climate change risks and hence safeguard livelihoods of vulnerable segments of the society, which in turn has positive implications on their health.

Climate change, if not sufficiently addressed, will continue to affect economic growth. Preliminary projections by UNDP indicated that climate change would have a sizable impact on the economy, in a range of 7% to 8% GDP loss per year. Ethiopia is one of the African countries most vulnerable to the adverse impacts of climate change with limited response capacity to short term climatic shocks or adapt to long term trends (Conway et al., 2007). Its geographical location as well as social and economic structures contributed to Ethiopia's vulnerability to climate change risks. More specifically, dependency of its population on climate sensitive sectors for livelihoods, limited national response capacity, poor infrastructure as well as wide spread environmental degradation and fragile ecosystem are reported to contribute towards country's vulnerability to climate change risks.

Desert and drought prone areas are characterized by either erratic or shortage of rain fall, high temperature, and flush flooding resulting in damage of Water supply and sanitation

infrastructures and creation of favorable environment for vector and water borne diseases. In addition, nine percent of the topographic feature of Ethiopian highland terrain is characterized with slope greater than 16% and one-third of this land area is with slope greater than 30% where rain can result in flush flooding which is the main cause for massive soil erosion, productivity loss and ground water scarcity. MoWIE took affirmative policy actions and developed risk assessment and management tools such as climate resilient water safety plans strategic framework and implementation guidelines so as to adapt to impacts of climate change.

Where sector policy documents recognize climate change as one of the development challenges, the theories of changes are not well articulated, and hence how climate change affect performance of the sector or sustainability of the services are not sufficiently addressed. This means that interventions are not targeting climate change risks, but are running as business as usual.

Climate change prone areas are not well known across the country by most of the sectors visited during this review. This is mainly because of the underdeveloped research and knowledge management in the areas of climate change in Ethiopia. Where there is mapping of climate change related risks, they are not being updated. For example, there is no update on malaria transmission mapping in light of current changes in urbanization, expansion of large scale agricultural and industrial development, improvement in economic growth and climate change.

NTD control master plan (FE) component of trachoma control strategy did not consider the national hygiene and sanitation strategy being one of the opportunities for its successful implementation program. Therefore, there are grey areas that need integration and alignment of prevention and control program interventions and resources for diseases that share common environmental and climatic risk factors

## Recommended policy options

The following recommendations have been made to facilitate discussions among key stakeholders leading to the establishment of climate resilient WASH and Public Health in Ethiopia.

**Option 1: Provides Proposals for Policy Options in the Areas of Strategic Directions.**

In the long run WASH Sector Policies, being vulnerable to climate change risks, shall take climate resilience as their respective sector direction by reflecting it in the overall policy goals, objectives, strategies and targets. While revising their respective policies and strategies, sector ministries shall consider climate change as part of water, health and education sector policy goals, objectives, strategies, and targets. In the short run, climate change adaptation shall be made part of water and education sectors' GTP 2 targets.

Similarly climate change policy documents shall prioritize WASH and Public Health in the national adaptation and/or mitigation action plans. Policy documents should also identify social sectors including health, and education sectors as CRGE implementing sectors so that they are capacitated to address climate change adaptations

Health program strategies shall identify infectious diseases that have common environmental and climatic risk factors and design high impact intervention that simultaneously addresses the burden and reduce vulnerability of the population to climate change.

Sector policy documents (policy, strategy, programs) should have theories of change to fully address climate change risks within their respective contexts. They should have clear path on how climate change events affect the performance of WASH and public health, and hence have clear measurable indicators.

**Option 2: Provides Recommendations with Regard to Management of Climate Change Risks on WASH and Public Health**

This review process agrees with recommendations given by previous researchers in those future water supply technology choices that need to focus on reliable sources including boreholes or deep wells with productive aquifers, and large springs.

In case there is no option but to use vulnerable sources, more focus should be placed on proper sitting of the source (shallow wells, hand dug wells, on spot springs) and/or developing vulnerable sources along with more resilient technologies to spread climate related risks.

At this point in time, it is clear that sectors lack required capacity to draw accurate plan to adapt to or mitigate climate change risks. Therefore, increasing adaptation and mitigation capacities of all sectors susceptible to climate change would be of great importance. This might include in-service capacity building training or pre-service training.

It is also important to capacitate sectors to analyze, interpret and use climate data or information in planning process (for example: if temperature is projected to increase by 1degree Celsius, what does it mean for water supply planners? Health service planners? Education planners?). It is critical to fully understand the scientific associations between increase or decrease in temperature or precipitation and WASH and/or public health.

MoEF is supporting development of climate resilient green economy through providing training, preparing guidelines to mainstream climate change adaptations or mitigations in sector programs. Sector ministries should be aware of such support and should utilize the opportunity in the process to establish climate resilient WASH and public health.

**Option 3: Provides Alternative Recommendations to Improve Research and Knowledge Management for Laying Ground in Establishing Climate Resilient WASH and Public Health**

Findings from this review indicated that there are limited scientific understanding on the link between WASH and climate change, WASH and public health as well as climate change and specific components of public health interventions in Ethiopia. CRGE coordinating body (MoEF and MoFED) in collaboration with relevant sectors should commission research to generate evidences on the scientific links between WASH and climate change, WASH and public health as well as climate change and public health.

Besides, CRGE coordinating bodies in collaboration with relevant sectors should map the country in terms of different variables including climate prone areas, people's livelihood practices, hydrological and geological formations. This helps sectors to align their respective climate change adaptation plans.

## Acknowledgement

The Federal Ministry of Health (MoH) would like to thank World Health Organization (WHO), for continuous financial and technical support to make the WASH and Health Sectors' effort to adapt to current and future climate change in general and to conduct review of the Ethiopia's policy documents on climate change, WASH and health in particular.

Furthermore, the Ministry would like to appreciate contributions of different Ministries and partner organizations including National WASH Coordination Office, MoA, NMSA, MoE, and MoEF, MoH/EPHI, CO-WASH, MWA, and CRS, in providing documents and their valuable opinion on the strengths and gaps of their policies, strategies, programs and projects and for their explanations to the consulting team to have basic understanding on the challenges associated sensitiveness of national policies, strategies and programs in light of climate change.

MOH would like to thank and appreciate Mr. Girma Aboma (Senior Economist, Policy Analyst) and Mr. Yared Legesse (Environment and Public Health Specialist), WHO consultants for their efforts to review policy documents and production of analysis report that could inform future actions.

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Acronyms

| | |
|---|---|
| AfDB | African Development Bank |
| AWD | Acute Watery Diarrhea |
| CC | Climate Change |
| CRS | Catholic relief Service |
| CRGE | Climate Resilient Green Economy |
| CSA | Central Statistic Agency |
| CSO | Civil Society Organization |
| DFID | United Kingdom, Department of International Development |
| DHS | Demographic and Health Survey |
| EPHI | Ethiopian Public Health Institute |
| ESDP | Education Sector Development Program |
| DPPRA | Disaster Prevention Preparedness and Response Agency |
| DRM | Disaster Risk Management |
| GDP | Gross Domestic Product |
| GTP | Growth and Transformation Plan |
| HDW | Hand Dug Well |
| HMIS | Health Management Information System |
| HSDP | Health Sector Development Program |
| HSTP | Health Sector Transformation Plan |
| ITN | Insecticide Treated Nets |
| IRS | Indoor Residual Spray |
| JMP | Joint Monitoring Program |
| MDG | Millennium Development Goal |
| MWA | Millennium Water Alliance |
| MoE | Ministry of Education |
| MoFE | Ministry of Forest and Environment |
| MoFED | Ministry of Finance and Economic Development |
| MoH | Ministry of Health |
| MoWIE | Ministry of Water, Irrigation and Energy |

| | |
|---|---|
| NAPA | National climate change Adaptation Program Action |
| NGO | Non-Governmental Organization |
| NHS-SAP | national Hygiene and Sanitation Strategic Action Plan |
| NMA | Nation Meteorological Agency |
| NTD | Neglected Tropical Disease |
| NWI | National WASH Inventory |
| ODF | Open Defecation Free |
| PHEM | Public Health Emergency Management |
| SNNP | Southern Nation, Nationalities and Peoples Region |
| STH | Soil Transmissible Helminthes |
| UN | United Nation |
| UNDP | United Nations Development Program |
| UNICEF | United Children Fund |
| WASH | Water Supply, Sanitation and Hygiene |
| WB | World Bank |
| WFP | World Food Program |
| WHO | World Health Organization |
| WSS | Water Supply and Sanitation |
| WSP | Water Safety Plan |
| WSPD | Water Sector Development Program |

# 1. INTRODUCTION

This report is produced from reviewing policies of climate change, WASH and public health conducted during June to August 2015. Findings from the reviews were complemented with informative discussions with relevant government ministries and development partners. This policy review aims to generate evidences of whether WASH and public health policy documents are sensitive to climate change; and whether climate change policies prioritize WASH and public health as sectors vulnerable to climate change events. Findings from this review are expected to support informed discussions among key stakeholders resulting in climate resilient WASH and Public Health in Ethiopia.

## 1.1. Socio-economic status

Ethiopia is the second populous country in Africa. Its population is estimated to be 90.08 million in 2015; 83% and 17% reside in the rural setting and urban centers, respectively (CSA, 2014). Central Statistical Agency reports that Ethiopia's population has been growing, on average, at 2.6% every year with considerable variations across regions. Population growth rate is high compared to the average growth rate for African countries (2.2%) and that of the world (1.2%). With this growth rate the population is estimated to reach 94 million in 2017.

Ethiopia stretches over 1.1 million square kilometers of land surface with a wide range of climatic zones, such as highland, midland and lowland. The mean annual temperature ranges from 10 to $16^0$c for the highland, 16 to $29^0$c for the midland, and 23 to $33^0$c for the lowland. Similarly, the mean annual rainfall ranges between 500 and 2000mm for the highland, and between 300 and 700mm for the midland. Ethiopia is largely characterized by high and ragged mountains, flat topped platues, deep gorges, river valleys and plains (MoWIE, 2014). Seventy percent of Ethiopia's land is arid, semi-arid or categorized as dry humid which are prone to desertification and drought. Desert and drought prone areas are characterized by either erratic or shortage of rain fall, high temperature, and flush flooding resulting in damage of Water supply and sanitation infrastructures and creation of favorable environment for vector and water borne diseases (NAPA 2007).

Recent reports indicate that Ethiopia is amongst the five fastest growing economies in the world. In spite of this, GDP per capita is reported to be one of the lowest in the world (UNDP, 2011). Ethiopian economy has registered a double digit growth during the last decade; in 2013/14 grew by 10.3%. In 2013/14 Agriculture contributed to 40.2% of GDP, 80% of employment and 70% of export earnings (Admit, 2015). But agricultural productivity remains to be very low in part because of limited use of improved technologies including chemical fertilizer and improved farming practices. Smallholder farmers couldn't afford the increasing price of agricultural inputs and hence fail to follow the recommended rates of chemical fertilizers. Since the country's agricultural production is fully dependent on rainfall, food production is highly vulnerable to environmental and climatic shocks (ibid). During the last year, 2.7 million people were dependent on emergency food aid and another 7 million were chronically food insecure across pastoral, semi-arid and arid areas. Currently international news broadcasting agencies are reporting the fact that more than 4.5 million people are at risk due to extreme weather conditions (drought) in some parts of the country, which is about 67% higher than the previous year.

Despite the fact that Ethiopia has rich water resources, it has not yet been fully utilized to advance economic and social developments. Uneven distribution of water resources, and limited financial and technical capacities, adversely affected the pace at which these resources can be tapped to productive uses. As of 2011, only 1% was used for power production and 1.5% for irrigation development (UNDP, 2011). Agriculture, the backbone of the Ethiopian economy, relies on seasonal rainfall that is susceptible to climate change and weather variability

Existing document shows, even if contribution to global greenhouse gas emissions is negligible, Ethiopia is already affected by the adverse impacts of climate change such as recurrent drought and floods, which have resulted in catastrophic consequences including loss of life and property, displacement, and posing stress on rain-fed subsistence farming and live-stock production, health and water supply and sanitation services. Thus, it can be deduced that adverse effects of Climate Change are threatening the overall economic development of the country, which is heavily dependent on agriculture, and the stress on the development is further aggravated by rapid population growth and poor management of natural resources.

GTP, being the main government policy document, guides overall economic and social development in the country. It targets to achieve a double digit economic growth that could lift up the country to reach middle income level by 2025 through increasing agricultural productivity, strengthening industrial base and nurturing export growth. Climate change, if not sufficiently addressed, will continue to affect economic growth. Preliminary projections by UNDP (2011) indicated that climate change would have a sizable impact on the economy, in a range of 7% to 8% GDP loss per year. Ethiopia is one of the African countries most vulnerable to the adverse impacts of climate change with limited response capacity to short term climatic shocks or adapt to long term trends (Conway et al., 2007). Its geographical location as well as social and economic structures contributed to Ethiopia's vulnerability to climate change risks (UNDP, 2011). More specifically, dependency of its population on climate sensitive sectors for livelihoods, limited national response capacity, poor infrastructure as well as wide spread environmental degradation and fragile ecosystem are reported to contribute towards country's vulnerability to climate change risks.

Analysis of different climate sensitive project interventions of ministries of agriculture (MoA), and the ministry of environment and forest (MoEF) like fast tracking investment projects such as landscape forest development, watershed management, and soil and water conservation, capacity building to climate change and resilience to climate change which is supported by DFID are believed to have positive effect in reducing drinking water supply vulnerability to climate change by increasing biomass in the water shed and ground water recharge. Components of the fast tracking investment the focus on households like provision of improved chicken and modified dairy cows also improves livelihood of households and increase their capacity to cope with climate change impacts.

## 1.2. Brief Summary of Health and WASH Sectors' Profile

### 1.2.1. Health sector profile

Government of Ethiopia, on the basis of analysis on the determinants of the health of population, has formulated comprehensive health policy in 1993. The policy aims at increasing access to all segments of population with promotive, preventive, essential curative and rehabilitative health

services through decentralized and integrated health care delivery systems. It has a health development goal of creating healthy and productive society that contributes to overall socioeconomic development of the country.

To put the policy in to practice, the MoH has developed a 20 year long term health development plan (1996-2015); sub-divided into five year sector development programs. Components of the sector development program are further translated into five year strategies and annual operational plans and has been implementing over the last 20 years. The government has established decentralized institutional arrangements from federal to household levels that enable effective planning, implementation, monitoring and evaluation of the programs, strategies and plans, and ensure participation of range internal and external stakeholders.

Implementation of the Health Sector Development Programs and strategies over the last four rounds have brought about momentous changes in the health conditions of the populations as measured by health status indicators. Existing records show, access to primary health care services (health posts, health centers, and primary hospitals) has increased to more than 92%, rate of chronic child malnutrition (stunting) is declined from more than 52% to 44%, maternal and child health service utilization increased, utilization of malaria preventive technologies (vaccine, ITN, household water treatment chemicals) increased, access to improved water and basic toilet facility are also increased and prevalence of diarrhea among under-five children reduced from 23.6% in 2000 to 13% in 2011 (MoH/HMIS 2013 and DHS 2011).

Furthermore, a number of communicable disease prevention and control measures has been implemented and as a result burden of vaccine preventable childhood diseases and major communicable diseases such as HIV/AIDS, malaria and tuberculosis is significantly decreased. In summary, HSDP interventions have contributed to overall socioeconomic development which is witnessed by significant increase in average life expectancy at birth from 45 years in 1990 to 65 years in 2012, under-five child mortality and infant mortality rates are reduced from 97/1000life births and 165/1000 child within 0-5 age group to 47/1000 and 68/1000, respectively over the last 12 years (Mini DHS 2014).

In summary, great improvements made in health status of the population by increasing access to promotive, preventive, and basic curative services through health extension programs, enhanced community engagement and expansion of health infrastructure, will absolutely improve the coping capacity of the population to shock caused by climate change and weather variability. Furthermore initiatives planned in HSTP and strategic plan of the EPHI will significantly sustain the improvements made and more strengthen the capacity of the health system to reduce impacts of health related disasters and risks within acceptable threshold.

### 1.2.2. WASH sector profile

Ethiopia's WASH sector, which stands for Water Supply, Sanitation and Hygiene, was emerged in 2005 following the effort to institutionalize sector wide approach with considerable support from development partners. It was the time when Ethiopia had developed its first universal access plan that significantly impacted on the mobilization of resources from external sources.

Water Resources Management Policy was formulated in 1999 showing the commitment of the government (the then Ministry of Water Resources) to advance developments in the water sector. This policy document has many sub-policies, including water supply and sanitation policy that

aims at enhancing wellbeing and productivity of its people through provision of adequate, reliable and clean water supply and sanitation services. Following this the Ministry of Water has developed water sector strategy in 2001 and water sector development program in 2002 that extend through 2002 to 2016. As part of its sector development program, it has revised its universal access plan in 2010 to align with GTP (2011-2015). The policy and development programs aim to provide sustainable, efficient, reliable, affordable, safe and adequate drinking water and sanitation services to both rural and urban population. Over the last two decades, a number of efforts have been made to implement its strategies within the decentralized policy frameworks that extend from the federal ministries down to local governments with clear mandates on their functions.

As a result, considerable progresses have been registered in terms of increasing access to improved water supply, sanitation and hygiene across the country with some variations between regions. As of April 2011, there were 39,868 hand dug wells and 8,106 shallow wells fitted with hand pumps, 24,596 protected spot springs, 2,735 motorized deep boreholes, and 10,937 gravity fed springs, small and other 6,346 unprotected hand dug wells throughout the country (NWI, 2012). JMP report (2012), on the other hand, indicated that, access to piped water connections in premises in urban areas has reached 51% and other improved (including public stand post) accounts for 46%. Considering the efforts going on throughout the country, the number rural water supply schemes and urban piped water supply connection in premises and access at public stand post could significantly increase during the last two to four years after the national WASH inventory. In general, the overall access to water supply is improved from 13% in 1990 to 52% in 2012 (JMP 2014). But, as of 2012, the same report indicates the wider difference in terms of access to improved water supply and sanitation services between urban (97% Vs. 27%) and rural (42% Vs. 23%).

Unlike most of the urban population, majority of rural population relies mainly on community managed rural water supply schemes that are vulnerable to weather variability as compared to urban water supply systems. Shallow ground water sources and springs are at risk drying or lowering of static water table due to evapotranspiration as temperature increase. Such small scale water supply schemes are no climate resilient and easily damaged with flooding increasing risk of microbial contamination. In response to this challenge, the MoWIE took affirmative policy action and developed risk assessment and management tools such as climate resilient water safety plans strategic framework and implementation guidelines so as to adapt to impacts of climate change. The water safety plan tools are instrumental for realization of technical, institutional, capacity building, social and environmental aspects of the water sector strategy. The CR-WSP tools identify and discuss paths through which climate change negatively affect drinking water supply and sanitation systems, limitation of conventional water quality management techniques, and experiences of health burdens occurred as a result of contamination of drinking water sources due to flooding and water scarcity as a result of shortage of rain and prolonged drought season in some parts of Ethiopia.

The tools provide guidance how to identify water safety sensitive interventions to be streamlines in to different sectors regular programs, put forward multi-sectoral coordination and institutional support mechanism that enable resource mobilization, technical support and monitor performances the water safety plans, of the primary institutions (utilities and WASH committees) and other sectors. Furthermore, implementation guidelines put in place step wise implementation

through which WSP teams can assess hazardous events, hazards and associated risks, effectiveness of existing control measures, and prepare and implement improvement plans, conduct ongoing operational monitoring and verification to minimize vulnerability of the water supply systems to climate change effects. Informative discussions with the MoWIE and partner organization indicates, the ministry is taking further action to materialize climate resilient water safety plan by developing different standard operational and management guidelines, training manuals on CR-WSP and on climate screening for rural water supplies. Additional informative consultation with internal organizations like Catholic Relief Service (CRS) and Millennium Water Alliance (MWA) indicates there is high interest to institutionalize and streamline climate resilient water safety plan in to their respective WASH program.

Concerning sanitation, 57% rural and 92% urban have access to any type of latrine. Only about 23% of rural and 27% of urban have access to improved latrine, and the remaining 34% of rural and 65% of urban population use unimproved latrine with shallow pit depth, poor slab and superstructure which does not prevent flies access to human faeces. More than 32 Million (43%) of rural and about 1.25 million (8%) of urban population have no access to any type of toilet facility and exclusively defecate in the open field (JMP 2014). Most of unimproved latrines are in a poor operation and maintenance and easily damaged with simple runoff and floods and huge amount of human faeces goes to environment increasing risk of contamination of drinking water supplies. In addition, in low laying areas and with problem of water logging, ground water contamination could be caused due to rising of the ground water table during rainy season and contact with latrine content. Thus, in one or other ways, rural and poor populations are at higher risk of climate sensitive water and sanitation borne diseases compared to urban population.

### 1.3. Climate Change Trends in Ethiopian

Climate change is often describing the statistical interpretation of precipitation and temperature data recorded over a long period of time for a given location. It manifests itself in terms of changes in temperature and rainfall recorded over long years. During the last 55 years, in Ethiopia, temperature has been increasing by $0.37^0$c every ten years (NAPA, 2007). When averaged over the whole country, rainfall, however, remained more or less constant. Change in temperature is projected for the IPCC midrange (A1B) emission scenario. Accordingly, the mean annual temperature will increase in the range of 0.9 to $1.1^0$c by 2030, 1.7 to $2.1^0$c by 2050 and 2.7 to $3.4^0$c by 2080 over the country compared to the 1961 to 1990 period. A small increase in the annual precipitation is also expected over the country (ibid).

Trend in climate changes over years are perceived to have adverse impacts on the economy as a whole or individual households by deteriorating their food security situations. NAPA also identified climate related hazards in Ethiopia that include, among others, drought, flood, heavy rain, strong winds, frost, and heat waves (high temperatures). But the historical, social and economic impacts of these climate hazards are not yet properly studied and documented. The same document has identified food insecurity, outbreak of diseases (malaria, water borne diseases such as cholera and dysentery), diseases associated with floods and respiration, and land degradation as adverse impacts of climate change.

Findings from this review aims to inform discussions around the need to establish climate resilient WASH in Ethiopia. The following section discuss the methodology adopted to generate evidence on the extent to which climate change policy documents prioritize WASH and Public

Health as sectors vulnerable to climate change as well as generate evidence on the extent to which WASH and Public Health Policies are aware of climate change risks.

# 2. METHODOLOGY AND APPROACHES USED

Four steps have been followed to implement this review–identification of key stakeholders, reviewing policy documents, conducting informative discussions and consultation workshop

Details are discussed as follows.

## 2.1. Identifications of stakeholders

Socio-political network analysis techniques were employed to identify key actors and their roles, their formal and informal relationships/interactions, and their readiness to address climate change adaptation/mitigation interventions. The first step in conducting this review was mapping key stakeholders. And power-interest grid matrix was used to further analyze the power and interest mix of those stakeholders in light of creating climate resilient WASH and health in Ethiopia. The questions were as listed below.

- Which organization (government and non-government) play a role in improving climate change risks management and adaptation for WASH and public health? Which organization play an influential roles in building adaptive capacity of WASH and public health sectors to adapt to climate change and what kind of linkage exists between the organizations?
- Which stakeholder has the highest power and interest to create climate resilient WASH in Ethiopia? (this stakeholder should be engaged in the whole process)
- Which stakeholder has the highest political power to create climate resilient WASH and health but has low interest because of many reasons such as low awareness of the impact on climate change or fear of financial shortages? (this stakeholder should be kept satisfied)
- Which stakeholder has the lowest political power but has high interest to create climate resilient WASH and public health? (this stakeholder should be kept informed of the whole process)
- Which stakeholder has the lowest political power as well as the lowest interest for creating climate resilient WASH and public health in Ethiopia? (this stakeholder may not be important)

Following the above exercises, different categories of stakeholders such as those who should be part of the whole process, those who should be consulted for more information, and those who should be informed of the outcomes has been identified

## 2.2. Review of policy documents

Reviews of policy documents were guided by specific review questions. In other words, the whole review processes were geared towards answering these questions.

- Does climate change related policies recognize WASH and Health being one of the priority areas (projects) for future adaptation and mitigation actions?

- Are WASH and public health policy documents sensitive to climate change related risks? Do the WASH and public health sector policies, programs, and plans consider climate change risks being one of the sector development challenges and determined the path ways through which climate change risks affect the program/plan? Are there integrated /mainstreamed actions planned to address climate change issues in sector's program? What are the specific policies' provisions for achieving climate resilient WASH and public health in Ethiopia?
- What policy gaps and/or weakness and challenges (barriers) are observed within the existing policy environment in terms of creating climate resilient WASH and public health?
- What should be done to create climate resilient WASH and public health in Ethiopia? What policy options are of high importance to bring about climate resilient WASH and public health? What structural arrangements are required to implement proposed policy options?

**Scoring policies for climate resilience**

Scoring of the policy documents on Climate Change, WASH and Public Health were guided by the following parameters. Scores were given to policy documents on the basis of the evidences collected against the criteria indicated in the following table. Scores of 0 to 5 were used, 0 standing for the lowest score and 5 the highest score. Results of the scoring were also presented using traffic lights.

**Table 1. Criteria for scoring policies for climate resilience**

| Score | Brief descriptions on the criteria for scoring policy documents |
|---|---|
| 5 Deep green | A score of "5" will be given: (a) if climate change policy documents prioritized WASH and Public Health in adaptation or mitigation actions as sectors vulnerable to climate change; (b) if sector policy documents have component on climate change that is translated into mitigation or adaptation strategies, programs and implementation plans including institutional arrangement and focal person; monitored and reported on annual basis. |
| 4 Light green | A score of "4" will be given: (a) if climate change policy documents has component on water supply and public health included in adaptation or mitigation plans, but not clear about sanitation and hygiene component of WASH; (b) if sector policy documents have component on climate change translated into mitigation or adaptation strategies and programs, as well as operational plans; but not regularly monitored and reported. |
| 3 Yellow | A score of "3" will be given: (a) if climate change policy documents have component on WASH and Public Health, but not prioritized in adaptation and/or mitigation plans; (b) if sector policy documents have component on climate change but not translated into strategies, program and plans. |
| 2 Orange | A score of "2" will be given: (a) if climate change policy documents do not prioritize WASH and Public Health in adaptation and/or mitigation actions; (b) if sector policy document have no component on climate change but if recent program documents capture aspects of climate change related risks. |
| 1 Pink | A score of "1" will be given: (a) if climate change policy documents do not recognize WASH and Public Health at all; (b) if sector policy documents have no component on climate change but some aspects associated with climate changes are indicated in the program documents. |

| Score | Brief descriptions on the criteria for scoring policy documents |
|---|---|
| 0 Red | A score of "0" will be given if climate change or sector policies, strategies, standards, guidelines, directives, plans and program are not totally sensitive to climate changes and associated risks. |

### 2.3. Informative Discussions

Findings from the review process were complemented by informative discussions conducted with selected stakeholders. Informative discussions are guided by checklists prepared by consultants. The following table provides lists of stakeholders included in the informative discussions. Others out of office for organizational business are expected to provide their feedbacks in written or in person during the consultative workshop (Annex 3).

## 3. KEY FINDINGS

This section provides findings from the review process. It is presented in three sub-sections. Section 3.1 presents stakeholder analysis; section 3.2 presents impacts of climate change events while section 3.3 presents analysis of the policy environment and governance. Refer the following for more details.

### 3.1. Stakeholders analysis

#### 3.1.1. Key stakeholders for climate change adaptations

As it is crosscutting issue climate change need multisectoral responses. This means that a number of stakeholders are involved in activities associated with climate change at different levels. Relevant stakeholders are identified for this review process, which are summarized as follows.

**Table 2. Lists of stakeholders for climate change, WASH and Public Health**

| Government bodies | UN agencies | CSOs |
|---|---|---|
| Ministry of Environment and Forestry | UN-WHO | German Agro-Action |
| Ministry of Water, Irrigation and Energy (Hydrology and water quality and WSS Directorate Director) | UNICEF | MWA and CRS |
| National Meteorology Agency (NMA) | UN-WFP | WaterAid |
| Ministry of Health (Disease control, Family Health and Hygiene and Environmental Sanitation Case Teams, and EPHI/PHEM) | WB-WSSP/WSP | Plan International |
| National Population Office | DFID | WSF |
| Ministry of Education (WASH Program Management Unit or its representatives) | AfDB (WASH Unit) | Water Action |
| Ministry of Finance and Economic Development (WASH Unit or its representative) | COWASH-Gov of Finland | Ripple |
| Ministry of Urban Housing Construction (relevant department) | AMREF | Forum for environment |
| Ministry of Agriculture (MoA) | | SNV |

Ministry of Science and Technology
National WASH Coordination Office
Ministry of Communication and Information Technology
Teaching Institutions

### 3.1.2. Power and Interest Analysis

Consultants used power interest grid matrix to conduct stakeholder analysis. The power-interest grid below shows four categories of stakeholders. Category 1 include stakeholders with high power and high interest; category 2 include stakeholders with high power but low interest in climate change; category 3 includes stakeholders with low power and low interest; and category 4 includes stakeholders with low power and high interest (Table 4).

**Table 3. Stakeholder analysis using power-interest grid (consultant perspectives)**

| Power | Low Interest | High Interest |
|---|---|---|
| High | Government sectors highly sensitive to climate change but have low awareness on climate change risks (MoCIT)<br>Donors not interested in climate change and hence not financing | Government sectors assigned to lead climate change related issues (MoFED, MoEF; NMA)<br>Donors interested to finance climate change related interventions including UN agencies (WHO, UNICEF, WFP, WB, WSSP/WSP, AfDB)<br>Government sector ministries (MoA, MoWIE, MoH, MoE, MoI, MoT, MoUHCo) |
| Low | Government sector not sensitive to climate change (National Population Office)<br>CSOs currently not interested to engage in climate change related interventions (WAE, WACT, etc) | Government sectors highly sensitive to climate change, and are aware of the effects of climate change on their respective sectors (NWCO, COWASH)<br>CSOs active in climate change related interventions in the country (GAA, FfE, CRS, MWA, RiPPLE) |

**Category 1**: stakeholders categorized under the high power and high interest in climate change include climate change leads (MoFED, MoEF, NMA), UN agencies and donors (WHO, UNICEF, WFP, WB, WSSP/WSP, AfDB), and CRGE implementing agencies (MoA, MoWIE, MoH, MoE, MoI, MoT and MoUHCO). These stakeholders should be part of the review process.

**Category 2**: stakeholders included under the high power and low interest in climate change constitutes Ministry of Science and Technology, and Ministry of Communication and Information Technology. These stakeholders need to be consulted during the review process and obtain feedbacks from them.

**Category 3**: stakeholders categorized under the low power and low interest includes National Population Office, Teaching Institutions, etc). These stakeholders may not be important for this

review process. They either lack experience in climate change or lacks the required power to influence the objective of this review process.

**Category 4**: stakeholders included under the high interest but low power includes COWASH, NWCO, GAA, FfE, WSF, WaterAid, and WMA). These stakeholders could be allies with advocacy groups and good to be informed of the findings from the review.

Each of these stakeholders has roles to play. Informative discussions indicated that some sectors are highly vulnerable to climate change and these sectors should have clear strategy to cope with climate change risks by developing adaptation strategies. Sectors should have access to climate data and also have sufficient capacity to interpret climate data for efficient use during planning. And National Meteorology Agency should provide climate data and the necessary advice to sector ministries on the use of climate information.

## 3.2. Impacts of Climate Change on WASH and Public Health

### 3.2.1. Nature and scale of climate change on public health

There are a number of ways through which health sector is affected by common climate change hazards such as drought and flooding. This include; morbidities and mortalities resulting from outbreaks of climate sensitive vector borne and non-vector borne infectious diseases, damage to health infrastructure and shift of resources to counter act humanitarian emergencies related to weather variability by compromising routine health programs. Climate change affects human health directly through exposure to drought, flood and heat; or indirectly by altering environment and favoring the proliferation of disease vectors, causing drinking water contamination or by aggravating residual chronic health problems (Ethiopian Panel on Climate Change 2015).

Recurrent drought incidents over the past five decades (mainly in 1984/5 and 2002/3) in Ethiopia has significantly affected agriculture production and consequently resulted in sever shock including food shortage, severe malnutrition, morbidities, deaths, displacement; lose of property and disruption of livelihood. According to NMA data, Ethiopia has experienced devastating major flood incidents in 1988, 1993, 1994, 1995, 1996 and in 2006 which claimed human life and property damage (NMSA 2006).

According to humanitarian emergency report (WASH ETF 2006), a recent experience of disastrous flush and seasonal river flooding in 2006 (Dire-Dawa, West Shoa, Afar, Tigray, Gambela and South Omo) has directly affected livelihood of about 199,000 population, claimed life of 364 people, loss of about 13,000 livestock. It also caused damage to economic and social infrastructure (road, health, school, water supply, and electric power network), loss of agricultural produce and internal displacement and has created favorable environment for spread of water borne diarrheal disease outbreaks including acute-watery diarrhea (AWD) and vector borne disease like malaria in different parts of Ethiopia. The study by Cesar (2013) reports that death per year due to indoor air pollution is 72,400 for Ethiopia, 14,300 for Kenya and 19,700 for Uganda; death per year due to outdoor pollution is 2,500 for Ethiopia, 600 for Kenya and 100 for Uganda. Rural households often use open fire for cooking causing indoor air pollution resulting in respiratory diseases – over 70,000 people die every year due to indoor air pollution. Women, children and elderly are exposed to indoor air pollution. Reducing indoor air pollution

benefits the poor and help achieve MDG 4 (reducing child mortality) and MDG 5 (improve maternal health).

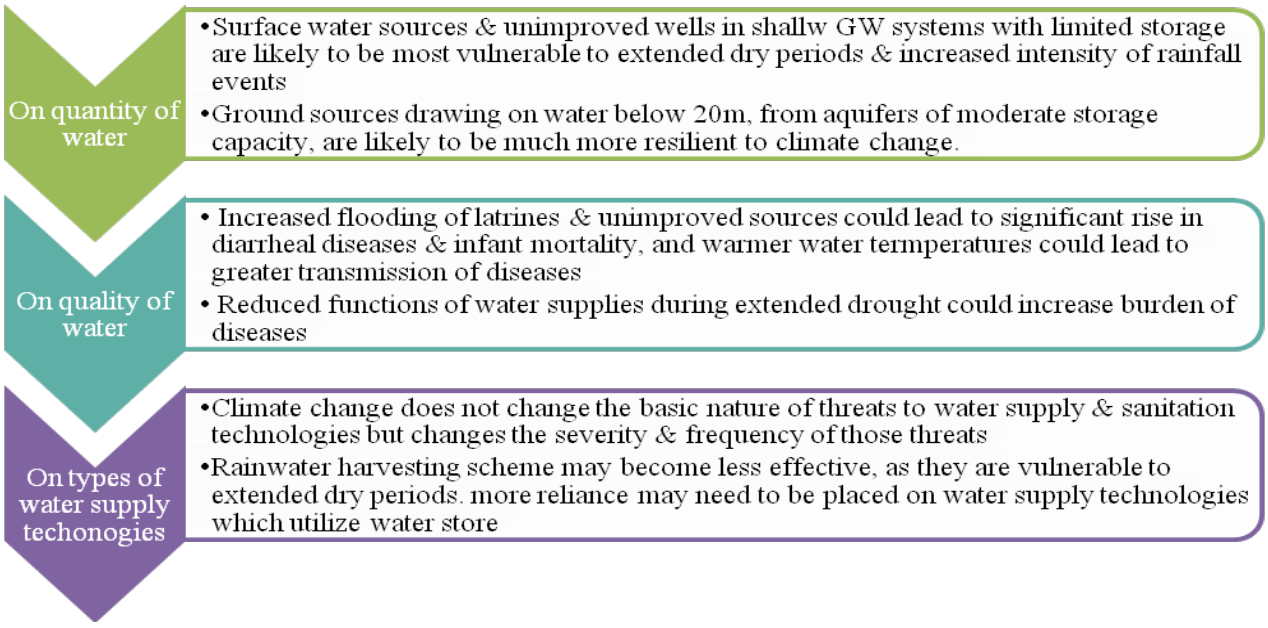
While seasonal river splash flooding is common experience in areas along with big rivers Baro-Akobo river in Gambela, Omo river in SNNPR, Awash river in Afar, Wabi-Shebele river in Somali, and Abay river in Amhara regions. Similarly, low laying plain areas in all regions are also affected by flush flooding flowing down from highland mountainous areas (Ethiopian Panel on Climate Change 2015).

In response to public health and nutrition emergences, the MoH has exerted great efforts and mobilized internal and external resource to counter act and managed to minimize negative health effects associated with climate change hazards within acceptable threshold. Even if diversion of huge amount of health resources (financial, logistic, human resources) to respond to humanitarian crisis to save life, on other hand it setback efforts and investment to be made on development programs interventions and negatively affect achievement towards health development goals.

### 3.2.2. Impacts of climate change events on WASH

The study by Cesar (2013) reports the impacts of climate change on the quantity and quality of water resources. Death due to diarrhea in Ethiopia are significantly larger compared to other sub Saharan African countries. Diarrhea caused by poor WASH is reported to be 49 persons per 1000 in Ethiopia (compared to 24 in Kenya and 35 in Uganda). WHO estimates that more than 112,000 people die every year due to lack of access to safe drinking water and sanitation.

Climate change impacts on the quantity, quality and infrastructures of water supply technologies. The following paragraphs discuss the impact of climate change on WASH, and thereby on the life of the people (Calow et at., 2011).



Climate Resilient Water Safety Strategy Framework also recognizes the fact that previous studies reports existing WASH services are not climate resilient. And the WASH is among the sectors adversely affected by climate change. Most of the Ethiopian population depends on shallow ground water sources which are largely vulnerable to changes in climate. Quality of water is under threat as 34% of the population defecates in the open areas (poor sanitation) and because of intensive use of chemical fertilizers for crop production (MoWIE, 2014).

Climate change affects every sector and/or every society in the country but the scale and nature of the risks vary largely because of the difference in the shock absorption capacities. If policies are sensitive to climate change, it is possible to minimize climate change risks and hence safeguard livelihoods of vulnerable segments of the society, which in turn has positive implications on their health. The following paragraphs discuss the scale and nature of climate change risks to selected sectors.

**Water Supply Policies**

Climate change has direct influence on water supply services. Some further analysis on the NWI (2012) data reveals that 86% of the national water services [HDWs (43%), spring on spots (27%), shallow wells (9%) and unprotected HDWs (7%)] are vulnerable to climate change. Even if details of the categories indicated by NWI may not be the necessary condition for this specific review, protected sources may have more reliance to climate change compared to unprotected water sources. Climate change is adversely affecting water quantity and quality in different ways (refer the following diagram). Despite this, climate change has not yet been a priority in screening water supply projects and efforts put to ensure climate resilient water supply services is nil or insignificant.

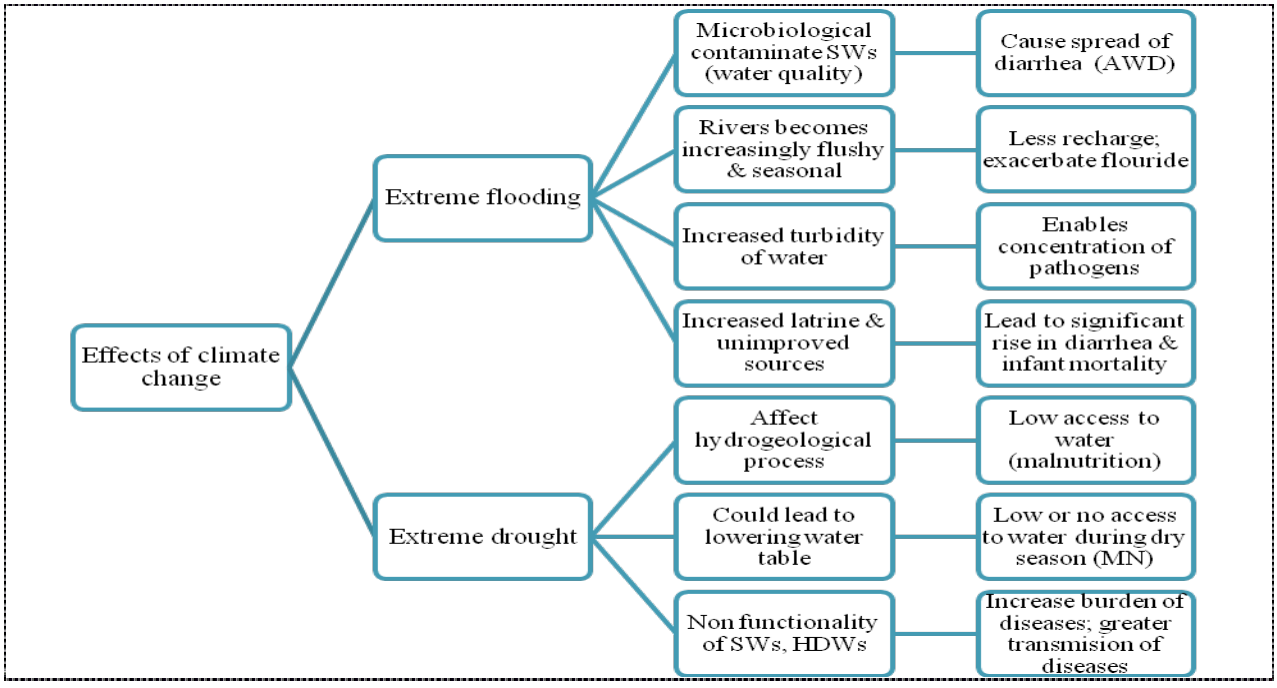



Figure 1: Effects of climate change on water supply

Previous studies (Calow et al., 2011; Boko et al., 2007; Goulden et al., 2009) have identified relationships between the type of water supply technologies and the scale and nature of climate change risks. According to the studies some technologies are resilient to climate change while others are highly vulnerable. Calow et al. (2011) reported that climate change is adversely affecting water quantity and quality. Surface water sources and unimproved wells in shallow ground water systems with limited storage are most likely be vulnerable to extended dry periods and increased intensity of rainfall events, whereas, groundwater sources drawing on water below 20 meters, from aquifers of moderate storage capacity, are likely to be much more resilient to climate change. The same study reported clear link between access to safe, reliable water source and human health, and the existing challenges could be exacerbated by greater climate variability. Increasing flooding of latrines and unimproved source could lead to significant rise in diarrheal diseases and infant mortality, and warmer temperatures could lead to greater transmission of diseases. Furthermore, reduced functions of water facilities during the extended drought seasons could increase burden of the disease.

Even if water sector policy documents are largely aiming at expanding improved water sources to all Ethiopian citizens subjected to available resource, two of the policy objectives targeted to combat extreme weather events such as flooding and drought. As part of the sector wide program, the ministry, with the support of development partners, is leading the development of climate resilient water safety plans, training manuals and guidance note on climate risk screening for rural water supplies. This is progressing well under the COWASH. If water sector continues to focus only on advancing service delivery regardless of climate change risks, water services are not likely sustainable and hence not providing lasting services for the society, which leads to malnutrition and thereby affecting human health.

## 3.3. Analysis of Policy Environment and Governance

### 3.3.1. Ethiopia's Policy Responses of Climate Change

**Climate change and the economy**

Ethiopia's economy is largely depending on activities highly vulnerable to climate change. Nearly half of the country's GDP comes from agriculture sector which is highly dependent on seasonal rainfall and traditional farming practices. Besides, productivity of agriculture, industry and service sectors depends on productivity of the workforces, which again relies on sustainable access to basic services such as education, health, water supply and sanitation, among others. Anything that affects people's health has direct effect on their productivity, and cumulatively affecting the economy as a whole. Climate change, therefore, has both direct and indirect effect on the economy. By 2045, damages caused by climate change events are projected to bring a loss of GDP by 2 to 10 percent (World Bank, 2010). If Ethiopia fails to sufficiently respond to climate change, it is going to cost its economy considerably. Shepherd et al. (2013) in its recent report entitled 'The Geography of Poverty, Disasters and Climate Change' ranks Ethiopia as the 11$^{th}$ country most at risk of disaster induced poverty, signifying the sense of urgency for advancing adaptations to climate changes.

Ethiopia, despite its historically insignificant contribution to greenhouse gas emission, has given due attention to climate change. It has taken a leading role in facilitating responses to climate change at national and global levels (through its Prime Minister). Ethiopia has ratified United Nation Framework Convention on Climate Change (UNFCCC) in 1994, but climate change was strongly becoming government agenda since 2007, when it has prepared NAPA, which used a project approach to address climate change risks. In 2010, Ethiopia Program of Adaptation to Climate Change (EPACC) has been formulated that follows programmatic approach to adapt to climate change; and hence replaced NAPA. In the same year, the country has also developed Nationally Appropriate Mitigation Actions (NAMA). Also, Ethiopia has developed Climate Resilient Green Economy (CRGE) vision and Strategy in 2011 that aims to support the country's development objective of achieving middle income status by 2025. It is supported by two national strategies; Green Economy Strategy and Climate Resilient Strategy. GTP considers climate change risks as one of the crosscutting issues that could affect every sector, if not all affected equally; and hence continues to implement climate resilient strategies as a means to reduce the effect of climate change on the economy.

The following table discusses the policy environment for climate change. It provides the content of the policy documents in terms of addressing climate change related risks. It also discusses the main objectives of those policy documents and links with the overall socio-economic development objectives of the country (Table 5).

**Table 4. Overview of climate change policy responses**

| Policy | Brief descriptions of policy contents (policy responses) |
|---|---|
| Ratified UNFCCC 1994 | Article 4.9 of the United Nations Framework Convention on Climate Change (UNFCCC) calls for addressing the specific needs and special situations of the least developed countries. In line with this the Seventh Session of the Conference of Parties (COP 7) established instruments and mechanisms for supporting adaptation, including the establishment of three new funds namely the Special Climate Change Fund, the Least Developed Countries Fund and the Adaptation Fund. |
| Environmental policy | Ethiopia had formulated Environmental Policy in 1997 to improve and enhance health and thereby the quality of life of all Ethiopians and to promote sustainable social and economic development through sound management and use of natural, human-made and cultural resources and the environment as a whole so as to meet the needs of the present generation without compromising the ability of future generations to meet their own needs. The policy covers climate change. Environmental Protection Authority (now called the Ministry of Environment and Forestry) is leading national efforts towards climate resilient green economy. Ethiopia's Vision for CRGE and CRGE strategy are coordinated under the leadership of Environmental Protection Authority.<br><br>Though the Environmental policy states the vulnerability of the country and the importance of national actions targeting management of climate risks and external financial mobilization, the policy does not mention any statement about the need for full integration of climate change adaptation and nationally appropriate mitigation measures in the environmental policy. This gap could arise due to the fact that Environmental policy was prepared ahead of the time issues use of climate changes becomes top political agenda for the country. |

| Policy | Brief descriptions of policy contents (policy responses) |
|---|---|
| NAPA 2007 | Ethiopia has prepared Climate Change National Adaptation Program of Action (NAPA) in 2007, under the coordination of the National Meteorology Agency that aims at identifying lists of priority activities, formulating priority adaptation options, building capacity and raising public awareness on the urgency to adapt to adverse effects of extreme weather events (NMA, 2007). NAPA identifies ecological areas, livelihoods, sectors that are most vulnerable to climate change (drought) and immediate climate change adaptation needs. Arid, semi-arid and dry sub-humid areas; agriculture, health, water, and energy sectors, and small scale rain-fed subsistence farmers and pastoral livelihoods are pointed out to be at risk of weather variability. To address immediate need for adaptation to climate change, it identified eleven projects and five implementing sectors that are mainly focusing on the improving natural resource management, enhancing irrigation and rain water harvesting, strengthening of the early warning system, human and institutional capacity building, malaria prevention and control, and on awareness creation. Though it recognizes the likely impacts of climate change on the water sector but not very clear from the document on how it is going to address those impacts. It does not consider WASH as priority project among others, which is likely associated with lack of engagement of MOH in NAPA process. In addition, it lacks gender sensitivity particularly women which are highly vulnerable to climate change compared to their counterparts mainly due lack engagement of the MoWCYA. It also lacks measureable monitoring indicators and mechanisms to track performances. Furthermore, responses are project based and not comprehensive, hence replaced by EPACC |
| EPACC (2010) | UNFCCC 2010 report encouraged the updating of NAPA suggesting that programmatic approach is more effective than project approach in addressing climate change related risks. Hence, EPACC has been formulated in 2010 to build on climate resilient green economy; and it takes a more programmatic approach to adaptation planning. It replaced NAPA. EPACC is a program of action that aims to establish the foundation for a climate resilient economy through adaptation at sectoral, regional and community levels. It is a grassroots initiative in such a ways that the solution to climate change will be implemented by local people with continued support from the regional and federal institutions. It plans to work in three dimensions: (i) the program will reach sample local communities in each region, and each local community will have its own work program and bylaws to guide actions of its members towards greater climate resilience; (ii) the program will reach throughout government sectors to ensure that mainstreaming of climate change is embedded within government policies and plans through sectoral climate programs and action plans; and (ii) the program will regularly be monitored and reported. However, the role of non-state actors in the planning, design and implementation of activities mentioned in the work program is not clearly described |
| CRGE Vision and Strategy (2011) | CRGE vision summarizes Ethiopia's ambition to build on climate resilient green economy by 2025. It aims to support country's development objective of achieving middle income status by 2025 in carbon neutral and climate resilient manner. This document sets out the challenges and opportunities which climate change brings for Ethiopia. It makes the case for why a carbon neutral and climate resilient |

| Policy | Brief descriptions of policy contents (policy responses) |
|---|---|
| | development trajectory to a green economy is a priority for the country and thus for the implementation of the current GTP. It explains what the Environmental Protection Authority is doing on behalf of the Federal Democratic Republic of Ethiopia to lead and coordinate an efficient and effective national response to climate change.<br><br>CRGE strategy was developed to elaborate priorities for climate change to enrich those identified in the EPACC and the emission abatement initiative such as NAMAs. It provides the blue print for Ethiopia's response to climate change and an overarching plan to realize the ambitions to build climate resilient green economy. Sectoral climate change strategies are the core element of the strategy detailing the country's climate change responses. |
| Green Economy Strategy (2011) | It was launched with the CRGE vision in November 2011, and it takes an economy wide approach to GHG reduction. It is based on four pillars. (1) improve crop and livestock production practices for greater food security and better income; (2) protecting and re-establishing forest for their economic and ecological values, including carbon stocks; (3) expanding electricity generation from renewable sources of energy for domestic and regional markets; and (4) leapfrogging to modern and energy-efficient technologies in transport, industrial and building sectors. |
| Climate Resilient Strategy | The Climate-Resilient Green Economy (CRGE) initiative follows a sectoral approach and has so far identified and prioritized more than 60 initiatives, which could help the country achieve its development goals while limiting 2030 GHG emissions to around today's 150 Mt CO2e – around 250 Mt CO2e less than estimated under a conventional development path. CRGE strategy focuses on four pillars: adoption of agricultural and land use efficiency measures, increased GHG sequestration in forestry, development of renewable and clean power generation, and use of appropriate advanced technologies in industry, transport and building. |
| NAMA | Ethiopia has developed its voluntary NAMA in 2010 under the guidance of NAMA Facility, which was established to provide financial support to developing economies that show strong leadership to voluntarily coordinate actions so as to address climate change. It identifies nationally appropriate mitigation actions across seven sectors, namely, energy, industry, forestry, agriculture, waste, building and transport. Ethiopian NAMA was submitted to UNFCCC on the 29th of January 2010. However, it lacks important mitigation actions in land use planning, energy efficiency, fiscal incentives and traffic management and regulatory policy measures |
| SRM | MoEF and MoFED in consultation with the inter-ministerial committee prepared Sector Reduction Mechanism (SRM) in 2014. It is a process that systematically mainstream and integrate climate change and economic growth sustainability considerations into the country's economic development planning. It aims to elaborate the policy, technical, institutional and financial requirements as well as mode of operation to enable implementation of CRGE vision and strategy; provide support for preparation and implementation of sectoral reduction actions; and track progress towards achieving middle income status with zero net carbon emission by 2025. |

## Climate Change and Sector Policies

Sector reduction mechanism was formulated by the Ministry of Environment and Forestry (MoEF) and Ministry of Finance and Economic Development (MoFED) in consultation with Inter-Ministerial Committee in 2014 to guide mainstreaming and integration of climate change in sector policies, strategies, program, plans and budgets. But, sectors may not sufficiently address climate change risks in their policies and operational plans. Whether WASH and Health sectors sufficiently recognize climate change risks will be discussed below.

## Water Supply and Climate Change

Water sector policy documents are expected to recognize climate change risks and to formulate appropriate adaptation or mitigation measures at different levels since water sources are highly susceptible to climate change events. Even if Ethiopia has long experience of the effects of climate change, it has strongly taken up climate change as a development agenda since 2007. Previous policy documents do not sufficiently prioritize climate change risks but largely focusing on the expansion of water supply and sanitation services subjected to availability of resources. Water Resources Management Policy was enacted in 1999 and has not yet been revised to sufficiently address climate change risks on water resources in general and developed water sources in particular. It promotes efficient, equitable and optimum utilization of available water resources for significant socioeconomic development on sustainable basis, but the effect of climate change has not been well addressed. It has a specific objective to combat flooding related risks; and also aims to conserve, protect and enhance water resources but strategies specified in the document are not enough to establish climate resilient water supply and sanitation services. Similar justifications are discussed in the water sector strategy (2001) and Water Sector Development Program (2002-2016). But, currently the Ministry of Water, Irrigation and Energy is facilitating the formulation of Climate Resilient Water Safety Plan, showing considerable steps towards adaptation to climate change. Climate Resilient Water Safety Strategic Framework enables the provision of safe and adequate drinking water which has trust of the consumers and meet health based water quality targets. The scope of the strategy framework covers water utility (city, small and medium town) and rural community managed drinking water supply from catchment to point of use including the water supply system and household.

## Health Sector and climate change

### Health Sector Development Program and Public Health Emergency Management

Cognizant to the importance of strong institutional arrangement to strategically address climate change impact on health system, the MoH took policy decisions and have established, special program (PHEM) and institutional arrangement at all levels of health service delivery system so as to specifically manage public health emergencies including those associated with climate change hazards.

Furthermore, as part of the its planning processes, the MoH and EPHI identifies different climate change associated public health hazards including outbreaks of infectious diseases that can be exacerbated by fluctuations of the climate stimuli (weather variability), malnutrition, and

economic and social infrastructural damages that could occur due to extreme weather events like drought and floods (Draft Climate Change adaptation to health 2011-2015 and EPHI strategy 2011 - 2015). Besides, hot spot areas and populations at risk of climate driven health hazards are mapped and communicated seasonally based on evidences generated from periodic risk mapping exercises and early warning system. Review of the first EPHI strategic plan (2011-2015) also indicate, policy actions have been taken to strengthen the capacity of health system to forecast possible occurrence of public health emergencies, plan and implement preventive and control measures.

Accordingly, the emergency preparedness and response strategy, programs and plan are streamlined in to existing routine health programs at all levels and implementation guidelines are developed on outbreak risk assessment and management, diagnosis and treatment, and reporting.

Successful adaptation to Climate Change risks requires recognition of the necessary capacity including; capacity to assess risks and vulnerability, knowledge about available options, and the ability to implement the most suitable options. These in turn need technical capacity to understand the scope of the problems which is determined on availability of skilled human resources. Reviews of reports and informative discussion showed that, MoH/EPHI has been implementing human capacity building interventions at federal, regional, zonal/Woreda and health institution levels through in-service and pre-service trainings and at post graduate levels.

Regarding coordination and partnership, the FMoH/PHEM has established partnership with other government sectors (MoWIE, DRMFFS), international organizations and with universities and works on the capacity building trainings, mobilization of resource (human, material and financial resources) for humanitarian responses. Furthermore, MoH also established public health and nutrition emergency taskforces composed of representative from government, UN agencies, CSOs and private sectors to jointly discuss and conduct humanitarian risk assessments twice a year followed by development or updating of the preparedness and response plans. In addition, outbreak prone diseases including climate sensitive diseases are monitored through established surveillance system. MoH/EPHI has set targets and regularly monitors the performances of surveillance system by timeliness and completeness of the reports and provides feed backs to regions. In spite of their key role in prevention and control of climate driven health hazards either in disaster risk assessment, provision of periodic information to strengthen early warning system, preventive service provision, or in community mobilization, the NMSA, MoWIE, MOE and DRMFSS are not identified and discussed being key stakeholders. In addition, availability of climate information/data from NMSA is not identified and considered as opportunity and benefit of climatic information in strengthening of the public health emergency management is not discussed.

The MoH showed its commitment to further strengthen the capacity to health related disasters and risks in the coming five years (2016-2020). In the processes of development of the Health Sector Transformation Plan (HSTP) and of the second strategic plan; the MoH/EPHI identifies climate change among other challenges (threats), even if paths through which climate change is linked with public health emergency is not discussed in the strategy document. The Four broad policy initiatives which significantly reduce health sectors' vulnerability to climate change are identified and discussed in the second HSTP/EPHI strategic plan. Namely;

- Initiatives to conduct vulnerability and risk assessment and mapping of diseases, as well as Climate change copying capacity of health facilities
- Initiatives to improve research and evidence based decision making through research and evaluation of health and nutrition issues and technology evaluation and transfer
- Initiative to improve health related disaster risk management through strengthening public health emergency response and rehabilitation system in general and strengthening public health surveillance and public health emergency preparedness program
- Initiative to develop institutional policy and management as well as strengthening of coordination and communication, atomization of the communication infrastructure and human resource development

In addition to improve health related disaster risk management initiatives, there are important activities planned under research and evidence based decision making initiatives that have direct contribution on strengthening adaptive capacity of health sector to climate change. To mention;

- Research agenda such as impact of indoor air pollution on human health, health impacts of climate change industrial emission of persistent organic pollutants, linkage between food and water safety, effect of climate change on food and drinking water quality, and health and livelihood of population are identified and weaved in to major research and development initiatives of the HSTP/EPHI plans.
- Evaluation study on the effectiveness and efficacy of technologies used for malaria prevention such as ITNs and IRS chemicals is relevant initiative to evaluate effectiveness of climate change adaptation intervention in health to inform policy makers to make timely decision if technologies fail to reduce vulnerability of the population against malaria.
- Establishment of sentinel surveillance sites for climate sensitive diseases such as vaccine preventable disease (M. meningitis), enteric bacterial pathogens (Cholera, B. dysentery), medically important disease vectors, malaria and climate change/weather variability, NTDs, cardio-vascular diseases and for behavioral and demographic surveillance provides opportunity to establish evidence on sensitivity level of diseases to climate change.
- A plan to study effects of climate change/weather variability and agro-ecology and forest distribution on the health and nutritional status of women and children will generate additional knowledge on linkage between maternal and child nutrition and climate change.

**Disease Prevention and Control Programs and Climate Change**

Government has further extended its commitment to safe guard health of the population by giving due attention to prevention and control of vector borne and neglected tropical diseases that pose burden on the health and economic development of the population. For example, the national malaria control program (2011-2015), national NTD master plan (2013-2015), Hygiene

and sanitation strategy (2011-2015) are to be mentioned among other national response to climate sensitive communicable disease

In all strategies important behavioral, ecological and climatic factors like vegetation, altitude, temperature, rainfall, and relative humidity associated with occurrence and distribution of vector borne and neglected tropical diseases, technologies required and legislative measures taken for control of the diseases, and governance mechanisms through which the performances of the strategies can be tracked and monitored are identified and discussed. The differential effects of environmental factors on the breading of diseases vectors and survival and development of diseases agents are addressed in the strategies.

The malaria control program strategy (2011-2015) is core component of the HSDP-IV and builds on the preceding control strategy (2006-2010) and aims to significantly reduce the malaria burden in the country through increasing access and utilization of high impact preventive and control interventions (technologies and methods) and strengthening of the health service delivery system. The control program identifies and discusses in detail individual, population, settlement, socioeconomic, ecological and climatic risk factors that favors malaria transmission including impacts of weather variability. In summary, it addresses that, malaria is the top leading cause of morbidity in Ethiopia and reminds burden of large malaria outbreaks burden documented during 1958, 1991-1992, 1997-1978, and during 2003-2004. Since 2004, there was no report of major outbreaks of malaria. However, update of the malaria transmission mapping is required in light of current changes in urbanization, expansion of large scale agricultural and industrial development, improvement in economic growth and climate change.

In addition, the NTD master plan (2013-2015) and draft HSTP (2016-2020) have identifies and discusses in detail burden of neglected tropical diseases and their behavioral and environmental risk factors. Soil transmissible helminthes common among the school age children and affect the learning capacity and their educational achievement mediated through malnutrition, and consequently limit their success later in their adulthood life. People affected by debilitating diseases such as soil transmissible helminthes (STH) cannot fully engage in the productive activities which later on increase their vulnerability to environmental shocks. The target set in HSTP to achieve 82% ODF Kebeles by the end of the plan period a high impact intervention which significantly contribute in the reduction of prevalence of debilitation NTDs mainly STH, Schistosomiasis and trachoma, maternal and child malnutrition, and diarrheal diseases.

The NTDs control program presents lack of budget and resources being one of the challenges to implement Face washing and environmental sanitation (FE) component of trachoma control strategy while there is no point where the control program state hygiene and sanitation strategy being one of the opportunities for successful implementation of trachoma control program. Therefore, there are grey areas that need integration and alignment of prevention and control program interventions and resources for diseases that share common environmental and climatic risk factors.

**Education and climate change**

Similar justification holds for education sector. Education and Training Policy was formulated in 1994 and not yet revised to accommodate any emerging development issues that have considerable impact on education performance. It is true that climate change has both direct and indirect impact on the performance of education sector. Extreme weather conditions (extreme increase in temperature due to prolonged drought or flooding caused by heavy rains) directly affect the atmosphere for education and training and indirectly affecting school community through the damage caused to water supply and sanitation facilities because of flooding or absence of water in the tap due to lowering of water table as a result of prolonged dry seasons. Education sector is therefore required to establish climate resilient school environment by at least including climate change issues in the curriculum and prioritizing climate change risks in its policy documents. One of the education and training policy (1994) directs the provision of education that can produce citizens having national and international outlook on environment and protection of natural resources. It strategizes to achieve this objective through developing relevant educational curriculum. ESDP IV also aims to address human development needs so as to achieve MDGs by 2015. It recognizes the need for environmental education and protection, and the difficulty of education in emergencies. It also states that low awareness on the impact of emergencies on education has contributed to inadequate response to emergencies by education sector. "Emergency – drought and natural catastrophes" is identified as one of the risks that could affect education sector in achieving its objectives. But it is silent when it comes to climate change related risks and how to respond to such risks.

**Sector Wide WASH Program**

One WASH National Program (OWNP) recognizes the impacts of climate change and plans to develop climate screening and resilience approach. Under section 10.9: Climate Screening and Resilience, it aims to "improve year round water security and resilience of schemes to drought, the program will promote and support better understanding of available water resources and climate risks and improve design and sitting of schemes". OWNP has relevant sub-programs such as Environmental and Social Management Framework (ESMF). ESMF aims to provide environmental and social screening process for urban and rural water supply and sanitation program. It is updated with the following objectives: "screen for potential environmental and social impacts of OWNP-CWA sub projects", "identify possible impacts and propose appropriate mitigation measures" and "monitor implementation of these measures".

### 3.3.2. Governance: Institutional Arrangement for Adaptation to Climate Change

**Lead agency**: Environmental Protection Agency (now called Ministry Environment and Forest) and Ministry of Finance and Economic Development) are the lead agencies for climate change response in Ethiopia. EPA's role as Ethiopia's lead agency on climate change is drawn from the National Environmental Policy and the Environmental Protection Organs Establishment Proclamation No. 295/2002 (as indicated in the Ethiopia's Vision for CRGE).

Ethiopia has put in place a new structure to facilitate cross-government engagements and to coordinate responses to climate change. Refer the follow governance framework designed by

government to facilitate cross government involvements in the effort to reduce the impacts of climate change.

Each sector ministry will take the lead in mainstreaming climate change risks within their respective sector development programs under the guidance of SRM. The Ministry of Water, Irrigation and Energy (MoWIE) takes the lead to mainstream climate change risks within the water sector program. Likewise, the Ministry of Health will lead mainstreaming climate change risks within the health policy, programs and plans and cascade down to local governments.

Water sector starts to lead development of national climate resilient water safety strategy framework, urban utility managed climate resilient water safety plan implementation guideline and rural/small community managed water supply climate resilient water safety plan implementation guideline. The draft guiding documents have been presented to the validation workshop and they are being finalized under the leadership of the Ministry of Water, Irrigation and Energy.

CRGE is governed by the co-responsibility of the MoEF and MoFED. MoEF supervises and regulate implementation of the technical component (deciding on proposals to be submitted, organizing and conducting independent measurement and adapting guideline, procedure and templates) while MoFED leads on the financial components of CRGE (solicit finance from different sources and channel funds as advance or ex-post payment; ensure transparency, objectivity, consistency, and professionalism in its operation in compliance with international agreement).

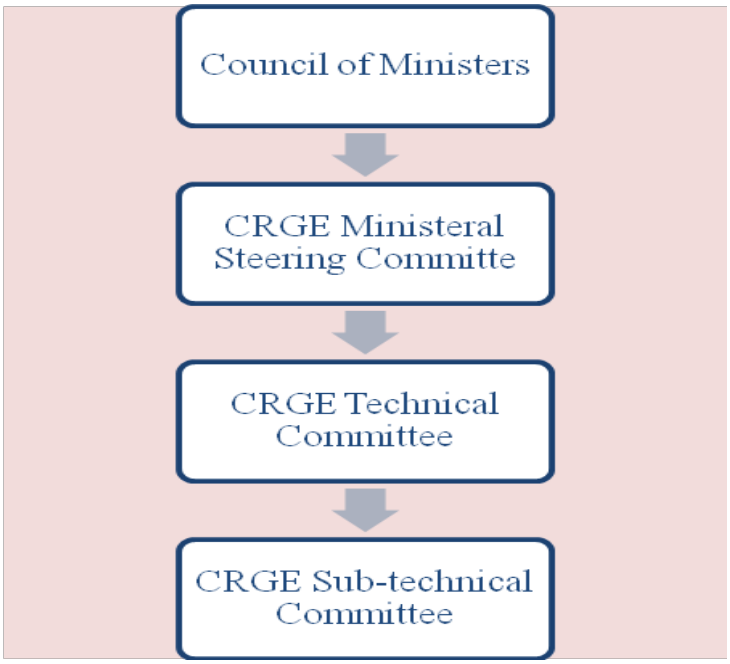



Figure 2: New structure for CRGE governance

### 3.3.3. Gaps / Limitations with Existing Policies

Single sector responses may not be effective to sufficiently address climate change related risks. It requires multi-sectoral responses. The fact that climate change related interventions requires meaningful involvement of multiple sectors indicate the importance of assigning a specific coordinating body. In Ethiopia, the then Environmental Protection Authority, now the Ministry of Environment and Forestry is the lead agency to coordinate climate change related interventions. New governance structure is put in place to implement climate change related programs (MoEF, 2011). Besides, despite its insignificant contribution to gas emission, Government of Ethiopia has shown high level of political commitment to respond to climate change risks by formulating alternative policies, strategies and programs (refer section discussing about policy environment). Despite the successes achieved so far, the country has to take many more actions in terms of implementing the program of adaption to climate change, in the mean time increasing awareness and capacities of implementing agencies. In addition to the commitments and policy options, capacitating implementing agencies at different levels would be equally important. Combating climate change risks requires the right skills and knowledge as well as finance. A lot is expected from the government to mobilize resources from internal and external sources using the global climate financing initiatives as an opportunity.

**Limitations with climate change policies (do they prioritize WASH and Public Health?)**

Climate change policy documents include National Environmental Policy, NAPA, EPACC, CRGE Vision and Strategy, NAMA and SRM. Looking into these policies, only NAPA and EPACC are found to prioritize water and human health. Others prioritize seven sectors such as energy, agriculture, industry, forests, waste, building and transport.

**Table 5. Gaps with climate change policy documents in terms of prioritizing WASH and Health**

| Policy | **Gaps with climate change policies in terms of prioritizing WASH and Public Health** |
|---|---|
| Environmental policy | Even if Environmental Policy was formulated three years after the ratification of UNFCCC, it doesn't clearly articulate how the policy strategizes interventions to sufficiently address climate change related risks. It has components on water resources, environmental health, and air pollution but not necessarily associating with climate change adaptations or mitigations. Even if the Environmental policy states the vulnerability of the country and the importance of national actions targeting management of climate risks and working on external financial mobilization, the policy does not mention any statement about the need for full integration of climate change adaptation and nationally appropriate mitigation measures in the environmental policy. This gap could arise due to the fact that Environmental policy was prepared ahead of the time issues use of climate changes becomes top political agenda for the country |

| Policy | **Gaps with climate change policies in terms of prioritizing WASH and Public Health** |
|---|---|
| NAPA 2007 | NAPA was reported to be less effective as it used a project approach to address climate change. It only provides project options to mitigate climate change related risks (not discuss issues beyond projects). Reports from previous studies are inconformity with this gap. Naomi et al. (2011) reported that NAPA was criticized for its project approach, as it was not comprehensive. Importance of water resource for adaptation is often acknowledged in NAPA but the link between water related climatic impacts and other development sectors are not well articulated; practical aspects regarding water management are often neglected; water insecurity not identified as major adverse impact of climate variability and water supply and sanitation are not well addressed. Hence, replaced by EPACC. NAPA does not consider WASH as priority project among others. It lacks gender sensitivity particularly women which are highly vulnerable to climate change compared to their counterparts mainly due to lack of engagement of the MoWCYA and does not have measureable monitoring indicators and mechanisms to track performances. |
| EPACC | It replaces NAPA as it follows programmatic approaches to climate change adaptations and/or mitigation planning.<br>Reports show that sector and regional program of actions for adaptation to climate change are prepared, but discussions with relevant government office indicated that the process is at its infancy and are expected to be mainstreamed with sector programs to be implemented during GTP 2. |
| Green Economy Strategy | Green Economy Strategy is based on four pillars identified from agriculture, forest, power, transport, industry and building sectors. It does not specifically prioritize WASH as well as public health. |
| NAMA | Ethiopian voluntary NAMAs targets seven sectors such agriculture, waste, transport, industry, energy and building. But it does not specifically prioritize WASH and Public Health. In addition, it lacks important mitigation actions in land use planning, energy efficiency, and regulatory policy measures that have indirect contribution to improvement of health by preventing indoor air pollution |
| SRM | SRM is a mechanism for reducing vulnerability of individual sector to climate change and emissions in the country. Further, sector reduction action plan was also developed but not put to practice till this review. Checklists are prepared that shows what each sector should mainstream in the preparation of GTP 2. But till this review, it has not yet been used. |

**Limitations with WASH Policies (do they prioritize climate change risks?)**

Informative discussion conducted with the lead agency, the Ministry of Environment and Forest, indicated that CRGE implementing sectors (secretariat) are trying to mainstream climate change within their programs. But mainstreaming of climate change across these sectors vary for many reasons such as fear of accountability, low understanding on climate change related risks, and the tendency to continue with the business as usual.

Sector policies and strategies are found to be very old and are not sufficiently addressing climate change related risks. On the other hands, some program documents somehow have shown aspects of extreme weather events (such as flooding and drought). But, these documents may not necessarily provide clear strategies on how these extreme weather events can be controlled before it results in considerable shocks to the economy of households at micro level.

The following table summarizes gaps of WASH sector policy documents including Water Resources Management Policy (1999), Water Strategy (2001), Water Sector Development Program (2002-2016), Universal Access Program (Urban), One WASH National Program (2013), Climate Resilient Water Safety Plan Implementation Framework (2014) in terms of mainstreaming climate change related risks. Generally, if not fully addressed, all the policy documents in one way or the other have activities associated with climate change, but a lot of works wait each sector ahead to establish climate resilient WASH and health in Ethiopia.

**Table 6. Limitations with WASH policy documents in light of climate sensitiveness**

| Policy | Limitations / constraints |
|---|---|
| Water Resources Management Policy; water sector strategy; water sector development program; UAP | WRM policy is as old as 1999; since then there have been many changes. The water supply and sanitation policy component does not recognize climate change related risks and hence not using climate information in planning and designing water supply and sanitation projects. The word 'climate change' does not appear even ones in the policy document. The study made by Alebel (2014) confirms this conclusion as it states that the policy does not factor out climate change as a major variable affecting the amount, distribution and quality of water resources.<br>None of the pillars of the water sector policy recognizes climate change as factor adversely affecting water supply and sanitation facilities. None of the elements of water supply and sanitation strategy are sensitive to climate change. It only discusses possible strategies to protect water bodies from pollution and contamination due to indiscriminate discharge of industrial wastes and others associated with poor sanitation; but not recognize the impacts of climate change on water supply and sanitation. WSDP aims to establish sustainable water supply, but it does not prioritize 'climate change". Climate change is not among the sector priorities, and also not part of implementation strategies. Climate change not mentioned in the program document. It might be because of low awareness on the impact of climate change on water supply. Climate change was identified as one risk factor under the urban water supply UAP (2011-15) but no further actions suggested. |
| One WASH National Program | OWNP has a component on climate screening and resilience (section 10.9); and it has identified key interventions to establish resilience of water supply facilities to climate change events. But, the focus of the document is mainly on expanding the services rather than achieving climate resilient WASH services. WASH sector is expected to be climate sensitive as it is vulnerable to climate change events. SRM has been developed to facilitate this process |

| Policy | Limitations / constraints |
|---|---|
| CR-WSP | As a follow up to OWNP, MoWIE has led the process of developing climate resilient water safety plan but this might not be the lasting solution to climate change risks on water supply and sanitation facilities. This document needs to be translated into operational annual plans and budgeted from different sources including the government. |

**Limitations of Health and Education Policy Documents in light of climate sensitiveness**

Similar to the water supply and sanitation policies discussed above, health and education policy documents have also some aspects of climate change. The national health policy is developed 1993 and climate change is not considered as a major public health threat. But, there are policy statements that indirectly address climate change such as prioritizing prevention of environmental pollution with hazardous chemical wastes and the development of environmental health. In light of current overall socioeconomic economic development in general, large scale estate farms and move towards industrialization and urban population growth, and climate change, the health policy needs revision taking in to consideration the above mentioned issues in to its objectives and targets. In addition, health sector development programs and strategies needs to engage all important stakeholders for successful implementation of health related disaster prevention and risk reduction programs. there is also a need to explicitly discuss how climate change is linked with diseases of public health importance and other health problems (like nutrition), and identification of different diseases and health problems that have overlapping climate risk factors and devise high impact intervention that can simultaneously tackle health problems and build adaptive capacity of the health system and the population.

Education and training policy is as old as 1994 and needs major revision to fully accommodate climate change risks to school WASH. It was since recent years that education sector took over full responsibility to lead school WASH interventions. A lot of works are waiting ahead to make their policies climate sensitive in general and establish climate resilient WASH in schools. Mapping schools situated in climate change prone areas might be needed, and further research on the link between education and climate change may be of high importance.

**Table 7. Gaps with education and health policy documents in terms of addressing climate change risks**

| Policy | **Limitations / constraints** |
|---|---|
| Health policy and programs | In the national health policy (1993), climate change is not considered as a major public health threat. But, there are policy statements that indirectly address climate change such as prioritizing prevention of environmental pollution with hazardous chemical wastes and the development of environmental health.<br><br>In spite of their key role in prevention and control of climate driven health hazards either in disaster risk assessment, provision of periodic information to strengthen early warning system, preventive service provision, or in community mobilization, the NMSA, MoWIE, MOE and DRMFSS are not identified and discussed being key stakeholders. In addition, availability of climate information/data from NMSA is not identified and considered as opportunity and the benefit of climatic information in strengthening of the public health emergency management is not discussed.<br><br>Though climate change is identified to be among other challenges (threats), a path through which climate change is linked with public health emergency is not discussed in the strategy document.<br><br>There is no update on malaria transmission mapping in light of current changes in urbanization, expansion of large scale agricultural and industrial development, improvement in economic growth and climate change.<br><br>The NTD control master plan (FE) component of trachoma control strategy did not consider the national hygiene and sanitation strategy being one of the opportunities for its successful implementation program. Therefore, there are grey areas that need integration and alignment of prevention and control program interventions and resources for diseases that share common environmental and climatic risk factors. |
| Education policy and programs | Education and training policy is as old as 1994; and there are considerable changes since then. It is silent when it comes to climate change related risks on the quality and quantity of education. Evidences of how climate change impacts on education is lacking in Ethiopia and this could have affected the likely responses to climate change by the education sector. Climate change can pose impact on education directly or indirectly but education policy does not recognize the impacts of climate change on education.<br><br>Major revision might be needed to ensure climate resilient education policy and practices in Ethiopia. No information is available as to how climate change could impact on education. This might have affected the response of education sector to climate change. Further research into the impact of climate change on education might be required to answer research questions like: How climate change could affect education? What are the climate change related risks to education sector? How education sector respond to climate change related risks? |

### 3.3.4. Scoring policy documents

On the basis of the findings from the review processes, policy documents were scored using specified criteria. 0 to 5 scores have been given; 0 representing the lowest score for policy documents but showing huge potential for revision; 5 representing the highest score. The scores given to climate change policies illustrate the extent to which WASH and Public Health are prioritized as vulnerable sectors to climate change. On the other hand, WASH and Public Health Policies are scored to present objectively whether they are sensitive to climate change related risks. Refer the following tables for more details.

**Scoring climate change policies**

Even if Government of Ethiopia has shown high level commitments to take forward climate change issues nationally and globally, there are still a lot of assignments waiting ahead to meet the objectives. Significant progresses have been made in terms of creating enabling environment for climate change adaptation and/or mitigations. Environmental policy was formulated in 1997, three years after ratification of UNFCCC. Following this, Ethiopia has prepared its first kind climate change national adaptation program of action (NAPA) in 2007, which followed a project approach to address climate change risks. Again, on the basis of the suggestions from UNFCCC, Ethiopia produced its program of adaptation to climate change (EPACC) in 2010, which replace NAPA, as it follows programmatic approach to climate change adaptation planning. In the same year, it has prepared its voluntary nationally appropriate mitigation actions and submitted to UNFCCC. In 2011 Ethiopia has formulated its climate resilient green economy vision and strategy. Analyses of the climate change policies (CRGE, Environment policy and NAMA) show the need for reconsidering of WASH and Public Health as a priority to address impacts of climate change these sectors.

Despite these huge efforts put in place to support implementation of green economic growth, they were found to dissociate with WASH and public health. In other words, climate change policies fail to prioritize drinking water supply, sanitation and hygiene (WASH) and health in adaptation planning being as one of the sectors vulnerable to extreme weather conditions.

**Table 8. Results of scoring climate change policies in light of WASH and Public Health**

| Policy | Provisions against criteria | Score |
|---|---|---|
| Environmental policy | National Environmental Policy has a component on water resources, environmental health and atmospheric air pollution but not necessarily aligned with issues associated with climate change risks. It also has a component on air pollution and climate change but it does not present anything on WASH and Health. | 3 |
| NAPA 2007 | NAPA identifies agriculture, water and human health as vulnerable sectors to climate change. But its strategic directions to achieve the objectives were not found to be comprehensive. It largely focuses on agricultural activities. Suggestions came from UNFCCC to update NAPA as programmatic approach to climate change are more effective compared to its project approach. | 3 |

| Policy | Provisions against criteria | Score |
|---|---|---|
| EPACC 2010 | EPACC follows programmatic approach to climate change adaptation planning (replaced NAPA). It outlines 29 components that include objectives around mainstreaming climate change within government policies and plans. As a follow up the country has produced sectoral and regional program of adaptation to climate change (Fikreyesus et al., 2014). | 3 |
| CRGE Vision and Strategy | It articulates Ethiopia's ambition to build climate resilient green economy by 2025. It identifies water and health as sectors vulnerable to climate change. SRM has been put in place to support the process of mainstreaming climate in sector development programs. | 3 |
| NAMA | Ethiopian voluntary NAMAs targets seven sectors such agriculture, energy, transport, industry, waste and building. But it does not specifically prioritize WASH and Public Health. | 2 |

### Scoring sector policies for their climate sensitiveness

Most of the sector policy documents were formulated before 2007 when the first climate change national adaptation program of actions was prepared; as a result, they are not strongly sensitive to climate change risks. But some of the interventions have indirect or direct implications on adaptation to climate change events (Table 10).

**Table 9. Results of scoring sector policies in light of adaptations to climate change risks**

| Policy | Provision of sector policies against set criteria | Score |
|---|---|---|
| Water Policy, strategy and program | Two of the water resources management policy is associated with extreme weather conditions (drought and flooding). These have also been reflected in water sector strategy and development program. If one looks into the overall policy direction of water supply and sanitation sub-sector, it largely focuses on expanding the services regardless of the fact that the facilities could be exposed sever climate change events. These documents need major revision in the areas of overall policy objectives, adaptation and/or mitigation strategies, and knowledge management. | 3 |
| Education Policy and program | The central objective of education policy and program is to address human development needs which are the backbone for economic growth. It recognizes the need for environmental education and protection, and the difficulty of education in emergencies. It also states that low awareness on the impact of emergencies on education has contributed to inadequate response to emergencies by education sector. "Emergency – drought and natural catastrophes" is identified as one of the risk factors affecting education sector performance.<br><br>As the policy is as old as 1994, it does not use the word "climate change". The new curriculum aims to integrate international economic and social realities as well as national democracy and gender equity, but it doesn't give a space for integrating climate change in the education curriculum. Besides, the program aims to integrate population and family life in the teacher training curriculum but it doesn't recognize climate change related issues. Especially at this point in time where education sector has received responsibility, within the sector wide program, to led school WASH | 2 |

| Policy | Provision of sector policies against set criteria | Score |
|---|---|---|
| | program, sufficient policy responses are required to ensure climate resilient WASH in schools. | |
| Health Policy and program | The national health policy is developed 1993 and climate change is not considered as a major public health threat. But, there are policy statements that indirectly address climate change such as prioritizing prevention of environmental pollution with hazardous chemical wastes and the development of environmental health. However, the health sector development program, specific strategies on prevention and control of climate sensitive diseases and public health emergency management programs (PHEM) set by the MoE and EPHI are aware of the negative impacts of climate change on the health and nutrition status of the population, and developed a number of high impact interventions that can turn away health related disasters and risks. The PHEM program is institutionalized since 2009 and responsible management units are established with relevant staffing from federal to Woreda levels, emergence response technical mechanism is networked between program management and hospitals, important implementation guidelines developed and surveillance system established at all levels up to village level to monitor 20 immediately and weekly reportable diseases. Targets and performance indicators are set for the PHEM programs and indicators are monitored and evaluated periodically and feedback is given to regional and sub regional management structures. The program is budgeted and a number of activities that reduce vulnerability of the health sector are weaved in to other health development programs. However, there are gray areas that need minimum effort to integrate and align of prevention and control program interventions and resources for diseases that share common environmental and climatic risk factors. Besides, there is a need to update malaria transmission mapping in light of current changes in urbanization, expansion of large scale agricultural and industrial development, improvement in economic growth and climate change. Further strengthening of coordination with other government sectors is also important. | 4 |
| Sector Wide OWNP | Sector wide program for WASH recognizes climate change events and plans to formulate climate screening and resilient approach. Section 10.9 discuss about Climate Screening and Resilience; it aims to improve year round water security and resilience of schemes to drought; also promotes and supports better understanding of available water resources and climate risks, and improve design and sitting of schemes. In order to translate the program into operational plans and allocate budget, it should be part of GTP. | 3 |
| GTP | GTP, as a main national development plan, targets to achieve double digit growth that lifts up the country to the middle income level by 2025 through increasing agricultural productivity, strengthening industrial base and promoting export growth. It has component on water supply (section 5.5.5); and health (section 6.2). It has strategic direction to prioritize water resource management, and mitigate impacts of runoff, drought and other natural hazards. It also targets to increase groundwater information and knowledge mapping coverage from 3% in 2010 to 22.7% in 2015. One of its strategic objective for health “improve public health emergency preparedness and response which include improvement in health risk identification, early warning, response and recovery from existing and emerging disease epidemics, acute malnutrition and natural disaster of national and international concern”. | 2 |

### 3.3.5. Potential areas for policy or program/strategy revisions

The main purpose of this review is to identify potential areas for policy revisions so as to establish climate resilient WASH and Public Health in Ethiopia. On the basis of the findings from the review process, potential areas for policy changes are summarized around three areas such as strategic direction and governance, improved management of climate risks, and research and knowledge management.

The following table presents potential policy or strategy revisions across WASH, Public Health and climate change policies.

**Table 10. Potential areas for policy/strategy revisions**

| Policy | Strategic direction and governance | Improved management of climate risks | Research and knowledge management |
|---|---|---|---|
| WASH Policy documents | Climate change as part of water, health and education sector policy goals, objectives, strategies, and targets with monitorable indicators<br>Climate change as part of water, health and education GTP 2 targets | Identification of areas susceptible to climate change<br>Identifying climate resilient technologies in accordance with the delineated areas<br>Capacity Building in areas of climate change; risk management practices and tools to manage climate-driven threats to water quantity & quality | Research to generate evidences on the link between WASH and climate change (vulnerability and adaptation assessment)<br>Hydrological and geological information |
| Public Health Policies | Climate change monitoring indicators as part of the health policy and programs | Adaptive capacity of health and WASH sectors on the management of the climate sensitive diseases. | Public health vulnerability and risk mapping of climate sensitive infectious diseases in light of climate change and economic development |
| Climate change policies | Reconsidering WASH and Public Health as part of adaptation or mitigation strategies | Increasing adaptation and mitigation capacity for sectors susceptible to climate change;<br>Human resource capacity to interpret climate information and increasing efficiency of using climate information for planning | Mapping of climate change prone areas |

# 4. CONCLUSIONS AND PROPOSED POLICY OPTIONS

## 4.1. Conclusions

Ethiopia, the fast growing economy with insignificant contribution to green house gas emission, has taken considerable steps towards adaptation and/or mitigation of climate change risks. This is mainly because of the fact that the opportunity cost of not investing in climate change is very high. If Ethiopia fails to move forward with the required speed to adapt to or mitigate climate change, it is expected to loss significant percentages of its economic growth. That is why Ethiopia has formulated its first kind Climate Resilient Green Economy Strategy which aims to support the country in achieving middle income level by 2025 that is carbon neutral and climate resilient. It has also put new structure to implement climate resilient green economy at national level as well as assigned CRGE implementing agencies. Ethiopia's Prime Minister has been playing a leading role in regional and global responses to climate change. Ministry of Environment and Forest (supervises and regulate implementation of the technical components of CRGE) in collaboration with the Ministry of Finance and Economic Development (the facility is responsible to solicit and manage the financial component of CRGE) are responsible to coordinate implementation of CRGE.

Despite such achievements, ownership of climate change issues by sector ministries and mainstreaming climate change adaptations and/or mitigation in their respective sector development programs remains to be at its infancy. Only CRGE implementing sectors are currently developing climate resilient strategies and the Ministry of Environment and Forest is finalizing guidance note to help sectors mainstream climate change adaptation in the second generation Growth and Transformation Plan which runs for the coming five years.

Similarly climate change policies are found to focus on six sectors identified as CRGE implementing agencies, namely, agriculture, energy, industry, transport, construction, and forest. This means that climate change policies are not fully prioritizing WASH and health in adaptation plans.

This review process has identified key challenges to achieve climate resilient WASH and Public Health. Some of these include fear of accountability to mainstream climate change adaptation in sector development program and the tendency to continue business as usual, low capacity of the sectors to mainstream climate change adaptation (weak institutional arrangement), and only six sectors are identified as CRGE implementing agencies while other social sectors are not taking part.

## 4.2. Proposed Policy Options for Climate Resilience

The following recommendations have been made to facilitate discussions among key stakeholders leading to the establishment of climate resilient WASH and Public Health in Ethiopia.

**Option 1: Provides Proposals for Policy Options in the Areas of Strategic Directions.**

In the long run WASH Sector Policies, being vulnerable to climate change risks, shall take climate resilience as their respective sector direction by reflecting it in the overall policy goals, objectives, strategies and targets. While revising their respective policies, sector ministries shall

consider climate change as part of water, health and education sector policy goals, objectives, strategies, and targets. In the short run, sector ministries shall consider climate change adaptation as part of water and education sectors' GTP 2 targets.

Similarly, climate change policy documents shall prioritize WASH and Public Health in the national adaptation and/or mitigation action plans. Policy documents should also identify social sectors including health, and education sectors as CRGE implementing sectors so that they are capacitated to address climate change adaptations.

Health program strategies shall identify infectious diseases that have common environmental and climatic risk factors and design high impact intervention that simultaneously addresses the burden and reduce vulnerability of the population to climate change

**Option 2: Provides Recommendations with Regard to Management of Climate Change Risks on WASH and Public Health**

This review process agrees with recommendations given by previous researchers in those future water supply technology choices needs to focus on reliable sources including boreholes or deep wells with productive aquifers, and large springs.

In case there is no option but to use vulnerable sources, more focus should be placed on proper sitting of the source (shallow wells, hand dug wells, on spot springs) and/or developing vulnerable sources along with more resilient technologies to spread climate related risks.

At this point in time, it is clear that WASH and Health sectors lack required capacity to draw accurate plan to adapt to or mitigate climate change risks. Therefore, increasing adaptation and mitigation capacities of these sectors to climate change would be of great importance. This might include in-service capacity building training or pre-service training.

It is also important to capacitate WASH and health sectors to analyze, interpret and use climate data or information in planning process (for example: if temperature is projected to increase by 1degree Celsius, what does it mean for water supply planners? Health service planners? Education planners?). It is critical to fully understand the scientific associations between increase or decrease in temperature or precipitation and WASH and/or public health.

MoEF is supporting development of climate resilient green economy through providing training, preparing guidelines to mainstream climate change adaptations or mitigations in sector programs. Sector ministries should be aware of such support and should utilize the opportunity in the strive to establish climate resilient WASH and public health.

**Option 3: Provides Alternative Recommendations to Improve Research and Knowledge Management for Laying Ground in Establishing Climate Resilient WASH and Public Health**

Findings from this review indicated that there are limited scientific understanding on the link between WASH and climate change, WASH and public health as well as climate change and specific components of public health interventions. CRGE coordinating body (MoEF and MoFED) in collaboration with relevant sectors should commission research to generate

evidences on the scientific links between WASH and climate change, WASH and public health as well as climate change and public health.

Besides, CRGE coordinating bodies in collaboration with relevant sectors should map the country vulnerability to climate change including climate prone areas, people's livelihood practices, hydrological and geological formations. This helps sectors to align their respective climate change adaptation plans.

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# 6. ANNEXES

Annex 1. AKEY INFORMANT INTERVIEW GUIDE [for CC Ministries]

**INSTRUCTION**

Consultant team will visit CC Ministries, namely, Ministry of Environment and Forestry, National Meteorology Agency, National Population Office, MoUHCo, Ministry of Science and Technology, Forum for Environment, etc to conduct informative discussions. Before getting into the actual discussion, the consultants will do the following.

- Introduction – name, professional background, roles in the current study.
- Introduce the objective of the study.
- Get into the actual discussion

**QUESTIONS TO GUIDE INFORMATIVE DISCUSSIONS**

1. Do you think WASH and Health sectors are vulnerable to climate change related risks? If yes, identify climate change risks to WASH and Health sectors?
2. Do you think climate change related policy/strategy prioritize WASH and Health? If yes, to what extent climate change related policies/strategies identify WASH and Health as priorities for adaptation?

| Indicators | Yes / No |
|---|---|
| Policy/strategy identified WASH and Health as sectors affected by climate change | |
| Policy/strategy discusses impacts of climate change on WASH and Health | |
| Policy/strategy calls for collaborations with WASH and Health sectors | |
| Policy/strategy included WASH and Health in the climate change mitigation or adaptation related objectives | |
| Policy/strategy identified or mapped regions, zones, woredas or population groups that are most affected by climate change events; also identified high risk seasons of the year | |
| Policy/strategy provides response measures for climate change risks on WASH and Health across the identified risk areas | |
| WASH and Health sectors participated in the formulation of climate change related policies and strategies | |

3. Are there climate change policy gaps in terms of addressing climate change risks on WASH and Health sectors? If so, please discuss.

4. What are the challenges in terms of sufficiently addressing climate change risks on WASH and Health sectors in Ethiopia? (issues with coordination, collaboration, governance, finance, etc)
5. Are the adaptation or mitigation strategies sufficiently addressing climate change risks on WASH and Health? If no, why? Discuss.
6. Is it possible to conclude that WASH and Health Services are resilient to climate change?
7. If no, what should be done differently to establish climate resilient WASH and Health in Ethiopia? Recommended actions!

THANK YOU VERY MUCH!

Annex 2: KEY INFORMANT INTERVIEW GUIDE [for WASH Sector Ministries]

**INSTRUCTION**

Consultant team will visit WASH Sector Ministries, namely, Ministry of Water Irrigation and Energy, Ministry of Education, and Ministry of Health to conduct informative discussions. From these ministries, the team will consult WASH unit or Directorates. Before getting into the actual discussion, the consultants will do the following.

- Introduction – name, professional background, roles in the current study.
- Introduce the objective of the study.
- Get into the actual discussion

**QUESTIONS TO GUIDE INFORMATIVE DISCUSSIONS**

1. Do you think climate change is a threat to WASH / HEALTH / EDUCATION services? If yes, how do you think climate change affect WASH / HEALTH / EDUCATION services?
2. Does water supply and sanitation (Health), (Education) policy/strategy recognize the impacts of climate changes? If yes, to what extent the policy discuss issues associated with of climate change?

| Indicators | Yes / No |
|---|---|
| In the policy/strategy document, climate change or weather variability discussed as one risk factor for the occurrence and distributions communicable disease transmission and malnutrition, (interruption of WASH/education services) etc | |
| Policy/strategy has clearly defined pathway on how climate change risks affect WASH/health/education sector development program | |
| Inadequate WASH program interventions such as management of or disposal of organic wastes are identified as contributing factors for exacerbating effects of climate change | |
| Sector Policy/strategy (WASH/Health Education) has climate change mitigation or adaptation related objectives | |
| Sector Policy/strategy clearly identified or mapped regions, zones, woredas or population groups that are most affected by climate change events; also identified high risk seasons of the year | |
| Sector Policy/strategy provides response measures for such identified climate change risks across the identified risk areas | |
| The ministry participated relevant stakeholders during the formulation of climate change policy documents (strategies, programs, plans) | |

3. Is there sector specific legal enforcement that contributes to reduction of the impacts of climate change? Discuss!

4. Is the WASH /Health/Education sector program sensitive to climate change? If yes, to what extent the program address climate change related issues?

| Indicator | Response |
|---|---|
| Program has climate change related Water/Health/Education targets (Yes/No) | |
| Program has climate change related Water/Health/Education activities (Yes/No) | |
| Water/Health/Education Program has climate change mitigation or adaptation strategies (Yes/No) | |
| Climate change mitigation strategies indicated in the Water/Health/Education program document are being practiced (Yes/No) | |
| Water/Health/Education Climate change mitigation strategies are adequate (Yes/No) | |

5. How climate change affects WASH, /Health/Education program in general and the interventions in particular? What are the risks and uncertainties associated with climate change on water supply and sanitation interventions? Discuss!
6. If there are anticipated risks of climate change on WASH, /Health/Education, what are the climate change mitigation strategies identified? Are these mitigation strategies being practiced?

| Indicators | Yes / No |
|---|---|
| Scaling up WASH & Health interventions in vulnerable areas | |
| Prioritizing WASH, /Health/Education specific technologies that are resilient to climate change | |
| WASH, /Health/Education Human resource development on risk management practices, adaptive capacity | |
| Tools to manage climate driven threats to water quantity and quality | |
| Adaptive capacity of WASH, /Health/Education sectors on management of climate sensitive diseases | |
| Conducting researches in WASH, /Health/Education areas where it is considered that further information are required to reduce uncertainty and to better guide investment | |

7. If WASH, /Health/Education mitigation strategies are not adequate to combat effects of climate change, what do you think should be done to reduce the impacts on the program effectiveness? Discuss!
8. Is it possible to conclude that WASH, /Health/Education services are resilient to climate change?
9. If no, what should be done differently to establish climate resilient WASH, /Health/Education in Ethiopia? Discuss!

THANK YOU VERY MUCH!

Annex 3 Lists of stakeholders included in the informative discussions

| No. | Name | Organization |
|---|---|---|
| **1** | Yohanes Melaku (CDF specialist) | Community Led Accelerated WASH, Ministry of Water, Irrigation and Energy |
| **2** | Musie H/Giorgis | Community Led Accelerated WASH, Ministry of Water, Irrigation and Energy |
| **3** | Abiyi Girma (National WASH Coordinator) | National WASH Coordination Office, Ministry of Water, Irrigation and Energy |
| **4** | Alemayehu Chekol (SWASH Sanitation and Hygiene Consultant) | WASH Program Management Unit, Ministry of Education |
| **5** | Teklit Berhane (SWASH M and E) | WASH Program Management Unit, Ministry of Education |
| **6** | Dula Shenko (Deputy Director) | National Meteorology Service Agency |
| **7** | Fikrie Sahile (GHG Emission Monitoring Expert) | CRGE Coordination Unit, Ministry of Agriculture |
| **8** | Dr. Adugna Woyessa, Deputy director | Ministry of Health/ EPHI |
| **9** | Melkamu Jaleta (Director) | Millennium Water Alliance |
| **10** | Habtamu Danboba, Planning officer | Ministry of Environment and Forestry |
| **11** | Wondiyifraw Taddesse, WASH officer | Catholic Relief Service (CRS), Ethiopia Program |