



Gender Analysis

**For Updated Ethiopia's
Nationally Determined Contribution**

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List of acronyms and abbreviations

BAU	Business as Usual
BOA	Bureau of Agriculture
CRGE	Climate Resilient Green Economy
CRS	Climate resilient strategy
CSA	Central Statistics Agency
CSA	Climate Smart Agriculture
CVA	Capacity and Vulnerability Analysis
EFCCC	Environment, Forest, and Climate Change Commission
ESS	Ethiopian Socioeconomic Survey
FAO	Food and Agricultural Organization
GA	Gender Analysis
GDP	Gross Domestic Product
GHG	Green House Gas
GTP	Growth and Transformation Plan
INDC	Intended nationally determined contribution
IPCC	International Panel for Climate Change
KII	Key Informant Interview
EFCCC	Environment, Forest, and Climate Change Commission
MOFEC	Ministry of Finance and Economic Cooperation
MoMP	Ministry of Mining and petroleum
MoWCY	Ministry of Women, Child and Youth
MoWIE	Ministry of Water, Irrigation and Energy
NAP-	National Adaptation Plan of Ethiopia
ETH	
NDC	Nationally Determined Contributions
NGO	Non-Government Organization
NTFPS	Non-Timber Forest Products
PFM	Participatory Forest Management
REDD+	Reducing Emissions from Deforestation and Forest Degradation
RIP	REDD+ Investment Programme
SDG	Sustainable Development Goals
SLM	Sustainable Land Management
SNNP	Southern Nations, Nationalities and People
SPFM	Sustainable Participatory Forest Management
UNDP	United Nation Development Program
UNFCCC	United Nations Framework Convention on Climate Change

1. Introduction

1.1. Background

According to the Climate Resilient Green Economy (CRGE) Strategy, the Government of Ethiopia intends to limit its net Green House Gas (GHG) emission in 2030 to 145 Mt CO₂e or lower. This would constitute a 255 Mt CO₂e reduction from the projected ‘business-as-usual’ (BAU) emissions in 2030 or a 64% reduction from the BAU scenario in 2030. The implementation of the CRGE would ensure a resilient economic development pathway while decreasing per capita emissions. The CRGE is also integrated into the Second Growth and Transformation Plan (GTP II 2016-2020). In the long term, Ethiopia intends to achieve its vision of becoming carbon-neutral, with the mid-term goal of attaining middle income status. 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 (FDRE, 2011). In addition according to the National Adaptation Plan (NAP) Ethiopia intends to undertake adaptation initiatives to reduce the vulnerability of its population, environment, and economy to the adverse effects of climate change, through building adaptive capacity and resilience; and integration of climate change in to its development plan, among others.

Based on the CRGE Ethiopia submitted its first Intended National Determined Contribution (INDC) in 2015 which become Ethiopia’s NDC in 2017. The Nationally Determined Contribution (NDC) of Ethiopia focus on four pillars to mitigate GHG emissions: (1). improving crop and livestock production practices for higher food security and farmer income while reducing emissions, (2) Protecting and re-establishing forests for their economic and ecosystem services, including as carbon stocks, (3) Expanding electricity generation from renewable sources of energy for domestic and regional markets, (4) Leap frogging to modern and energy-efficient technologies in transport, industrial sectors, and buildings (FDRE, 2015). In addition to mitigation efforts Ethiopia’s NDC identified adaptation efforts to reduce vulnerability of livelihoods and landscapes to climate impacts, focusing on three key areas: droughts, floods, and cross-cutting interventions. Many of the initiatives offer positive returns on investments, thus directly promoting economic growth and creating additional jobs with high value added (CRGE, 2011).

The ten-year Development Plan of Ethiopia, recently released, has mainstreamed climate change targets. Out of 11 sectors that submitted their ten-year development plan 6 has clear climate and environment related plans and targets. However, gender responsiveness of the climate related plans is yet to be seen. Based on the national plan and following the Paris Agreement, the country has submitted its first NDC in 2015 and updated and submitted its second NDC in December 2020. Both the Paris Agreement and the Sustainable Development Goals which Ethiopia is a signatory make gender equality their integral parts. Therefore, gender analysis is required for women inclusion in the implementation of the plan.

The Intergovernmental Panel on Climate Change (IPCC) Fourth Assessment Report (IPCC, 2007) discusses the differential impact of climate change on men and women. The physical, psychological, social, and economic impacts they experience together with the emergency responses, recovery and ultimately reconstruction are different. Women form the majority of the poorest sections of society has the least capacity or opportunity to prepare themselves for the impacts of climate change. The Report also recognizes

that women play an important role in disaster reduction, often informally, through participating in disaster management and acting as agents of social change.

Women play an important role in climate change adaptation and mitigation because of their roles in core climate change sectors: agriculture, livestock management, energy, Disaster Risk Reduction (DRR), forestry, water management and health (Dankelman, 2010; Denton, 2002). Because of the different roles and responsibilities of women and men, which vary by socioeconomic level as well as by region, there are gender differences in the impacts of climate change, responses to climate change, vulnerabilities to climate change, and the capacities to adapt. The Gender Analysis for NAP-ETH finds that climate change affects women and men differently due to differences in gender specific vulnerabilities and capacities to cope with the impacts. Due to pervasive gender inequality, compared to men, Ethiopian women normally have lower access to resources, information, participation, and decision-making processes. Climate change further exacerbates these pre-existing inequalities restricting women's ability to adapt (Alebachew et.al, 2018). However, it must be recognized that both women and men are also potential agents of change for climate change adaptation. Based on their roles and experiences, Ethiopian women and men have experiential knowledge and unique skills and capacities that are valuable for adaptation planning and implementation. Therefore, program and policy implementation need to take in to account these differences and opportunities to ensure equitable participation and benefit of women in different sectors.

1.2. Scope and objectives of the Gender Analysis

The main purpose of the assignment is to conduct Gender Analysis for Ethiopia's Updated Nationally Determined Contribution (NDC) to give recommendations on the actions for effective integration of gender considerations in the process of NDC moving forward.

The specific objective of this work is:

1. Reviewing gender issues related to the action stated in the NDC and in the NDC update, particularly in terms of differences in roles and responsibilities, access to resources, decision-making power and participation and differences in needs and capacities.
2. Recommend actions for effective integration of gender considerations in the process of NDC moving forward

1.2.1 Scope of the assignment

This assignment covers gender analysis to assess women participation in Ethiopia's NDC and the NDC update to evaluate how women are equitably participating and benefiting from different activities of the NDC. It entails reviewing literature on gender and climate change, Ethiopia's Updated NDC document, the NAP and other relevant climate change related policy documents. It includes mapping gender issues to the mitigation and adaptation actions identified in the Updated NDC and making recommendations for integrating gender considerations in implementation of NDC. It also involves conducting consultation of stakeholder on the implementation of NDC and assess how women are engaged in the process. In general, the analysis intends to:

- a. Identify men's and women's differences in roles and responsibilities, access and control over resources, decision-making power, participation and differences in needs and capacities (related to NDCs)
- b. Identify key issues and entry points that can help promote gender equality and women empowerment in the next phase of NDC
- c. Identify key strategic and catalytic issues that will help the next phase of NDC's implementing partners to have transformational impact.
- d. Provide recommendations on the actions for effective integration of gender considerations in the process of NDC moving forward.

2. Methodology of the study

Gender analysis for NDC is based on NDC's Gender analysis framework proposed by UNDP and guided by a set of leading questions. In addition, other UNFCCC, and international frameworks such the Enhanced Lima Work Programme of Gender (LWPG) are referred. To enrich the UNDP's NDC Gender Analysis framework the consultant employed the common gender analysis technique that involves identifying women and men roles, access to and control over resources and identify gender needs and priorities. The UNDP NDC Gender Analysis framework is adapted and as follows.

2.1. Gender Analysis framework for NDC

Gender Analysis (GA) for Ethiopia's NDC is informed by UNDP's Gender Analysis Guidance Note for NDC. According to the guidance note and Huyer 2016 it is necessary to focus on the structures, processes, institutionalization of addressing gender equality in the NDC formulation and implementation procedures itself. Accordingly, there are a range of aspects (building blocks) for gender analysis and integration in the NDC. There are: policy alignment, institutional coordination, capacity building, gender statistics and dedicated financial resources.

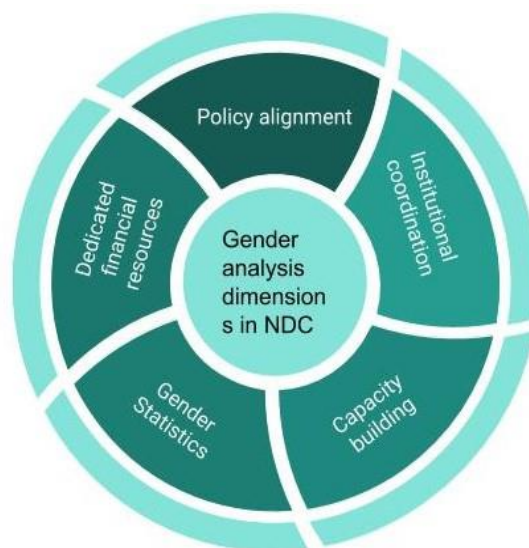


Figure 1 core aspects of gender integration in NDC

A. Policy Alignment

At NDC policy process level, an underlying question is how climate policies in the country help achieve or promote gender-related objectives. Another question is whether climate policies can consider the gender differentiated impacts of climate change and close gender gaps. To answer these questions, we can initiate the following issues around alignment.

- Examine national climate change policy and sectoral policies that are relevant for NDCs and assess the extent to which gender differentiated aspects have been incorporated. This means assessing how the different needs, opportunities and impacts of climate change on men and women have been considered in the sector. Some of the policies and strategies to be reviewed in this aspect are CRGE Strategy, GTP II, 10-Year Development Plan, the NAP and the Forest Sector Development Program.
- In addition, we have examined the national gender policies and national strategies on gender equality to understand what the country is striving for in terms of gender equality. In association, another area to examine is the extent to which climate impacts are considered in the national gender policy or strategy. The relevant document in this aspect are the National Women Policy and directives such as proclamations issued to mainstream gender in different sectors.

- Provide guidance on concrete actions to promote synergies between various policies to ensure gender equality issues are integrated. This entails reviewing and then outlining further mechanisms to be put in place to implement the gender-related objectives of the climate policies.

B. Institutional Coordination

Here the analysis should examine whether there are systems in place that integrate gender into the key existing climate-related coordination mechanisms. These could include for example national level coordination mechanisms or those at the sub-national level and incorporate the gender equality issues articulated by civil society groups, the private sector, academia and so on. The analysis identified opportunities that could be further exploited to strengthen the coordination mechanisms among climate change institutions, gender machineries, key line ministries and non-governmental actors. Some of these institutions have a mandate to mainstream gender, whereas others will have an ability to influence the policy and implementation objectives but need to understand the key gender equality issues in climate actions.

The results of an examination of institutional coordination mechanisms should articulate concrete actions that are needed to improve the institutional cooperative arrangements within the overall climate change policy framework and coordination process. For example, in some instances, efforts will be required to increase women's participation in national and subnational decision-making processes so they can have a voice. In other instances, specific sectors pertinent to the NDC should be able to articulate the key gender challenges in their sector and outline some steps they can take to address them through the NDC implementation process. In many cultures, women are insufficiently represented at the decision-making level, in their sectoral workplace, and participation and discrimination in resource use.

C. Capacity Building

Not all institutions or sectors will have the relevant capacity to integrate gender equality considerations within their climate efforts. A gender analysis can focus on gaps in capacities in relation to either gender (for some institutions, or sectors), or climate change (for the gender machineries). In some instances, there may be a negative attitude towards addressing gender equality. In other instances, there may be lack of skills. Some sectoral ministries have a gender focal point within each ministry, and these could prove to be a suitable entry point, if they become more knowledgeable on climate change. The opportunities for improving capacity and concrete recommendations for doing so should be made in the analysis report. In many countries it may be necessary to highlight challenges for capacity building efforts including the availability of financial and human resources and gender discrimination in capacity building at different level.

D. Sex-disaggregated data and gender information

Ideally the implementation of the NDC can draw on information and nationwide data that has been collected on the issues specific to women and disaggregated by sex. In practice this is not always available particularly in developing countries like Ethiopia. Gender equality indicators have usually not yet been integrated into relevant monitoring and reporting systems (UNDP Guidance Note on Gender in NDC). The gender analysis should investigate how reliable databases that already exist for monitoring and reporting

on climate action can also include sex-disaggregated indicators by climate related sectors. It is important to articulate which actions are needed by the central statistics agency, sectoral line ministries, and other bodies to improve the collection, availability, and analysis of sex-disaggregated data and the formulation of indicators for decision-making processes. Clear recommendations on gaps in this regard must be highlighted.

E. Dedicated Financial Resources

The mandate may exist for gender equality in NDC implementation, but without resources it is virtually impossible to implement any such mandate. The gender analysis identified national frameworks, guidelines, policies, or mandates that support or demand the integration of gender equality within climate-related budgeting. There may be differences between national, sub-national and local government regarding integrating gender equality within climate budgets. With regards to domestic funds, analysis of the extent to which gender equality issues are incorporated in budget formulation is required. The analysis should investigate the availability of domestic and international climate finance in key selected sectors and assess the extent to which gender equality is considered. The gender analysis report should contain recommended actions to better integrate gender equality in existing or new financial mechanisms under the NDC process.

Table 1 Guiding questions for gender analysis under each aspect of NDC

No	Dimension/aspect	Guiding questions	Source of data
1	Policy alignment	<ul style="list-style-type: none"> • What provisions are there in relevant sectoral policies and strategy documents? • To what extent the climate impacts are considered in the national gender policy or strategy? 	<ul style="list-style-type: none"> • National (e.g., CRGE, GTP II, etc.) and sector policies and strategies of the 7 target sectors and Ministry of Women, Child, and youth
2	Institutional Coordination	<ul style="list-style-type: none"> • Are there systems in place that integrate gender into the key existing climate-related coordination mechanisms? • What concrete actions are needed to improve the institutional cooperative arrangements within the overall climate change policy framework and coordination process? 	<ul style="list-style-type: none"> • Desk review of relevant documents such as the CRGE strategy, CRGE Facility and Governance systems
3	Capacity building	<ul style="list-style-type: none"> • What capacity constraints are there in each sector in relation to gender or climate change? • Which capacity constraints (limitations) affect women participation in NDC implementation? 	<ul style="list-style-type: none"> • Key informant interviews • Desk reviews of related capacity gap assessment of each sector
4	Gender statistics	<ul style="list-style-type: none"> • Are there nationwide gender statistics (sex disaggregated data or gender specific data) 	<ul style="list-style-type: none"> • Key informant interviews • Desk review of national/sectoral MIS

		<p>on which NDC implementation and decisions made?</p> <ul style="list-style-type: none"> • Are gender equality indicators integrated into relevant monitoring and reporting systems? How reliable are they? • Which actions are needed by the central statistics agency, line ministries, and other bodies to improve the collection, availing, and analysis of sex-disaggregated data and the formulation of indicators for decision-making processes? 	<p>systems such as NGIS and national level surveys by CSA.</p>
5	Dedicated financial resources	<ul style="list-style-type: none"> • Do national frameworks, guidelines, policies, or mandates support or demand the integration of gender equality within climate-related budgeting? • What are the dedicated financial resources in promoting gender equality in NDC? Are they enough to promote women equality? 	<ul style="list-style-type: none"> • Key informant interviews • Review of annual budget and financial reports of NDC sectors
6	Gender Analysis	<ul style="list-style-type: none"> • What are the roles of men and women in the sector? • What access to and control over resources men and women has in the sector • How men and women need (strategic and practical) differ in the sector? 	<ul style="list-style-type: none"> • Key informant interview in the sectors • Desk review of related literature and gender documents of pillar sectors

2.2. Data types and sources

The main data type for this gender analysis is qualitative. It is collected from key sectors in the NDC that include Agriculture (livestock and soil), Forestry, Transport, Energy, Industry (including mining) and Buildings (including Waste and Green Cities). Some quantitative data are also drawn from secondary sources such as the Central Statistics Surveys, sector annual reports. From each sector 2 key informants (one from the CRGE unit and the other from the Women Affairs Directorate) was interviewed.

Table 2 list of sectors for Key Informant Interview (KII) and targeted key informants (KIs)

No	Organization	Number of key informants	Key informants
1	Environment, Forestry and Climate Change (EFCCC)	1	<ul style="list-style-type: none"> • Climate Change and Bio-Diversity General Directorate • Gender Directorate at EFCCC (not consulted)

2	Ministry of Women, Child, and Youth	1	• Gender mainstreaming
3	Ministry of Agriculture	2	• CRGE Unit • Women Affairs Directorate
4	Ministry of Transport	2	• CRGE Unit • Women Affairs Directorate
5	Ministry of Water, Irrigation and Energy	2	• CRGE Unit • Women Affairs Directorate
6	Ministry of Industry	2	• CRGE Unit • Women Affairs Directorate
7	Ministry of Urban Development and Construction	1	• CRGE Unit • Women Affairs Directorate
8	Ministry of Mines and Petroleum	2	• CRGE Unit • Women Affairs Directorate
9	Pegassys Consulting	1	• Expert working on the NDC update)
10	Planning and Development Commission	1	• Gender Mainstreaming Directorate
11	Ministry of Finance	1	• CRGE Facility
	Total	16	

2.3. Data collection tools

2.3.1. Methods of data collection

For this gender analysis the consultant mainly used two data collection methods: key informant interviews and desk review. As indicated above the key informant interview is conducted with CRGE Units of the above sectors and Women Affairs Directorates.

The desk review is conducted by collecting and reviewing related documents such as the CRGE, GTP II, the 10 Year Development Plan of Ethiopia under preparation, the NAP-ETH including the NAP-ETH Implementation Plan and its Gender Analysis, Gender Analysis of Rural Energy Transformation (RET) Project, Nationally Determined Contribution (NDC Ethiopia) and the Updated NDC. In addition, the Women Policy (1993), and other related documents from the MoWCY and the line ministries is thoroughly reviewed. In reviewing the documents, the consultant looked at the 5 dimensions for gender sensitive NDC discussed in section 2.1 above.

2.3.2. Data collection Tools

The main data collection tools for this gender analysis are Key Informant Interview (KII) Checklist, Secondary Data Extraction Form and Desk Review Guide. The KII tool (Annex 6.1.1) is used to collect data from the sector offices and line ministries and agencies regarding the status of policy alignment, institutional coordination, gender statistics and gender budgeting in practice. Key informants in the sector also asked gender roles, access to and control over resources and benefits and gender needs in their respective sectors. In addition, desk review checklist and secondary data extraction form (Annex 6.1.2) are used to collect the data.

2.4. Methods of data analysis

Qualitative data analysis method was used to make sense of the data and information collected. The primary qualitative data was organized under the 5 dimensions discussed above and the emerging themes/issues were sought. Secondary data from the sectors and agencies is presented in tables to see how women and men participate in the sectors climate change mitigation and adaptation efforts. Comparative analysis of women and men participation and benefit from program in NDC is conducted and implications drawn.

3. Findings of the Study

This section presents the study findings which are organized under the main aspects to be considered in gender analysis for NDC. The first section deals with policy alignment for gender inclusion in NDC in which the national and sectoral policies related with climate, gender and sectorial issues are analyzed in gender lens. In the second section gender analysis of the mitigation and adaptation actions identified in the NDC are presented. The third section presents gender representation in the NDC coordination mechanism, followed by resource allocation for gender equality in the NDC. Section four presents availability of sex disaggregated data in each sector and the last section discusses capacity in gender and climate change in each sector.

3.1 Policy Alignment for Gender Equality in NDC

Experience shows that putting gender policy in climate related interventions contributes to better integration of gender into implementations. For example, once the NDC adopted a gender policy in 2011, which required all sectors to have “*policies or strategies that satisfy gender mainstreaming*” in all projects funded by the NDC, the proportion of gender-responsive projects doubled in every sector because of such policy [1]. Given the fact that women constitute half of the total population of the country, all sectors involved in NDC need to mainstream gender in all activities so that men and women benefit fairly from the initiatives. For this to happen sectorial policies, strategies and reforms should be checked for inclusion of gender issues preferably based on gender analysis. In the following sub sections gender analysis of national climate related strategies, plans and policies is conducted.

3.1.1. The Climate Resilient Green Economy Strategy

To ensure economic growth while adapting to the climate change and reduce emissions below the business-as-usual scenario Ethiopia developed different national and sectoral policies and strategies. The notable one is the Climate Resilient Green Economy (CRGE) Strategy that was adopted in 2011 with the goal of reducing emissions by 64% from the conventional path while enabling the country to reach middle income status by 2025. The strategy realizes that following the conventional development path would result in a sharp increase in GHG emissions and unsustainable use of natural resources. The strategy identified four pillars for reduction of GHG. Among the pillars areas for gender concern are identified as follows.

In the agricultural pillar the promotion of low emitting livestock such as poultry is gender sensitive. Poultry production is usually dominated by women and income from poultry and egg sale is usually controlled by women in Ethiopia. In livestock, it is generally men who own and control large ruminants such as cattle and camels, while women are mainly responsible for herding animals and controlling the proceeds from dairy products and small ruminants (Aklilu & Alebachew, 2009, cites in NAP-ETH Gender Analysis). According to FAO rural livelihood data, in Ethiopia share of female household members owning poultry is 54%, while share of male that own poultry are 47% indicating more women own poultry than men unlike other livestock. In addition, poultry production is conducted in backyard and hence it is women friendly activity. Therefore, the promotion of poultry production and consumption has strong positive gender

¹ Gender and Climate change GEF

implications, keeping other things constant. However, when the poultry sector is commercialized it attracts men who may take over the poultry activity from women. It is evident that economic activities that generate high income, such as cash crops and high value livestock products are usually controlled by men.

Under the forestry pillar reduction of demand for fuelwood via the dissemination and usage of fuel-efficient stoves and/or alternative-fuel cooking and baking techniques is another area for gender concern. It is evident that women in Ethiopia are mainly involved in fuel wood collection and cooking. Therefore, intervention in this area, if successful, will significantly reduce the drudgery on women through its effect on reduction of time spent by women for fuelwood collection and indoor smoke that have health effects on women. The CRGE states that with a sufficiently large scale-up, the use of efficient stoves will have a massive impact on the green economic development by increasing rural household income by 10%, creating an industry worth USD 15 million in gross value added (GVA), decreasing GHG emissions by 50 Mt CO₂e in 2030, and increasing health and gender equality (CRGE, 2011, pp 52). Studies also show use of improved fuel saving stove increases the probability of girls attending school through reduction household firewood collection time and reduce the health effects of indoor smoke.

At the sectoral level, five climate resilience strategies were developed to provide tailored and sector-specific frameworks to build climate resilience and reduce the impact of weather variability and climate change. The strategies build on the national CRGE Strategy as well as on sectoral policies. Some of these strategies explicitly cite gender issues to be addressed. The climate resilience strategy for agriculture and forestry states the impacts of weather extremes will be more severe for vulnerable groups such as children, the elderly, the disabled and women. For example, women tend to be more dependent on natural resources than men and have fewer financial resources and alternative income opportunities making them more exposed and sensitive to climate stressors.

3.1.2. The National Adaptation Plan of Ethiopia

Ethiopia is taking measures to adapt to the inevitable reality of climate change, which is expected to intensify as the world's climate changes, due to both the already accumulated and anticipated global GHG emissions. In this regard, Ethiopia's Programme of Adaptation to Climate Change (EPACC) and sectoral climate resilience strategies were developed to provide a framework to build resilience to climate shocks, with emphasis on reducing the cost of countering vulnerability and ensuring adaptation to protect the population. The most vulnerable sectors to climate shocks include health, agriculture, water, energy, buildings, forest and biodiversity and transport.

Adaptation to Climate change is the Climate Resilient (CR) component of CRGE while climate change mitigation is mainly dealt by the Green Economy (GE) component of the strategy. The Ethiopian National Adaptation Plan (NAP-ETH), developed to fill this gap, aims to reduce vulnerability to the impacts of climate change, by building adaptive capacity and resilience to enhance economic development and to facilitate the integration of climate change adaptation, in a coherent manner, into relevant new and existing policies, programs and activities, in particular development planning processes and strategies, within all relevant sectors and at different levels, as appropriate (Alebachew et.al, 2018). Such policies include the National Environment Policy, CRGE including sector CR strategies, NAP-ETH, Forest Sector Development Plan and the National Women Policy, among others.

NAP-ETH aims to strengthen holistic integration of climate change adaptation in Ethiopia's long-term development pathway, and its implementation are guided by the principles of participation, coherent interventions, stakeholder empowerment, gender sensitivity, equitable implementation, and partnership (Alebachew et.al, 2018). The NAP-ETH has put in place about 18 Adaptation Options (AOs) that focus on agriculture, health, water, social protection, livelihoods to urban development, industry, and transport systems, the sectors that have been identified as most vulnerable to climate change. Within these sectors, the 18 adaptation options have been identified recognizing the considerable diversity in context and vulnerability across Ethiopia's regions and social groups. The adaptation options also cover cross cutting issues such as adoption of improved adaptation practices, promote adaptation research and development, promote crop and livestock insurances and improving value chain efficiency. The adaptation options have potentially strong link with women as women play important roles in the sectors and climate change impact women and men differently. Gender analysis of the NAP-ETH is conducted in 2018 and identified gender issues to be considered in each AO (NAP-ETH Gender Analysis, 2018).

Gender is a key consideration in NAP-ETH, recognizing that women may be particularly vulnerable to climate change due to socio-economic inequalities that limit their adaptive capacity. The impacts of climate change are severe on women, and thus, scalable criteria for priority setting, including sensitivity to vulnerable groups, including gender and youth are important.

3.2 Gender Analysis of the Updated Nationally Determined Contribution

The Government of Ethiopia has undertaken economy-wide analysis and comprehensive stakeholder engagement to update and submit its NDC to the Paris Agreement (PA). In December 2020 Ethiopia prepared its updated NDC which builds on Ethiopia's first NDC and provides a robust and transparent evidence for the steps and methodology used to determine and prioritize mitigation and adaptation contributions, establish intermediate indicators to measure progress towards the NDC targets, and develop recommendations for strengthening Monitoring Reporting and Verification (MRV) and Monitoring and Evaluation (M&E) systems. In the following two sub sections gender analysis of the mitigation and adaptation actions are done.

3.2.1 Gender Analysis of Mitigation Interventions

Mitigation Action 1: Sustainable agriculture: increasing the share of agricultural land under sustainable land management and reducing pre-harvest losses and land converted for agricultural infrastructure

Women play important role in Ethiopian agriculture which is the mainstay for over 80% of the population. Even though women play significant role in agriculture, they have limited access to land and essential inputs and services. CSA data in 2017/18 indicates that women agricultural holders constitute 19% of the total. Average holding of women farmers is 0.65 hectares and that of men farmers is 1.1 hectares (CSA, 2017). In addition, the data indicates that women have limited access to agricultural extension and input services. In 2016 only 2% of women farmers have access to agricultural extension services while 49% of men farmers have access to agricultural extension services. In 2018, of those farmers who received agricultural extension women constitute only 16%, while the remaining 84% are men farmers, indicating male dominance in extension service use. About 36% and 8% of males and females, respectively, have ready access to credit

(CSA, 2017). This has resulted in lower productivity of women farmers compared to men. A study by the World Bank in 2014² indicates that women produce 23% less per hectare than men farmers. In general, men have better access to agricultural services than women and this resulted in difference in agricultural productivity in favor of men.

Regarding participation in agricultural activities about 69% of the agricultural holders reported that men are mostly responsible for the household crop production activities. While 21% of the respondents replied that both sexes (men and women) jointly participate in crop production in their household while 10% of the respondent reported female are mostly participated in crop production in their households (CSA, 2019). The survey shows that 35.9%, 33.9% and 30.2% of agricultural holders respond that the sale of crop produce in their household is mainly the responsibility of male, female and both (male & female) household members, respectively.

Sustainable agriculture practice depends on the use of improved agricultural practices. The application of different type of fertilizers, improved seeds (e.g. drought resistant variety), irrigation and integrated pest management instead of pesticide use determine whether the practice is sustainable (climate smart) or not. So far men farmers tend to use more of these inputs than women farmers. The CSA agricultural sample survey data in 2018 indicates that higher proportion of men farmers use improved seed (86% vs 14%), fertilizers (83% vs 17%) and irrigation (87% vs 13%). This is because of the limited access to and control over of women on inputs, information, and technology services.

A gender analysis in Ethiopian agriculture by FAO indicates that in almost all the indicators of technology and input use, female heads are less likely to use or adopt improved technologies and use less input. This is true for sustainable land management technologies such as soil and water conservation activities, conservation agriculture and use of drought tolerant varieties.

Mitigation Action 2: Enhancing efficiency and productivity in livestock subsectors

Livestock production is common in Ethiopia with majority of holders practicing both crop and livestock production i.e. mixed farming. Compared to crop production higher number of female farmers are engaged in livestock production. In 2017/18 production season the proportion of female who are engaged in crop production are 26% while those who engaged in livestock production are 39% (CSA, 2019). Therefore, livestock production is an area that engages more women than crop production. In addition, livestock production activities such as feeding, milking and dairy cow management are mainly the role of women in rural Ethiopia. CSA data in 2016 indicates that 46% of the households reported livestock rearing activity is performed by both sexes, 31% reported it is performed by men and 23% reported it is performed by women. On top of this income from dairy and sale of small ruminants and poultry are controlled by women (CSA, 2019). For example, agricultural sample survey in 2019 revealed that 83% of the respondents reported the decision on the sale of livestock products is mainly the role of female household members. Therefore, enhancing efficiency and productivity of livestock sub sectors has direct gender implications. The intervention of reducing per head livestock has also the impact of reducing drudgery on women because women are the one who mainly participate in livestock management (feeding, milking, etc.).

² Levelling the field: Improving Opportunities for Women Farmers in Africa, WB, 2014.

Mitigation Action 3: Replacing cattle/oxen by tractors for farmers and smallholders (agricultural mechanization)

The intervention of replacing oxen power with tractors is generally good to enhance productivity of the sector. Replacing oxen with tractors will affect men farmers compared to women. This is because oxen ownership of women farmer is lower than that of men farmers. For example, CSA survey in 2018 shows among the agricultural holders who reported having enough oxen, females constitute on average less than 10 percent. In addition, ploughing land is mainly done by men in most places of Ethiopia and continue to be linked with men, even though women in some cultures plough the land (Asrat and Getnet, 2014). Therefore, replacing oxen with tractors for land tilling has strong implication on men labor in agriculture. It is more advisable to mechanize other agricultural activities that require women labor, such as transporting, weeding, threshing, and storing produces. In general, in the mechanization of agriculture, sector there is a need to follow careful gender mainstreaming approaches based on gender analysis to avoid gender exclusion while implementing the mitigation interventions. Mechanization of agricultural activities such as threshing will reduce women access to some resources such as crop residues and harvest leftovers which are used by women as source of fuel and income.

Mitigation Action 4: Replacing non-dairy cattle stock by chicken (supply side) and inducing a demand shift from beef to chicken

This mitigation action focus on increasing the share poultry in country's livestock, so that high emitting livestock such as cattle are reduced. Shift from non-dairy cattle to poultry has positive impact on women because poultry is relatively women dominated sector in Ethiopia. FAO report on gender analysis indicates female to male ration in number of poultry owned is 0.93 while it is 0.80 for number of cattle owned. For example, promoting the development of low emitting livestock types such as poultry will increase women income and benefit as these value chains are usually controlled by women. This will also increase women role in livestock as feeding and management of poultry is done by women. However, as the poultry value chain is developed and replaces nondairy livestock, the attention of men will be on the poultry sector. This is because men usually tend to control high value products and assets that has high income potential.

Most of the poultry production activities, except shelter preparation is done by women. Shift to this sector will increase the burden on women since men consider poultry as a women domain. More analysis of the poultry sector in gender lens is given under Adaptation intervention 5 below (Section 3.1.2.1).

Mitigation Action 5: Improved feeding to reduce emissions from enteric fermentation

Livestock feeding in Ethiopia is usually conducted by women. Women collect fodder and feed animals in most farming systems. women generally contribute more labour inputs in areas of feeding and grazing of cows, watering, manage vulnerable animals (calves, small ruminants, and sick, injured and pregnant animals), cleaning of barns, dairy-related activities (milking, butter and cheese making), gathering and making dung cakes, transporting farm manure, egg collection, and sale of egg/poultry, than men and children (Kinati and Mulema, 2018). However, there are cases where both men and women take part in the harvesting and transportation of feed, chaffing of fodder, feeding of animals, cleaning of sheds and sale of milk, cheese, and butter.

Mitigation Action 6: Economy-wide improvements of energy efficiency of appliances, machinery, and other capital assets

This mitigation intervention deals with energy management in the industrial sector. The gender implication in this action is through the employment and ownership of women. Over the period 2008-2016 gender gap in industry sector employment ranges from 23% to 15%, which is reducing overtime. The interventions proposed in the Updated NDC and the 10YPP do not directly reflect gender and hence the indicators proposed are not eligible for gender disaggregation which make it difficult to see women inclusion.

Mitigation Action 7: Shifting transport energy demand from petroleum to electricity and increasing the share of electric vehicles

In Ethiopia majority of the people do not own private car as only 2.6% of them own private cars out of which women represent 27% while men represent 73% of the car owners. Therefore, women are more likely to use public transport than men. Women may face risks to their personal security utilizing public transport. In addition, women underrepresented as employees in the transport sector. The 2013 national labor force survey indicates that women constitute only 11% of people employed in the transportation and storage sector. It is also uncommon for women to be drivers of vehicles in Ethiopia.

Personal safety related to transportation and mobility is also a major concern for women and girls in Ethiopia. Poor street lighting and dark transportation stops threaten women's safety when traveling to and waiting for buses or trains. Also, crowded buses and trains increase fear of harassment and other forms of GBV among women when they are forced to be in close proximity with unfamiliar men (USAID, 2019). Fear of harassment reduces women's mobility and access to resources and affects their willingness and ability to participate in school, work, and public life. Inadequate or unsafe roads and sidewalks that limit access to transport and mobility is another concern for both women and men, posing increased risk of traffic accidents or death especially among young men. Ensuring that differentiated needs of urban individuals inform inclusive transport and mobility planning can dramatically improve equitable sustainable development outcomes for all.

The transport sector planned to introduce green technologies that help the sector achieve its own targets. The sector planned to meet the target set in 2030 by promoting number of people using cycle and number of roads compatible for cycle user by 70%, substituting the old and highly polluting cars with new and less polluting cars by 100%, and promoting the number of transport services that can use electric power by 20 percent and the like. Emission reduction in this sector is achieved by fuel switches or the adoption of low-carbon technologies such as transport electrification and public transport. Like the urban sector the interventions are not detailed and hence difficult to sense how might women can benefit or excluded from the intervention. Gender inclusion in this sector requires mainstreaming approach as there are not direct women related interventions.

Mitigation Action 8: Household energy use: shift from residential biomass energy demand to electricity and improved cookstoves

In Ethiopia, the main source of fuel for household is biomass (firewood and charcoal) as about 81% of the households reported firewood and charcoal as their main source of fuel and only 7.4 reported electricity as their main source of fuel (WMS, 2016). There is significant gap between men and women headed households in access to electricity. The 2016 Ethiopian Demographic and Health Survey (EDHS) indicated

that out of those who have access to electricity about 66% are men while women are 34%. Accordingly, female headed household have less access to electricity than male headed in the country. Moreover, female headed household access to electricity has been declined, slightly, from 34.6% in 2000 to 34.1% by 2016. According to 2016 welfare monitoring survey ownership of improved electric baking stove (electric *mitad*) is only 11% where women headed households have better access to improved electric *mitad* compared to male headed households. In addition, electric cooking stove, kerosene cooking and butane cooking stove ownership in the country stands at 12.9%, 6.9% and 1.4%, respectively with higher proportion of female headed households reported to own these appliances.

In rural areas women spend significant amounts of time and effort in fetching fuel, fodder, and water for homes (UNDP, 2004). Women and young girls often go out to collect fuel, water, and fodder by themselves and, particularly in conflict or post conflict situations, this can present a threat to their security. Time use survey by CSA in 2013 indicates that are more likely to engage in firewood/fuel collection than men, particularly in rural areas. Again, the greatest participation rate is among employed women. The data shows that in rural areas, 28% of employed women collected firewood, compared to 10 percent of employed men. About 18 percent of unemployed women and 12 percent of economically not active women also engaged in these activities, compared to about 5 percent of men in these groups (CSA, 2014).

Research in Brazil also shows that girls in rural areas with access to electricity are 59 percent more likely to complete primary education by the time they are 18 years old than those without (Practical Action, 2015). Similarly, improved cookstoves can reduce cooking time by 50 percent and increase fuel efficiency by 30 percent – high efficiency cookstoves lead to even larger benefits in time and energy savings, hence also contributing to emissions reductions (O'Dell, 2014). Therefore, this mitigation intervention in NDC will have both high potential of emission reduction and reducing the burden on women and improve their health.

Mitigation Action 9: Reforestation/afforestation

Men and women often have different productive and reproductive roles in forest resource management. They play different parts in planting, protecting, or caring for seedlings and small trees, as well as in planting and maintaining homestead woodlots and plantations on public lands. Men are more likely to be involved in extracting timber and non-timber forest products (NTFPs) for commercial purposes (Aguilar IUCN bulletin, undated). Women typically gather forest products for fuel, fencing, food for the family, fodder for livestock and raw materials to produce natural medicines, all of which help to increase family income (ibid). in afforestation and reforestation activities women usually participate in nursery development, watering the seedlings, looking after the nursery sites, planting seedlings and protection of the site while men participate in digging land for nursery preparation, fencing and planting.

According to KII respondents stated that farm tools and construction materials collection from forests, honey production and logging are mainly conducted by men while other non-timber forest products collection (e.g., spices) and firewood collection are mainly done by women. Compared to men women activities in forest related activities are less exploitative as they do not cut down trees. Regarding Environmental sector, women are highly affected by climate change compared to men and less emphasis is given to their participation in protecting the environment because women are mainly responsible for domestic works such as preparing food, childcare, fetching water, firewood collection and housekeeping. During famines and drought women are left in the household while men migrate to other areas for search

of food and employment opportunities. This leaves women to labor constraint, psychological and economic pressure.

Gender analysis in the REDD+ Investment Programme indicates that women have limited access to and control over forest and forest products compared to men. Mostly women have access to firewood, spices as well as vegetable products while men have better access to and control over forest and forest products such as timber, honey, construction materials. Experiences around the world also indicates that afforestation and reforestation programs usually exclude women and face challenges after implementation. This is because women and men have different needs and priorities and the benefits from reforestation and afforestation are not equitably distributed. For example, distribution of economic incentives achieved through REDD (reduce emissions from deforestation and land degradation) or payments for ecosystem services (PES) for carbon storage and new carbon sinks should be equitable among men and women. An analysis of several India and Nepal community forest groups highlighted the fact that, in most cases, cash is not distributed equally and funds are commonly invested in resources or activities from which women were unlikely to benefit from, such as club repair, purchasing community utensils, rugs, drums, etc. (Agarwal, 2002). Therefore, women need to be consulted and engaged in afforestation and reforestation programs for the success of the program, sustainability, and equity issues.

Mitigation Action 10: Clinker Substitution (Industry)

Generally Ethiopian women have played a traditional role of motherhood and home maker in both rural and urban areas. Employment of women in the manufacturing industry sector is lower than men. For example, based on survey of 12 cement manufacturing plants in Ethiopia the proportion of women employees are only 26% of the total. The KII respondent from the industry sector also indicated in Ethiopia manufacturing sector is predominantly employs men. For example, in industrial sectors like biochemical industry, material industry, mining industry, mechanical industry and others participation of men is more dominant. It is also seen that there are a smaller number of women who are currently work or are keen to work in this sector. This could be due to the traditional and cultural norms experienced in the communities.

For men and women, the manufacturing sector can provide opportunities for a better life, including increased employment, access to revenues, small and medium businesses can flourish in the associated supply chain and expanded investment in the local community. But data indicates that women have limited access to and control over resources in the industry sector. In 2017/18 small scale manufacturing survey by CSA 41% of the employees are women and the rest are men and 75 % of owners of the small-scale manufacturing are men, while the remaining 25 % are female. In all large and medium industries, the proportion of women employees is 34% while it is even lower at 14% for manufacturing of cement, lime, and plaster industries. Women are only 27% of the owners of the large and medium manufacturing industries in the country (CSA, 2018). The KII also added that male dominates in industries at all levels which were predominately under the men's controls. In addition, to bring equal participation and thereby ensure benefits of women, different measures were taken including awareness provision on gender equality and affirmative action for the women.

Mitigation Action 11: Waste Management

Ministry of urban and construction sector planned to reduce the amount of carbon emission by 12.425 Mt CO₂e by the end of 2030. The NDC Update proposed waste management (reducing emissions from reduced

waste generation rate per capita, reducing emissions from introducing ban on organic materials on landfills, i.e., waste separation and composting, reducing emissions from wastewater as the key intervention to reduce emission in the urban sector. The 10YPP has mainly planned to introduce green areas by allocating about 30% of land provided for investment (planned to raise the number of cities with greenery areas from 6 to 185), raising safe solid waste disposal by 75%, and promoting the number of cities with modern waste management system to 100 percent by the end of 2022 [Error! Bookmark not defined.]. These intervention areas are not made gender related which makes it difficult to disaggregate results by sex. Therefore, a gender mainstreaming approach during the implementation phase is needed or more gender related interventions should be identified.

3.2.2 Gender Analysis of Adaptation Interventions

The Updated NDC identified Ethiopia's major climate change adaptation commitments are in the sectors of agriculture, and land use and forestry, with additional adaptation contributions in the water, health, energy, transport, and urban settlements. Agriculture, Forestry, and other Land Use (AFOLU) adaptation actions represent the bulk of the updated NDC's commitments to strengthening Ethiopia's resilience to climate change. Ethiopia has already undertaken important adaptation efforts in these sectors, and will further expand and prioritize measures such as climate-smart agriculture, livestock diversification, improved (drought-resistant) animal breeding, rangeland management, improved (drought-resistant) crop varieties, crop and livestock insurance, integrated, watershed management and rehabilitation, ecosystem-based adaptation, sustainable forest management, community-based forest management and conservation, and afforestation and reforestation programmes (Updated NDC Technical Report, 2020). In general, there are 37 adaptation commitments identified in these sectors. In terms of relevance for gender equality none of the adaptation commitments specifically deals with gender issues or gender equality. Therefore, effective gender mainstreaming in the adaptation options is the key task ahead.

The Updated NDC has identified indicators, baseline, and target for the identified adaptation commitments. To measure the progress in the commitments 66 indicators most of them with baseline and targets are identified. This is very important and a pre-condition for effective M&E of the adaptation commitments. However, in terms of gender inclusion in the adaptation M&E there are critical gaps. These include out of 66 indicators identified only 4 indicators are sex disaggregated and another 8 can be disaggregated by sex, but not disaggregated by sex yet. For health and education sectors the document did not present baseline values and target, but the presented indicators are gender responsive (i.e. can be disaggregated by sex (compared to others. For effective gender inclusion of performance measurements should either disaggregate the performance indicators by sex or include women specific results or commitments in this case.

3.1.2.1. Agriculture Sector

Adaptation Intervention 1: Enhance food security by improving agricultural productivity in a climate-smart manner (promote yield increasing techniques)

This adaptation intervention deals with promoting climate smart agriculture that increases both agricultural productivity and reduce the impact of climate change. In Ethiopia men and women have a complementary role in agricultural activities. Since Ethiopia is the country of multicultural groups, there is different gender

roles in agriculture. For example, culturally women are engaged in domestic chores like cooking while men engaged on outside activities like farming activities. In some cultures women tills the land, in others not allowed to till the land. They engage in a range of agricultural activities, spanning both crop and livestock production, and are actively involved throughout the agricultural production process. Added to this, KII respondent mentioned that men play crucial role in food production; they, however, face lesser constraints than women.

In relation to green technologies, Ministry of Agriculture has identified sustainable agricultural technologies like Climate Smart Agriculture (CSA), sustainable livelihoods, seedlings, carbon sequestration and changing manual agriculture to mechanized agriculture, etc. These green technologies have multifold benefits of raising production efficiency of farmers on one hand and thereby raise environmentally friendly production system. The provision of such technologies depends on the preference of both male and female which was mainly determined by socio-economic status and cultural set ups of the country. Ethiopia is a patriarchal society, which gives leading roles to male over the female, and this gives an opportunity to decide over what technology to use for the household heads who are mostly men. The triple roles performed by women practically made women overburdened. They are usually busy with domestic care works and routine activities and thus the women's preferences over green technologies are influenced by their interest towards those technologies that help them reduce domestic household burden like production and marketing of cook stoves, productions mainly performed around home like poultry, and small ruminants' management.

Women have limited access to and control over resources such as land, inputs (improved inputs, fertilizer, etc.) and extension services. This could be due to male biased extension system and lack of awareness and cultural barriers. For example, even if there is dual land ownership certification system women are still dominated by male in making important decision related to land investments. This difference in control over important assets like land will affect women farmers' adoption of climate smart agricultural practices.

Some of the climate smart agricultural practices has also implication for women. For example, the promotion of conservation agriculture requires leaving crop residues on farm fields. This will affect availability of energy for the household because crop residues are used as household energy source which is usually the responsibility of women. But conservation agriculture involves zero or minimum tillage which is good for women because they lack labor and oxen for land tilling. In addition, high yielding varieties and drought tolerant varieties are usually expensive and needs access to extension services for which women have limited access. Therefore, both positive and negative effects of technologies on women need to be taken in to account when promoting the climate smart agricultural activities. Access to improved practices and high yielding varieties for women is required for gender equality.

Adaptation Intervention 2: Diversify livestock and animal mix, including promotion of poultry and small ruminants

In Ethiopia there is gendered role and ownership of livestock. The gender division of labour between women and men varies according to the enterprise, the farming system, the technology used, and the wealth status of the household influenced by sociocultural and socio-economic factors (Mulema et al. 2017). In most cases, ownership and managements of livestock was reported as a joint task (Zahra et al. 2014). Men own most of the livestock species with high values (such as cattle, camels, small ruminants, and apiculture)

whereas women own a small proportion of the large animals and often their secondary products such as milk and milk products (Mulema et al. 2017; Kinati and Mulema 2016). Women (household heads) own more small animals (such as poultry) than men because they lack income from large animals (Wondmeneh et al. 2014). Although, women are key players in livestock production, they have more roles and control over poultry production than other livestock species compared to men. Key informant interviews in the ministry of agriculture indicated that the number of farmers and pastoralists involved in production of less emitting species (e.g., poultry, sheep, goat and adoption of improved breeds has increased and women beneficiaries/participants in these activities is about 30% of the total.

The promotion of poultry and small ruminants has strong implication for women in current practice. Since poultry is relatively women dominated sector enhancing the productivity and development of the sector will benefit women and their households. Women participate in poultry production at small scale (subsistence) level as a supplement to household income and consumption. All activities in poultry production (shelter construction, feeding, cleaning, watering, selling chickens or eggs, and disease control and treatment) are done by women, except shelter construction which are done by men and boys (Dawit, et.al, undated). However, the development of the sector (commercialization) will attract the attention of men and it will require larger investment unlike the traditional practices women participate in. Given the men dominated extension and input system caution should be taken not to crowd out women from the poultry production activities.

Adaptation Intervention 3: Improve Animal breeds for enhanced climate resilience

Women are dominant in livestock management and husbandry practices compared to men and other household members across locations in Ethiopia (Kinati and Mulema, 2018). Aspects of animal husbandry such as care of the young, pregnant, and sick animals, processing of milk, sale of dairy products and milk in pastoral systems are mainly undertaken by women (Tangka et al. 2000). Men concentrate on a few roles (Kinati and Mulema 2016) and generally involved in herd management, sale of animals, purchase of feed and sale of milk in intensified systems (Tangka et al. 2000). Herding was mainly done by men and boys and girls assist in herding, especially of small ruminants (Tangka et al. 2000). More specifically, women generally contribute more labour inputs in areas of feeding and grazing of cows, watering, manage vulnerable animals, cleaning of barns, milking, butter and cheese making, gathering and making dung cakes and transporting farm manure than men and children (Kinati and Mulema, 2018). Adult men, on the other hand, mainly do activities considered culturally rewarding and of high status such as barn preparation, feeding the oxen, herding, taking sick animals to veterinary clinic, assisting during delivery, and marketing of large and small ruminants supported by young boys (Kinati and Mulema 2016). As one goes down the livestock ladder, the entire animal husbandry and management activities apart from the control and management of income fall under the responsibility of women and girls. In general studies imply that men control the political aspects of animal husbandry while women are responsible for all technical related roles that takes time and routine. There gender roles livestock management will remain same for local and improved breeds. But preference of local and improved breeds may differ between men and women.

Therefore, the promotion of improved animal breeds should target both breed improvement and practice improvement such as training and access to credits. This is because improved animal breeds usually need more inputs (feeds, vaccination, breeding, etc.) that needs more capital and skills which women have limited

access to. Even the improved breeds require more initial investment to acquire the breeds which is beyond reach for most women farmers.

Rural women tend to have an affinity and preference for indigenous rather than improved breeds because they are easier to care for (FAO, 2012). In addition, as women are severely disadvantaged with respect to land ownership, locally adapted breeds that can access and utilize common property resources represent an enormous asset – playing a role that cannot be fulfilled by improved breeds (FAO, 2012). Therefore, focus should also be given in improving productivity of local breeds through artificial insemination and breed selection.

Improved animal breeds imply more production of the dairy products. As production of dairy products and commercialization of livestock products increases women control over dairy products decreases. This is because high value agricultural activities are usually dominated by males. For example, majority of milk sellers to milk collection centers in intensified systems are males. However, in the past when local breeds are dominant women mostly responsible for sale of dairy products and have higher control over the income.

Adaptation Intervention 4: Strengthen and expand animal health services for enhanced climate resilience in livestock

Ethiopia has the largest livestock population in Africa, making a considerable contribution to the livelihood of Ethiopian people and to the wider economy. However, zoonotic diseases threaten the performance and potential benefits of this vast livestock sector (Adam et.al, 2018). As discussed under Adaptation Intervention 4 both women and men participate in animal health activities. Women usually takes care of sick animals while men take sick animals to veterinary clinic. The division of labor in this aspect is also based on women limited to activities inside homes while men do outside jobs.

On the other hand, there is animal borne diseases that affect humans. Nearly 75 percent of all new, emerging, or re-emerging diseases affecting humans have zoonotic nature (Tadele, et. Al, 2019). Since women are involved in animal management, particularly takes care of sick animals they are more exposed to zoonotic diseases. Gender inequalities and zoonotic diseases (those transmitted between animals and people) are problems in smallholder livestock production systems, particularly in low- and middle-income countries where these systems predominate. The world's billion-plus poor small-scale livestock keepers are at high risk of contracting zoonotic diseases such as anthrax, bovine tuberculosis, and brucellosis, due to direct and daily close contact with their food-producing animals. Risky practices include home slaughter, poor sanitation, handling sick animals, attending livestock births, handling milk and meat and preparing dishes from these foods, and consuming such foods in raw or undercooked forms. In developing countries like Ethiopia there is gender differences in roles, access to resources, and power influence whether, and how, the risks of zoonotic disease transmission are managed. Therefore, women are more at risk than men since they are responsible for cooking animal sources foods and have direct contact with animals.

Adaptation Intervention 5: Prevent and control the spread of climate-driven vector-borne diseases and macro parasites

Climate change is a great challenge and may ruin all the achievements gained unless great and integrated efforts were made to mitigate and adapt climate change (Health Adaptation Plan, Ethiopia). The CRGE acknowledges the health sector is one of the three most vulnerable sectors together with water and

agriculture sectors. Several climate diseases were occurred and aggravated in the country. Malaria which is climate sensitive disease is expanding to high lands as high lands temperature gets warm with climate change and being favourable to mosquitoes breeding (ibid). Diarrhea outbreak especially Acute Watery Diarrhoea become frequent following drought and flood occurrence. Dengue fever cases were reported for the first time in 2014 in Afar, Somali, Harar and Dire Dawa. Similarly, yellow fever was also reported in South Omo after 60 years.

Women and children are usually the most affected by malnutrition as they have more responsibility to take care of the family and less capability to get food by themselves, respectively. Women often experience additional duties as labourer and caregivers because of extreme weather events and climate change, as well as from society's responses to climate change (e.g. male migration). Thus, they face more psychological and emotional distress, reduced food intake and adverse mental health outcomes due to displacement, and in some cases, increasing incidences of domestic violence (Climate and Development Knowledge Network, 2015). Moreover, women put their health at risk while they use of traditional biomass methods for cooking (ICSU and ISSC, 2015). Air pollution from traditional biomass usage is a prime cause of premature deaths to children and chronic disease to women (ICSU and ISSC, 2015).

Communicable diseases associated with drinking of unsafe water, inadequate sanitation, and poor hygiene such as diarrheal diseases, intestinal parasitic infection, and trachoma remain the most prevailing public health problems in the country and are among the ten top leading causes of morbidities. Risk assessments of AWD outbreaks have identified that contamination of water supply sources due to poor operation and maintenance, unsafe water storage practices at household level and inadequate sanitation and poor hygiene were among other responsible associated factors including institutional, environmental and behavioral factors. Since women are usually responsible for household water supply, hygiene, cooking and taking of children and the sick climate related outbreak of diarrhea has huge impact on them.

Adaptation Intervention 6: Improve rangeland and pasture-land management diversification, including selection of drought-resistant animal breeds

Women play indispensable role in livestock production systems. One area of their involvement is in feeding animals. Traditionally, men/boys are responsible for herding while women feed animals at home by cutting and carry and taking feed to home for weak or sick animals. Rangeland and pasture lands are indispensable resources for livestock keepers, particularly pastoralists. The uses of natural resources are diverse and often there are overlapping users competing for the same resource. Men and women, young and old, use different resources in different ways. Their access to and use of the resources is often linked to gender norms and values and resulting 'acceptable' roles, responsibilities, and rights of access. Often men will have priority of use, with women and other less powerful groups having to wait in turn and/or use those resources that men do not need (Andrew et.al, 2007).

Both men and women living in dryland areas have an intimate knowledge of their environments, related to their different uses and management of natural resources (Andrew, et.al, 2007). Further gender has been shown to be a key determinant of rights to and benefits from natural resources (Watson 2005) whilst it has also been proven that gender relations have a direct impact on their use, management, and conservation. Most activities in rural societies including rangelands are managed along gender lines. While some activities such as water collection for domestic use and grass cutting are mainly the preserve of women,

few Natural Resource Management (NRM) tasks are carried out by men alone (Gender and pastoral project 2007). This means that it is often women who are responsible for natural resource collection and use, and particularly where these are scarce it can result in women being overworked. Further as pastoral systems change and there is a decline of activities more often associated with men such as hunting, cattle raiding and livestock herding, pastoral men are finding themselves under worked and yet fail to take up any of the ‘women’s tasks’. Rather in some cases women are taking up traditional ‘men’s’ roles. For example, amongst the Hamar of Ethiopia young wives are increasingly taking on herding activities, to promote the self-sufficiency of their new families (Andrew et.al, 2007).

Rangeland and pastureland management can provide opportunities for a better valuing of women’s knowledge and role in rangeland management, improving women’s understanding of NRM challenges and potential solutions, and increasing women’s participation in decision-making processes. Benefits can include going to meetings and discussing problems with fellow community members; receiving information during planning meetings that can be shared with other community members; improvement in rights and empowerment within the rangeland management setting and homestead context; and practical interventions that reduce women’s work load and/or improve men’s contribution to tasks that previously were carried out mainly or only by women (e.g. grass cut-and-carry for young or weak animals) (Kebede et al 2013).

Adaptation Intervention 7: Expand the use of improved crop varieties with climate-resilient characteristics

Access to and use of improved seed is critical factors for the ability of small holder farmers to increase agricultural production and productivity, ensuring food security and livelihoods. However, adoption of improved crop varieties in Ethiopia is very low. In 2017/18 women farmers constitute only 14% of agricultural holders who used improved seed are female (CSA, 2019). Similarly, they comprise only 13% and 18% of irrigation and fertilizer use. This is because of women’s limited access to resources and benefits and male biased agricultural extension services. In 2018 out of the smallholder farmers that received extension women constitute 14% of the total. In turn, limited women access to extension is partly because of household approach to agricultural extension system that target household heads instead of household members. Even if household members are targeted women can be left out because of the masculinization of farmer. Agricultural extension services are the primary platform through which smallholder farm managers access information about new technologies and information. Ethiopian Socioeconomic Survey (2016) shows that female farm managers, however, are less likely than their male counterparts to have attended an extension program, leading to a widening of the gender productivity gap (WB, 2019). On the supply side, top-down agricultural extension models historically targeted farmers who were more likely to adopt technological innovations, frequently leaving out female farmers. Therefore, in adoption of improved crop varieties and other climate resilient practices women are more likely to be left behind because of limited women access to resources and patriarchal extension system that targets heads.

Adaptation Intervention 8: Strengthen crop disease and pest monitoring systems in vulnerable areas

Women and men farmers often play different roles in agricultural production, and they possess different levels of knowledge about, and involvement in, pest and disease management practices like any other agricultural and domestic practices. Men and women also adopted different control methods which are in

line with their gender roles: men practice early planting to prevent infestation as they are responsible for ploughing, while women spend their time in the field hunting the pests and killing them as they are responsible for routine management (Kawarazuka, 2020). In addition, women are found to comply with disease monitoring agreements than men. However, women face difficulty to spray chemicals because of lack of finance if this is part of the agreement.

Despite these gender differences, pest and disease management research and training often targets “farmers,” neglecting the specific needs of women and men as well as the power relationships within households and communities. Such oversight is particularly important since providing gender-appropriate support to women and men farmers helps to increase the adoption of appropriate crop protection technologies and practices, reduce farmers' exposure to pesticides, and improve environmental quality (Christie et al., 2015). In Ethiopia, chemical use for crop pest control is more common among men than women farmers. Agricultural sample survey in 2017/18 indicates that out of the total farmers that used pesticide women constitute 14% of the total.

A recent study (Okonya et al., 2019) shows that men apply the chemicals in the field usually without any personal protective equipment, while women fetch the water to be used for mixing the pesticides, and wash the clothes worn during the pesticide application. However, women are often not invited to participate in training about the safe use and handling of pesticides organized by extension workers, who are often men. As a result, women are exposed to the negative effects of pesticides because they frequently do not know about the toxicity levels of the different chemicals being used and their impacts on health as well as the environment. If women were more aware of the hazards, they could influence their husbands to adopt safe practices around pesticide application (Lambrecht et al., 2016). In addition, studies (example, Christie, et.al, 2015) show that women are less aware of both the Integrated Pest Management (IPM) and the health risk of chemical use and hence more likely to be affected by the crop protection chemicals health effects.

Adaptation Intervention 9: Strengthen drought and crop insurance mechanisms to improve management of climate risk

Insurance can provide protection against anticipated climate risks such as droughts and floods as the insured can use pay-outs to address their needs, instead of resorting to negative coping strategies (Alebachew et.al, 2018). This adaptation option will promote preparedness related to risk reduction and create insurance schemes for anticipated climate risks, including drought and flood leading to crop failure.

In times of disasters, having insurance pay-outs as safety-nets, insured households may not need to resort to negative coping strategies which can leave them more vulnerable to the next round of shocks. For instance, in times of drought, women compromise their nutrition and health by eating less quantity and quality of food themselves to feed their families (Alebachew et.al, 2018). However, if insured, households will be able to use pay-outs to address at least a portion of their food security needs. In pastoralist settings, although men are under pressure and stressful situation to provide for their families in times of crisis, the ability to migrate in search of economic opportunities makes it relatively easier for them to deal with crisis. However, male migration often overstretchers women's domestic responsibilities, and in turn, increases their care burden. Though migration is a coping mechanism often used by men, women are often restricted from leaving their home, having less education and being less likely than men to find employment. Insurance can potentially minimize the need for male migration alleviating the burden on women.

Even when there is no pay-out, insurance provides a peace of mind and knowing that they are insured, people are more likely to invest in high-risk, high return activities. For instance, agricultural insurance can enable farmers to re-invest in agricultural assets, inputs and technologies despite shocks and natural disasters. An impact evaluation in Ethiopia showed that insured female-headed households increased their agricultural investments, spending more on hired labour and oxen compared to other insured farmers and the uninsured (World Bank, FAO & IFAD, 2015 cited in Alebachew et.al, 2018). Thus, insurance can build a case against the notion that women will not engage in risky business ventures whilst it promotes and catalyses protection of livelihoods and the preservation of assets.

However, subsistence farmers in Ethiopia have traditionally been unable to secure coverage through climate risk insurance. This lack of access particularly affects women, who are risk managers, compounding existing problems associated with limited access and control over productive resources and decision-making power. Women's low access to insurance could be attributed to differences between women and men in the types of risks faced, affordability, institutional trust and financial literacy (IPA, 2017). Men tend to be more concerned about risks that affect income while women are usually more interested in shocks that affect health, given their role as domestic care providers. Such differences determine the types of shocks that women would like to insure and are willing to pay for (Msangi, 2017). Buying insurance might also be unaffordable for low-income women. Besides, lack of trust in the insurance provider and lower level of financial literacy among women might make the product incomprehensible, affecting their willingness to purchase insurance (IPA, 2017). Such issues need to be considered in the design and management of agricultural insurance schemes.

Adaptation Intervention 10: Strengthen sustainable natural resource management through safeguarding landscapes and watersheds for enhanced climate resilience

Natural resource management through landscape and watershed management are becoming common practice in Ethiopia. For example, during the GTP II period (2016-2020), a total of 36,780 community watersheds were developed, making the total developed community watershed in the country 97,240. Every year millions of smallholder farmers participate in community watershed management through mass mobilization and campaign forms. The major goal is to proactively manage the resources and natural community assets within a given watershed area. Based on the annual Agricultural Sample Surveys results, the participation of male small holder in community watershed management practices much higher than their female counterpart. Over the period 2014-2018 the participation of female in community watershed management practice shows slight fluctuating trends. In 2013/14 out of the total watershed management participants women constitute only 11.7%. this figure has increased to 12.9% in 2017/18 (CSA, 2019). Lower proportion of women participation in watershed management is because of physically demanding nature of the work, remoteness/inaccessibility of the watershed for women and dominance of men headed households in the country. Regarding practice of soil and water conservation practices women still constitute lower proportion of soil and water conservation practices. Agricultural Sample Survey in 2017/18 indicates that women constitute only 17% of soil and water conservation practices in the country and the figure showed minor changes since 2013/14.

Adaptation Intervention 11: Integrate climate change adaptation and expansion of agroforestry

Women in rural settings play an important role in development. In addition to caring for their families, women in the developing countries spend considerable proportions of their time and energy using and preserving land for production of food and fuel and to generating income for their families and communities (Alemu and Getachew, 2020). In Ethiopia most home gardening tasks seem to be performed by women. For example, in most of enset-based agroforestry systems the enset (Tesfaye Abebe, 2009.) production and processing activities are performed by women (Tesfaye, 2009 as cited in Alemu and Getachew 2020).

Women generally play major roles in agroforestry practices in most parts of Ethiopia. However, their roles and levels of participation vary in different practices largely based on the location of the practice (distance from home), types and purposes of the dominant crops produced in the practices. For example, in a study in Southern Ethiopia 95% of women play a major role in different agroforestry practices management. About 82% of the women participate in village forest gardens and 15% of the respondents participate in woodlot practices. At the study site home garden was found to be the dominant practice in which women are significantly active. The high participation of women in home garden management could be due to proximity of the practice to homestead and women can take care of it while undertaking their domestic responsibilities. The dominant crop in home garden is *enset*, for which women have more interest and responsibility. Akhter et al. (2010) and Abeba (2011) also reported women play a key role in home garden management and they are usually responsible for a large part of food production. Women play a major role in home gardens because they have direct access to raise their incomes and they are generally the guardians of home garden and devote much of their time in care and management of the home garden (Watson and Eyzaguirre, 2002).

Women also participate in village agroforestry. The same study in Southern Ethiopia found that about 82% of women are involved in village forest gardens. This might be because village forest gardens are located a bit far from home where women have domestic responsibilities. Besides, the dominant crop in the village forest garden practice is the market-oriented coffee which needs little women labor in the cultural division of labor of the society. According to focus group discussion in REDD+ Investment Programme Gender Analysis women participation is high during coffee harvesting. On the other hand, only Ten percent are involved in woodlots management in addition to home garden and village forest garden management. According to Kiptot and Franzel (2011), planting of trees in the form of woodlot is attractive to men because of the commercial benefits they get from selling poles, timber and fuel wood while women are interested in fuel wood for domestic use. In the study area women participate in planting and in collection of branches for firewood when men cut trees for timber and poles from woodlot fields.

Lastly women usually plant gardens and trees around their houses because they benefit more from it than men. These provide them with shade, windbreaks, fuelwood, and fruit. At the same time, it gives them more security, as they do not need to go so far to get their fuelwood anymore. Very often women are victims of assault when they must go far away from their village or residence and having the trees close by, makes their lives both easier and safer (Aguilar et.al, undated). Therefore, women will participate and benefit from agroforestry in more than one way.

3.1.2.2. Forestry, Land Use, and Natural Resources Management

Adaptation Intervention 12: Rehabilitation of degraded lands and restoration of degraded forestland through natural regeneration to enhance landscape-based climate resilience

Like in other activities due to their socially constructed gender roles and responsibilities, women's and men's environmental knowledge and priorities for restoration often differ (CIFOR). Inequalities persist with respect to women's and men's access to and control over forest land restoration benefits. For instance, as women in many parts of the world control less land than their male counterparts, benefit schemes based on land ownership (UN REDD 2011) or relative contributions of land to restoration (Agarwal, 2001) may have significant gender implications. In other instances, den Besten (2011) found the promotion of cash crop trees for farmland restoration predominantly boost the income of men. In the absence of suitable benefits, women who mostly depended on non-cash income from agriculture were forced to clear more land.

Gender equality and rights must be central in restoration of degraded forestland to avoid perpetuating gender inequalities, to incentivize women and men to contribute to restoration efforts and to provide greater opportunities and enhanced wellbeing for women and men alike (Sijapati, et.al, 2017). Equitable participation in restoration initiatives in terms of decision making and influence, and the distribution of costs and benefits generates broader local buy-in and enhanced capacities. This, in turn, improves prospects for both human and socioeconomic development and environmental outcomes. Past restoration initiatives that were gender blind and/ or excluded women exacerbated gender inequalities. Women's access to land and resources were further restricted, women's voice and agency were undermined, and their work burden heightened (Agarwal, 2014). Restoration initiatives need to support growing efforts globally to enhance women's rights (including those to land) rather than ignoring or reversing progress.

The essence of gender-responsive degraded forest landscape restoration is ensuring that women and men at all levels have equal voice and influence in strategic decisions related to the restoration, and that this contributes to substantive equality in outcomes for women and men. Restoration of degraded land affects women, particularly those in forest dependent communities. Therefore, 'free and prior informed consent', 'fair' and 'just' compensation, and impartial and effective grievance mechanisms for all those affected are critical to safeguarding the rights of local and indigenous women and men (CIFOR). Experience from log forestry research by CIFOR indicated that decisions about target areas for restoration, choice of stakeholders for restoration governance and how to include them, restoration approaches, priority species and how to monitor progress should be made following gender-inclusive participatory processes to capitalize on the knowledge and experiences of both women and men. Mechanisms and measures at various scales are required to equitably distribute benefits and costs associated with restoration for both women and men in participating communities.

Adaptation Intervention 13: Afforestation and reforestation of degraded lands through tree planting to restore forest ecosystems enhance for enhancing landscape-based climate resilience

Men and women often have different productive and reproductive roles in forest resource management. They play different parts in planting, protecting, or caring for seedlings and small trees, as well as in planting and maintaining homestead woodlots and plantations on public lands. Men are more likely to be involved in extracting timber and non-timber forest products (NTFPs) for commercial purposes (Aguilar IUCN bulletin, undated). Women typically gather forest products for fuel, fencing, food for the family,

fodder for livestock and raw materials to produce natural medicines, all of which help to increase family income (ibid). in afforestation and reforestation activities women usually participate in nursery development, watering the seedlings, looking after the nursery sites, planting seedlings and protection of the site while men participate in digging land for nursery preparation, fencing and planting.

As the KII respondents from EFCCC indicated in rural areas the role of women and men is consequently different. In the rural area the role of women in Environment and forestry management is given little recognition partly due to cultural and traditional bias against women. According to KII respondents stated that farm tools and construction materials collection from forests, honey production and logging are mainly conducted by men while other non-timber forest products collection (e.g., spices) and firewood collection are mainly done by women. Compared to men women activities in forest related activities are less exploitative as they do not cut down trees. Regarding Environmental sector, women are highly affected by climate change compared to men and less emphasis is given to their participation in protecting the environment because women are mainly responsible for domestic works such as preparing food, childcare, fetching water, firewood collection and housekeeping. During famines and drought women are left in the household while men migrate to other areas for search of food and employment opportunities. This leaves women to labor constraint, psychological pressure and economic pressure.

Gender equality can also be measured by the degree on which men and women have access to and control over resources (assets, income, benefits, and services). Gender analysis in the REDD+ Investment Program indicates that women have limited access to and control over forest and forest products compared to men. Mostly women have access to firewood, spices as well as vegetable products while men have better access to and control over forest and forest products such as timber, honey, construction materials. The KII respondents indicated that in Environment and forest sector, to bring equal participation and ensure benefits of women, different measure have been taken including adequate awareness on gender equality, different training on capacity building (to enhance their capacity and knowledge) are provided by the sector and as well as affirmative action is given.

Experiences around the world indicates that afforestation and reforestation programs usually exclude women and face challenges after implementation. This is because women and men have different needs and priorities and the benefits from reforestation and afforestation are not equitably distributed. For example, distribution of economic incentives achieved through REDD (reduce emissions from deforestation and land degradation) or payments for ecosystem services (PES) for carbon storage and new carbon sinks should be equitable among men and women. An analysis of several India and Nepal community forest groups highlighted the fact that, in most cases, cash is not distributed equally and funds are commonly invested in resources or activities from which women were unlikely to benefit from, such as club repair, purchasing community utensils, rugs, drums, etc. (Agarwal, 2002). Therefore, women need to be consulted and engaged in afforestation and reforestation programs for the success of the program, sustainability, and equity issues.

Adaptation Intervention 14: Enhance forest climate resilience through sustainable forest management

There is gender differentiated use, access, and control of forest resources (NAP-ETH, 2018). Along with this, gender division of labour plays a pivotal role in the differences in the usage and management of forests

and rangelands between women and men, both of whom hold different knowledge about forest resources. A CSA study reveals that although 59 percent of female household members (compared to only 22 percent of male members) spend some time to collect fuel wood or water on a daily basis, men dominate in the harvesting of forest products mainly for commercial purposes (timber and poles) while women harvest mainly for less commercial use such as food, handcrafts, raw materials, medicinal herbs, non-timber forest products and firewood (CSA, 2014). There are also gender-based inequalities in formal employment in the forestry sector. For instance, the percentage of men in skilled agricultural, forestry, and fishery (62 percent) is almost double that of their female counterparts (32 percent) (Ibid).

Moreover, the intensity of usage differs for women and men. Women are often dependent on biomass and forest resources for household livelihood and energy, and climate change could reduce their ability to obtain necessary environmental resources and household incomes. Declining forest cover and diversity require women to spend more time foraging at greater distances for forest products. In 81 percent of rural and 70 percent of urban households, women are solely in charge of firewood collection (NAP-ETH, 2018). This shows that women and girls are mainly responsible for collecting traditional fuels, a physically draining task that can take from 7 to 14 or more hours per week (CSA, 2014). Consequently, women have less time to fulfil their domestic responsibilities, earn money, engage in public activities, learn to read or acquire other skills, or simply rest. Girls are sometimes kept home from school to help gather fuel, perpetuating the cycle of disempowerment. Moreover, when environmental degradation forces them to search farther for resources, women and girls become more vulnerable to injuries from carrying heavy loads long distances and face an increased risk of sexual harassment and assault. In the face of climate change, this would further increase women's vulnerability and workload in ensuring household food and livelihoods.

Concerning women's knowledge, skills and experiences for sustainable forest management, their responsibility of forest foods and other forest related resources well positions them to develop livelihood strategies that fit the changing climate (NAP-ETH, 2018). Also, as natural resource managers, women influence the diversity within forests and contribute to biodiversity as men tend to focus on cash-oriented monocultures (World Bank, FAO & IFAD, 2008). Women can also organize the community for forest restoration and fire prevention plans and programs. There is a need to ensure that information on the use of forests and forest products, agro-forestry, participatory forest management and community-based rehabilitation of degraded forests is gender-disaggregated as it is well established that there is significant variation in gender roles in this area. Supporting services, such as extension, information dissemination, and seedling provision must also be gender responsive. There is also a need to ensure that both women and men are equitably represented in forest management and governance systems.

Adaptation Intervention 15: Improve sustainable utilization of forest resources

Studies indicate that there is difference in gender role regarding forest resource utilization. Gender analysis of REDD+ Investment Programme (RIP) indicated that farm tools and construction materials collection from forests, honey production and logging are mainly conducted by men while other non-timber forest products collection (e.g. spices) are mainly done by women. Forest coffee production is done by both men and women and boys and girls. In coffee production land clearing and planting coffee is done by men and boys while coffee weeding and harvesting is mainly done by women and girls. Compared to men women activities in forest related activities are less exploitative as they do not cut down trees. Such gender division of labor in forest-based livelihoods is the same in most areas in the country.

Regarding forest resource management men tend to dominate in most places. For example, gender analysis of the RIP of Ethiopia in 2020 indicates that lower proportion of respondents (45%) reported women participate in forest resources management compared to men (79%). In addition, men also participate in community management roles (kebele leadership, managing water points, participation social institutions and development groups, etc.) women participate in 77% of the cases while men participate in 86% of the cases. This indicates men dominance in management of community resources.

Adaptation Intervention 16: Implement forest protection and health enhancements measures in natural forest ecosystems to enhance landscape-based climate resilience

Healthy forests are essential for sustainable forest management, yet forests, like other ecosystems, are subject to a number of threats that can cause tree mortality or reduce their ability to provide a full range of goods and services (FAO,2005). The causes of the negative impacts on forest health and vitality vary from place to place, and the magnitude and duration of the impacts are not easy to assess. Causes include, but are not limited to, fire, insects and diseases, overexploitation of wood and non-wood forest products, poor harvesting practices, poor management, uncontrolled grazing, invasive species, air pollution and extreme climatic events (e.g. drought, frost, storms and floods). The complexity and interrelationship of these factors and their impact on the health and vitality of forests are difficult to unravel. Indirect impacts may be far reaching and include social, economic and environmental dimensions.

Forest fire has been one of the major factors of forest health in the world. Some forest ecosystems have evolved in response to frequent fires from natural as well as human causes, but others are negatively affected. Most fires in forests and woodlands today are caused by humans. They are the result of a misuse of fire for conversion of forests to agricultural lands, maintenance of grazing lands, extraction of non-wood forest products, hunting, and clearing of land for mining, industrial development and resettlement and charcoal burning. Forest fires may also be the result of personal or ownership conflicts (FAO, 2005). In Ethiopia, indigenous societies burn forest for regeneration and control of animal pests. The role of women in forest fire is limited in Ethiopia because women are less likely to be involved in clearing of land for agriculture, mining, herding animal and burning of charcoal.

Adaptation Intervention 17: Enhance climate resilient livelihoods of wildlife resource dependent communities in protected areas

The contribution of forest income to the total household income is significant although it varies from place to place and with wealth category. Forest income was more important for poor households (47.3%) than for medium (30.5%) or rich (20.2%) households (xxx). Wildlife contribute more to income of women headed households than those of the male headed households. Study in eastern Ethiopia indicates that forest income contributes 58% of women headed household income while it contributes 29% of male headed household income. This indicates women are one of the wildlife resource dependent people alongside the indigenous societies. The gender dimension of forest and wildlife income was also apparent within the household. Female members generated about four times more forest and wildlife income (77% of the household forest income) than male members (23%) (ibid). The sex of the household head and distance to the forest were the two determinant variables that significantly affected forest income out of the eight explanatory variables considered in the regression model in the study on Eastern Ethiopia Jelo Afromontene Forest. Policy to promote new forest management arrangement such as participatory forest management

(PFM) in Jelo forest needs to take into account the major forest users and the types of products they depend on, and be accompanied with other poverty reduction measures so that improved forest conservation outcome will not have negative consequences on local livelihoods, particularly on poor and women, who depend most on the forest for survival.

3.1.2.3. Water Sector

Adaptation Intervention 18: Improve access to potable water to strengthen community climate resilience

Women are the responsible and highly victimized citizens as they are more responsible in the supply of water and energy to their households. Even if there are efforts to address these issues, as compared to men, women are liable to different socio-economic challenges as they are responsible for collecting fuel woods and water supply for the domestic use. These socio-economic challenges include health problems due to carrying overloads of water; they are direct victims of indoor air pollutions due to responsibility of food cooking etc. Moreover, they are also deprived from attending sufficient schooling and pursue better life due to the responsibility to fetch water. They are also liable to sexual harassment along their way to bring water to the house.

Qualitative data obtained from the ministry of water, irrigation and energy indicates that for those activities that require technical knowledge and experiences, however, both men and women are doing all activities as per the designated duties and responsibilities. The KII from the sector stated that *“For those activity that requires technical knowledge women get equal job opportunities as long as they have interest for the post. In case when the required women failed to win on competitive basis, priorities are given to women through some affirmative action. Taking past domestic pressure, all sectors have gender mainstreaming guidelines and most of the sectors are working to meet at least equal level of participation (50% male and 50% female).”* The sector has not differentiated job descriptions and responsibilities by gender disaggregation. However, in MoWIE sector there are areas where the work requires physical strength and less preferred by women. Such works included climbing heights, working under caves related with green technologies like geothermal energy, wind farm installation and the like that women are less likely to be involved.

Under the MoWIE sector, there are various green resources like geothermal energy, cook stove, biofuel, wind farm, solar energy, smart-grid technologies (smart meters), power generation solutions and electric vehicles. These resources are creating green job opportunities for both male and female. Since these technologies are reliant on technical knowhow and experience of the experts, green job opportunities are created based on competitive basis unless the required number of women candidates are low, equal chance will be granted.

Both CRGE and gender experts of the sectors said that, *“Both male and female have access to all green technologies available in the sector as long as they have required technical skill. Yet, the reality on ground shows, few women are accessing these resources due to shortage of women expertise (candidate) and yet, following gender mainstreaming principle, we are giving affirmative action on capacity development, socio-economic and leadership empowerment by giving priority chances them.”* For some technologies, like cook stove, priority access opportunity is given to women given their close attachments with reproductive tasks. Such cook stove has multifold benefits; reduces carbon emission, protect health and

safety of women from unnecessary health complications, and generate green employment opportunity from its production process.

Adaptation Intervention 19: Expand the construction of medium and large-scale irrigation systems to enhance food security

Irrigation development is an important strategy to increase agricultural productivity, secure agricultural livelihoods, enhance food security and overcome rural poverty for a large number of smallholders, particularly in the phase of climate change. However, there are cases on how specific technical properties of irrigation systems negatively affect women in a disproportionate way. In other words, identifying gender differences and inequalities in conventional gender analysis is necessary but not sufficient. Rather, the integration of technical properties of irrigation systems within gender analysis leads to comprehensive and effective policy and interventions when evaluated in the technical context of farming practice. For example, investment in irrigation infrastructure that reduces the physical workload in the practice of irrigation agriculture, would particularly help women farming on their own.

Large and medium scale irrigation expansion usually correlates with the shift to high value cash crops which is usually dominated by men. This will have negative effect on women farmers and women household members, because it drains their opportunity to grow crops and vegetables that are useful for household consumption. Nevertheless, promotion of new irrigation technologies requires cautious evaluation of the gendered outcomes to ensure equitable use, control and benefit share between men and women (Oates et al., 2017, in Imburgia).

Study results found that security of irrigation water access is also influenced by the time constraints because of the demands on farmers' time placed by communal Water User Association (WUA) activities (Imburgia, 2019). For example, in Tigray, traditional gender roles and division of labour were found to be strong, with men mostly in charge of farming tasks, but women nevertheless performing a large share of farming activities (ibid). In addition, women are responsible for most of the domestic tasks, which in rural areas of Ethiopia are very time consuming. For example, women farmers needed to fetch drinking water from a communal water source located outside their compounds. They also had to collect firewood for cooking and heating. Women and girls were responsible for the largest part of both activities. Likewise, a lack of affordable and reliable energy sources and technology rules out the use of time and labour saving implements for cooking (e.g. manual mill for grains; improved cooking stoves). As a result, women have much less available time to participate in all activities related to irrigation management. These activities include participation in regular WUA meetings, where irrigation schedules are discussed, and monthly meetings where other agricultural issues are discussed (e.g. pest management programmes and market updates). Female landowners, mostly heads of households, can be absent from the weekly meetings. This implies that they have no saying in setting water delivery schedules. On the other hand, access to irrigation can relieve women and children from the burden of fetching water from long distances, because water is distributed through the village/farmland through irrigation canal.

3.1.2.4. Energy Sector

Adaptation Intervention 20: Increase of households using renewable off-grid energy sources for lighting

Energy poverty is still pervasive both globally and nationally. One in five people in Africa and South Asia do not have access to electricity, and close to 3 billion people (40 percent of the global population) burn solid fuels such as wood, charcoal, animal waste or crop residues in open fires or inefficient stoves for their daily cooking and heating. In Ethiopia access to electricity is less than 10% (7.4 use electricity for cooking and 39% use the same source for lightening (ESS, 2016). The use of off grid energy sources for cooking is less than 1% and close to 12% use solar energy and biogas for lightening.

Women, as household energy managers, should have a bigger say in household energy decision making. Thus, from the standpoint of consumption, the design, production, distribution and sales of sustainable energy technologies (for example, clean cooking stoves and lighting devices) would benefit from having women contribute to shaping the clean energy value chain (UNDP and GGGI).

Energy poverty, one aspect of broader economic poverty, has distinct gender characteristics that disproportionately affect women and girls (ibid). Women and girls are often primarily responsible for collecting fuel and water at the community level. Also, poor women tend to participate in the informal economic sector (for example, the food sector), which relies strongly on biomass as its main energy source, which, in turn, does not feature heavily in national energy policies and priorities. Indoor pollution from the burning of solid fuels is a serious health problem for women and girls. Every year, 4.3 million people – mainly women and children – die because of indoor air pollution (WHO, 2016). In 2012 alone, 7 million people died – representing one in eight of total global deaths – because of exposure to indoor air pollution, which confirms that air pollution is now the world’s largest single environmental health risk. Women are also exposed to other health risks likened to the toilsome work of energy collection. They carry greater loads compared to men but have a lower intake of calories as most customs dictate that men receive more food and water. Women’s poor nutrition vis-à-vis their workloads increases their susceptibility to anemia and perinatal mortality, while the drudgery of energy collection could entail postnatal complications and takes a toll on women’s well-being (WHO, 2014).

Energy poverty affects women and girls by virtue of the toll it takes on their time, resulting in ‘time poverty’ (a lack of time for rest and leisure after taking into account the time spent working, whether in the labour market or at home). Women spend considerable time gathering biomass for energy. Because they undertake these activities largely on foot, climate-induced scarcity of natural resources can exacerbate their time poverty, as women are forced to travel and spend more time collecting these resources, thereby causing them to lose out on other, self-nurturing activities such as education. Better access to modern energy can help alleviate some of these challenges on women.

3.1.2.5. Transport Sector

Adaptation Intervention 21: Build sustainable transport systems for resilience through enhanced access to mobility

This adaptation action focus on availing transport system that is environmentally sustainable while improving access to mobility. In transport planning and management, women are rarely employed as drivers in the most places in our country due to cultural barriers. Gaps in access to good infrastructure affect women disproportionately. Poor urban transport design disproportionately and negatively affects women, preventing them from accessing jobs, schools, and health centers. Added to this, women have a higher

dependency on public transport than men due to their limited transport access (ownership and use). At the community level, men have a dominant role in determining transportation mode, type, and ownership of private vehicles; it influences the choice of transportation mode and the way to ride vehicle. However, the differences of travel pattern and transportation between men and women has implication to GHG emissions contribution.

According to information from the ministry of transport the transport sector has four pillars to mainstream CRGE strategy to reduce GHG emission: mass mobilization, full efficiency standard, new technology and non-motorized transport. Mass mobilization relies on expansion of public and private transport systems that carry many people at a time. This mass mobilization affects women and men differently. Women who are usually travel with kids and or are pregnant face a difficult challenge using mass mobilization transport. Even women of all ages will not feel comfortable using mass mobilization transport because it involves close physical contact and requires strong physical presence to travel will mass mobilization transport systems. On top of these, women are usually responsible for shopping of household consumables as a result of which they have different transport needs than men. They usually require multiple stops which mass mobilization transports are less likely to provide. In addition, use of non-motorized transport such as bicycle is usually dominated by male and rarely used by women in Ethiopia.

Adaptation Intervention 22: Increase climate resilient designs and safety standards for transport systems

Meeting the gender differentiated needs of women and men in terms of basic services such as health and education as well as climate change adaptation hinges on overcoming constraints of underdeveloped transport services. In this context, very little is known about women's and men's role and use of transportation infrastructure in Ethiopia due to inadequate sex-disaggregated data and statistics. Despite this, the need for gender-sensitive approaches to transport planning with a view of contributing to the reduction of women's transport challenge and their heavy workload is duly recognized in the National Action Plan for Gender Equality (NAP-GE, 2006).

Essentially, women's and men's mobility is determined by their gender roles. Women mostly use transport systems to access markets to perform their domestic roles, to collect water and fuelwood, to go to schools and health centres as care-givers, access income-earning activities and fulfil other social obligations. Meanwhile, men's mobility is largely driven by income earning responsibilities and leisure (USAID, 2014). Moreover, there are also differences between women and men in terms of the mode of transport used. Women might lack access to motorized transport due to prohibitive costs and might walk to most places. Thus, women's mobility might be more affected due to damages to pedestrian roads, which are becoming more common as a result of extreme weather events such as floods, while men, relying mostly on motorized transport, might be more impacted by damages to vehicular roads and railway transport.

It is important to note here that gender norms also constrain women's ability to travel and access information including early warning information (CSA & the World Bank, 2013). Physical mobility becomes even more challenging for persons with disabilities, which disproportionately affects women. The Ethiopian Rural Socioeconomic Survey conducted in 2013 reports disability being higher among the oldest age category (51 and above), with elder women exhibiting more disabilities than elder men of the same age group (CSA & the World Bank, 2013). Finally, women also face more security risks compared to men

while travelling both in rural and urban areas further limiting their mobility and compromising their productivity, incomes, and adaptive capacity. However, despite the challenges they face, women can contribute to building sustainable transport systems for instance by informing the design of road safety standards based on their unique experiences and design of pedestrian roads in relation to access to health centres, schools, markets etc. that help enhance communities' adaptive capacities.

3.1.2.6. Urban Sector

Adaptation Intervention 23: Construct new sanitary landfill site in cities/towns in climate resilient locations

Compared to men, vulnerable women in cities, especially slum dwellers, usually have limited ownership of resources such as land titles and property ownership which increases the severity of their losses during climate induced disasters, limiting their ability to recover faster and re-build their livelihoods better. Women of lower socio-economic status also exhibit a lower level of literacy compared to men which hinders their access to early warning information as well as preparedness and response strategies (IFRC, 2015). Also, as slum dwellers in cities, women are more vulnerable due to lack of access to housing, water, sanitation, health services, transport, education and employment opportunities (USAID, 2014). These challenges are exacerbated by climate change as it affects for instance availability of water, leads to damage to infrastructure in the aftermath of extreme weather events etc.

Additionally, the absence of proper waste management systems in urban areas is yet another issue which affects both women and men but significantly increases the burden on women since women deal with domestic work and are responsible for waste management and disposal. As consumers, they also have a role in the type of waste generated. Women also influence others', especially children's behaviour when it comes to waste management practices (WEDC, 2018). Thus, it is important to recognize the gender division of labour in issues such as waste management for appropriate targeting of activities including environmental education.

Adaptation Intervention 24: Increase the climate resilience of urban systems

Urban areas are at the center of economic development. The population of urban areas in Ethiopia has been increasing over the years, thus increase the demand for economic and social services in recent years. An efficient and electives construction industry can enhance national competitiveness and create employment opportunities. Increased frequency of droughts and floods are the major climate risk in urban areas. Increase in hunger and famine as well as increasing rural urban migration also observed in urban areas in recent years. Solid Waste Management and Climate Resilient Green City strategic documents that help to guide and implement the clean and green city development through community mobilization are among the initiatives developed in the sector for the GTP II implementation. However, the role of women and men has very important for the urban development.

Both men and women engaged in the sector development activities, but women do not benefit equally to men in urban development and construction due to lack of adequate awareness. However, considering their roles men are more involved and benefited than women. For instance, women in the leadership positions and in the construction industry (contractors, consultant) are less in number and affected by the decisions

taken by men. In terms of access and control, as the offices level both women and men have the right to access and control over resources, but in rural mostly women have no right to access and control over resources. As a country there is a big difference among male and female is observed on the issue of control resources in rural area. As the KII respondents said to realize the ownership and access of resources for women the sector integrated women issues in its development programs. For instance urban housing program has acknowledged women are in a disadvantaged position in the control of resources and has set a rule that 30 % of the condominium houses to be transferred to women and in the remaining 70% they can participate get the same change (through lotteries) with the total registered candidates. Similarly, in the land registration and certification women are given equal rights as their spouses in the land holding, utilization, and rights to permanent properties.

As the KII respondents said that in urban development and construction sector, to bring equal participation and ensure benefits of women different measure have been taken. This include adequate awareness on gender equality, different training on capacity building to enhance their capacity and knowledge are provided by the sector and as well as affirmative action is given. In order to realize equal participation and benefit of women in the sector, 2013 E.C yearly plan was carefully reviewed in order to make sure that gender issues are considered through planned activities targets and indicators. Hence the participation of women beneficiaries at all levels in the plan was given a participation level of 50% from the total participant. The sector of urban development and construction has prepared different policies and strategies to alleviate urban citizen problems and ensure sustainable urban development. These policies recognize the equal rights of women that can enhance the number of women participants at different level in the sector. Building women capacity through affirmative actions was also considered in the education and training programs. For example, the sector has urban management higher education project that is designed to build the sector leaders and employees capacities.

In relation to green technologies, Ministry of Urban Development and Construction has introduced green cities and building to improve waste management of cities. As the KII respondent said leapfrogging to modern and efficient construction technologies is the basic strategic direction of the government of Ethiopia in building a climate resilient green economy so that our sector has a plan to increase the number of women to about 50% of the total in these activities. Among the measures planned during the GTP II period include building the capacity of domestic construction industry, bridging the critical infrastructure gaps with a particular focus on ensuring the quality of infrastructure services by strengthening the implementation capacity of the construction sector, and implementing strict legal measures to safeguard the environment.

Adaptation Intervention 25: Improve provision and condition of housing for enhanced human safety against climatic stressors

Due to extreme weather events such as floods and drought, urban areas, particularly in developing countries, are affected by damage to urban infrastructure, population migration to cities, public health concerns and increase in both solid and liquid waste accumulation, among others. This adaptation option seeks to enhance the resilience urban housing conditions for enhanced human safety against climate change.

Compared to rural areas, in addition to being responsible for domestic chores, women in urban areas take on many roles and responsibilities as they are more likely to work outside the home in formal and informal work (IFRC, 2015). These multiple roles increase the burden on women and might lead to physical and

health impacts that further reduce their resilience (Ibid). On the other hand, normally, urban men work in the formal and informal sectors, without being responsible for domestic chores. However, women work mostly in the informal sectors and have higher domestic responsibilities than men.

To ease the burden on urban systems, particularly when disasters have destroyed fragile structures, many towns in Ethiopia relocate slums to remote areas where land is cheaper. This type of relocation of informal settlements could lead to loss of livelihood for informal traders, most of whom are women and increase the difficulties of both women and men to access formal jobs and might lead to further exclusion of poor urban dwellers.

Although urban women, compared to rural women, can be increasingly engaged in decision making processes (household, workplace, community, etc.), they still face constraints. In cities, compared to men, women are more likely to work in the informal sector with lower wages and unfavourable working environment. The informal sector has been the most important source of employment for the growing population in Ethiopia. In 2009, around 50.6 percent of urban employment came from the informal sector with the proportion of women working in the informal sector significantly higher than men (Martha, 2012). Data from 2005 shows, of those in paid employment outside agriculture, 55 percent of women and 33.4 percent of men had low monthly earnings (ILO, 2013). Alongside this, owing to the cultural norms and values that limit women's labour market opportunities, there is substantial evidence of persistent wage inequalities between women and men. Moreover, women who migrate to urban areas due to disasters are also likely to join such informal settlements, becoming susceptible to trafficking for labour or sexual exploitation and abuse (IFRC, 2015).

Adaptation Intervention 26: Enhance urban greenery for improved climate resilience

The global challenge in an increasingly urban world is to ensure that towns and cities provide healthy and safe living environments, productive economies and social benefits to diverse groups, and for generations to come (WomenWatch: Gender Equality and Sustainable Urbanization - fact sheet-UN HABITAT). Neighbourhood green space serves an important function for the urban population and provides valuable ecosystem services for human well-being. Studies indicate that regardless of the type of naturalness, women are more active in urban green spaces development and use than men. Women also saw greater aesthetic value in green spaces than men did, and had higher self-reported well-being associated with the urban green spaces (Sang et al, 2016). In addition, women are more likely to spend their time in their neighbourhood and hence has higher probability to use green areas than men. As the primary caretaker of children and the elderly women also benefit from the development of green areas as it can serve as a recreational and playground for children. In Ethiopian urban areas failure to develop green areas, use of green areas as open waste disposal site and encroachment of green areas by private and government organizations are the major challenges that need attention if it is meant to serve their primary purposes.

Adaptation Intervention 27: Ensure food security of urban poor dwellers

Food insecurity is closely connected to poverty; throughout the world, rural poverty remains deeper and more widespread than urban poverty. With the rapid urbanization of low- and middle-income countries, however, poverty is increasingly located in urban areas and this will continue as virtually all global population growth in the next three decades is expected to be in cities and towns of Africa and Asia (iied, 2013). Given urban residents' dependence on food purchases, food insecurity will increasingly become an

urban issue in the future. Low-income urban residents in low- and middle-income countries are also likely to be the most vulnerable to the increase in the frequency and severity of extreme weather events such as heat waves, floods, and cyclones. This, in turn, will have a negative impact on their incomes, both by increasing expenditure and reducing their ability to earn; it will also exacerbate non-income dimensions of poverty related to inadequate living conditions. In addition, the links with relatives and kin in home areas that often provide safety nets for both rural and urban households, including transfers and exchanges of food and cash, are likely to be affected by the disruptions caused by environmental change (ibid).

Studies suggest that severity of food insecurity among female-headed households in Ethiopia was a more pronounced issue as compared with the general national estimate of food insecurity. For example, from meta-analysis Negesse et, al 2020, found that food insecurity among them was two-fold increased as compared with their men counterparts.

Adaptation Intervention 28: Undertake climate-adaptive urban planning

Rapid urbanization shifts social, economic, and political dynamics, with particular impacts on women's empowerment and gender equality. Access to basic services is essential for the health and wellbeing of people in urban areas including for women and the most vulnerable. Cities in Ethiopia often struggle to deliver these services due to unrelenting urban population growth, poor planning that does not integrate nature, unreliable service supply, and service delivery systems that are poorly maintained and unresponsive to user needs. Unreliable, unsafe, and inaccessible urban services exacerbate threats related to displacement, violence, illness, malnutrition, and loss of livelihoods to which women and the elderly are most exposed. This is especially evident for women and their families living in slums and informal areas. Women household heads constitute 40% of the poorest households in urban areas globally. Moreover, especially compared to men, women in cities often face specific legal and societal restrictions that limit access to equal economic opportunities, property rights, healthcare, education, mobility, and decision making (USAID, 2019). This creates a significant barrier to accessing adequate urban services or benefitting from urban development interventions. Women's roles and responsibilities as household and community decision makers make them essential to formulating, leading, and participating in urban planning. Recognizing the ways in which gender shapes realities in cities and involving women in the design, implementation, and management of urban development and planning projects has wide-reaching benefits and makes cities more livable for women, men, and children. Evidence indicate that gender-responsive urban planning can accelerate sustainable development outcomes that contribute to women's empowerment and gender equality across communities, decision-making levels, and sectors.

3.1.2.7. Climate Services and Disaster Risk Reduction

Adaptation Intervention 32: Integrated watershed development in million hectares

As indicated in the mitigation actions natural resource management through landscape and watershed management are very common practice in Ethiopia. For example, during the GTP II period (2016-2020), a total of 36,780 community watersheds were developed, making the total developed community watershed in the country 97,240. Every year millions of smallholder farmers participate in community watershed management through mass mobilization and campaign forms. The major goal is to proactively manage the resources and natural community assets within a given watershed area. Based on the annual Agricultural

Sample Surveys results, the participation of male small holder in community watershed management practices much higher than their female counterpart. Over the period 2014-2018 the participation of female in community watershed management practice shows slight fluctuating trends. In 2013/14 out of the total watershed management participants women constitute only 11.7%. This figure has increased to 12.9% in 2017/18 (CSA, 2019). Lower proportion of women participation in watershed management is because of physically demanding nature of the work, remoteness/inaccessibility of the watershed for women and dominance of men headed households in the country.

Adaptation Interventions 29, 30, 31, and 33-37: Climate and early warning data, weather monitoring systems, river basin information system, surface and ground water assessment, water quality monitoring.

Actionable climate information access including early warning data, weather information and natural resource information systems is crucial for disaster preparedness and climate risk management for both men and women. Thus, the adaptation options stated from 29-37 that focuses on improving early warning systems, river basin information systems, survey and ground water assessment coverage through improved climate information management and exchange as well as networking capabilities.

Given the differences in literacy and access to resources to enable action, women and men usually differ in their informational needs as well as in how they access, understand and act upon early warning information. They might also differ in their preferred outlets for receiving early warning information. Therefore, to trigger timely and appropriate actions, early warning information should meet the needs of both women and men and be accessible and understandable to both.

However, in most cases, weather and climate services are produced and communicated in a gender-neutral manner without considering men's and women's needs (WMO, 2015). This leads to gendered differences in access and use of information, reinforcing gendered vulnerabilities. So far, in Ethiopia, early warning information has traditionally not included a women's rights or gender perspective. In the development and implementation of early warning systems (EWS), little consideration is typically paid to the structural or context-specific differences between women's and men's situations, perceptions of threats and vulnerabilities, experiences, or adaptive capacities. When women are not included in EWS, their opportunities to fully participate in disaster preparedness and climate risk management is compromised.

Additionally, EWS, weather and water monitoring systems should also consider women as potential agents of change for climate change adaptation as women often have a strong body of knowledge and expertise that can be useful for EWS, weather information and water and other natural resource related information. Unfortunately, women are usually underrepresented in national and international institutions that provide weather and climate services hindering the reflection of women's needs in products that are generated (WMO, 2015).

3.3 Gender and NDC Coordination mechanisms

The NDC aims to expand environmentally friendly activities in all sectors at all administrative organs. They are not only climate responsive measures but also productive interventions. The CRGE was initially framed to reduce carbon emission with supplementary objective of mainstreaming gender components to all its activities. Accordingly, in all administrative and CRGE coordination system, women representatives are put in place. For example, the finding from sectoral KII reveals that, in agricultural and water and energy

sector, women staff constitute about 30% of the total staff, in energy and petroleum women constitute about 40% and even in transport sector which was once said as men's office, the number of women even working on fieldwork has significantly increased to 45%. Though the number of women participating in the sectors is not equal with men, their number is increasing from time to time. To meet the target, there is minimum gender inclusion criterion prepared at top layer and which is distributed to all corresponding administrative organs and includes, raising the number of competitive women to responsibilities, if not available, capacitate and empower women to various responsibilities till the number reach the needed gender equality.

Similarly, the KII report from gender offices of water and energy sector said that *“At this time women are working in every layers of our sector but still they do not have equal job opportunity with men given the wrong perception that women are physically weak and frequently absent from duty because of women dominated care works. Yet, as gender office, we are following every activity and negotiate the employer to allocate half of its job opportunity for women”*.

The assessment indicates that there are women representatives in sectors who are actively participating in all activities performed by CRGE since its inception. The CRGE units/directorates have gender office to closely monitor all activities and negotiate with all stakeholders to enable women equally participate in all capacity development and benefits provided by the project. Still in some sectors like energy and mines, the experts believe that, *“opportunities are provided based on merit-based approach and no room for affirmative action assuming women are equally competitive in the market. Added to this, he said that affirmative and quota system was in action to raise the number of women which once was low, yet now, the environment is almost fair, and they can equally compete with men.”* However, the CRGE mainstream gender issues in all its activities as per the working book in almost all sectors.

3.3.1 CRGE Facility

The CRGE Facility is established under MoF to support implementation of the strategy, mobilize resources for the implementation of CRGE/NAP-ETH, building the capacities of implementing and coordinating entities on resource mobilization and project development and monitor and evaluate implementation of CRGE/NAP-ETH funded by the facility. The Facility has developed a Gender Mainstreaming Strategy (2020-2023) to provide strategic guidance for addressing gender inequalities in the operations of the CRGE Facility and improve the accountability mechanisms on how gender mainstreaming can be ensured in climate finance. The overall goal of the CRGE Facility gender mainstreaming strategy is to enable vulnerable women and men, young girls and boys to improve their livelihood, to raise their incomes and strengthen their resilience to climate change by creating equitable and fair opportunities for men and women to support a paradigm shift to low-emission and climate-resilient development. The strategy has the following four strategic outcomes.

1. Strengthened policies, institutions, and processes within the CRGE Facility and implementing entities on the promotion of gender equality
2. Enhanced gender mainstreaming capacities and strategy delivery within the CRGE Facility and Executing Entities
3. Increased design of gender-responsive projects and programs in the CRGE Facility
4. Increased participation of women climate actions decision making.

The CRGE Facility in collaboration with Global Green Growth Institute (GGGI) has also developed a gender framework with an objective of identifying existing gender equality issues in the implementation of the CRGE Strategy vis-à-vis the CRGE Facility's mandate and develop a framework that facilitates the integration of gender equality. The findings of the framework revealed that relevant policies are weak in areas of gender equality integration mainly due to lack of gender analysis during program/policy design as well as weak participation of the gender and women's rights related stakeholders in the processes. This translates into the lack of identification of clear gender related activities that need to be addressed with sufficient budget.

3.4 Dedicated Financial Resources for Gender Equality

Women empowerment and gender equality are one of the most discussed issues in development community. However, actual implementation and resource commitment for the issue is far from success. Gender equality is considered as cross cutting areas which is the responsibility of all program implementers but usually end up unimplemented. This is partly because of lack of budget for both gender mainstreaming and implementing gender specific activities. In 2017-2018, DAC members targeted an average of USD 48.7 billion per year, corresponding to 42% of their bilateral allocable aid towards gender equality and women's equality as either a significant (secondary) or principal (primary) objective. But support to programs specifically dedicated to gender equality and women's empowerment as their principal objective remains consistently low at 4% and 58% of aid is not targeting gender equality (OECD). Therefore, the gender inequality is pervasive due to limited resource allocation to the gender equality and women empowerment interventions.

Ethiopia is one of the top five countries in the world who receives aid dedicated to women equality and empowerment. As of 2015-2016 it has received about USD 1180 million (average) total aid targeting gender equality (principal or significant objective). Financing that is dedicated to gender equality and women's empowerment in developing countries as a main objective is rare. Financing with the secondary development goal of increasing gender equality and women's empowerment (mainstreamed support) is more common, but not sufficient.

The result from KII of various sector offices indicates that, the sectors cannot easily access the fund for various gender mainstreaming projects rather it is through Ministry of Women, Child and Youth that the money is distributed to the most urgent sector as per their priority. In some other sectors, there is gender mainstreaming fund from Ministry of Finance though not significant. Similarly, some sectors have direct international financing sources with the secondary development goal of increasing gender equality and women's empowerment (mainstreamed support) from various projects. Added to this, KII from transport, mines and petroleum, trade and industry indicated that, capital budget for running primarily gender equality is very few. The financial support provided for the sectors are that of the program integrating gender equality not dedicated budget for targeting gender equality. Therefore, our role is limited to negotiate the program to capture at least 30 percent of total benefits/resources provided to be given to women. To enhance budget allocation for gender equality the NAP-ETH Resource Mobilization Strategy can be a good entry point, particularly if gender issues are considered as one area of resource gap. Climate finance can play a big role in crowding in funds for gender activities. In addition, there is a community development project fund disbursement requirement in which the community development project assures the gender issues

related to participation and benefit of the women within the communities for disbursement of fund. These must be capitalized on to make NDC implementation gender responsive and support it with a good resource base.

Based on KII respondents, most of the sectors use regular budget for the implementation of NDC except *MoA*, *MoWYC* and *MoWIE*. For some of these sectors, there is additional gender mainstreaming budgets received from various *donors* (Table 3). The budget granted are implemented according to the government rules and donor's guidelines.

Table 3: summary of gender budgeting for NDC activity implementation

Sector	The main sources budget for NDC activities implementation				Additional sources budget for NDC activities implementation
Ministry of Agriculture	✓	Regular government	budget	from	✓ From Green Climate Fund (GCF), UNDP and World Bank
Ministry of Mines and Petroleum	✓	Regular government	budget	from	-
Ministry of Urban Development and construction	✓	Regular government	budget	from	-
Ministry of Water, Irrigation and Energy	✓	Regular government	budget	from	✓ From World bank, African Development, and UNICEF
Ministry of Women, Children and Youth	✓	Regular government	budget	from	✓ From NORAD, NEPAD and GCF
Ministry of Finance	✓	Regular government	budget	from	-
Planning Development Commission	✓	Regular government	budget	from	-
Ministry of Transport	✓	Regular government	budget	from	-
Ministry of environment, Forest, and climate change	✓	Regular government	budget	from	-
Ministry of Trade and Industry	✓	Regular government	budget	from	-

Source: Sectoral KII survey (Dec 2020)

3.5 Sex disaggregated data availability

Gender disaggregated data availability is one of the serious gaps observed during the survey. In almost all sectors, CRGE strategy is integrated into each sector strategic plan. Each sector has gender and CRGE unit to help the implementation of the NDC's project in accordance with guidance and strategic framework. The CRGE project office has main role of introducing various climate smart technologies that reduce CO2 emission on one hand and enhances production efficiency on the other. They provide all types of inputs (material inputs, capacity development trainings, outputs/outcomes/results). Whereas gender office initiated under the project team takes the main role of negotiating with all necessary stakeholders in allocating any resource provided from the project on equal basis between male and female beneficiaries.

The gender office operates, as separate unit, to help the project achieve gender equality and participation by the end of target year. When asked about gender equality and availability gender disaggregated data on climate change, the key informant from each sector witnesses the absence of sex disaggregated data and gender specific indicators that deals with women and men issues. The most common data reported is the 30% or 50% quota given for women in participation of development activities such as training and employment opportunities. Added to this, all sectors KII believed in the presence of gender-disaggregated indicators for climate change related objectives, but the problem is the data is not collected and hence usually not available. Gender data is said to be available if there is easily retrievable sex disaggregated and gender specific data, presence of knowledge management system including gender aspects and periodically updated information and data. The MRV and M&E of the updated NDC has a lot to do in availing data, not only indicators.

From the secondary data collected on NDC implementing sectors, we can generally conclude scarcity of sex disaggregated data and absence of gender specific data. The result from **Error! Not a valid bookmark self-reference.** on gender statistics reveals the fact that for all sectors, except the ministry of women, youth and children sector, the gender availability ratio is less than 50 percent, implying the lack of gender data availability data for climate related indicators. The statistics may also indicate gender inequality in the sector. But, in ministry of women, youth and children gender availability data is estimated 60% of the total, implying women related performance indicators are well represented in CRGE related implementation. To conclude, gender disaggregated data gap is a serious concern in most sectors and corrective measures need to be taken in the following NDC plan period.

Table 4: Sex disaggregated data availability

Sector	Total # of indicators for Climate related components	Number of indicators that can be sex disaggregated	# of gender related indicators	# of sex disaggregated indicators	Gender statistics availability
Ministry of Agriculture	44	26	5	2	27%
Ministry of mines and Petroleum	0	0	0	0	0%
Ministry of Urban Development and construction	6	6	0	0	0%
Ministry of Water, Irrigation and Energy	10	10	0	0	0%
Ministry of Transport	5	5	0	0	0%
Ministry of Environment and forest	6	6	0	0	0%
Ministry of Finance					
Ministry of Industry	0	0	0	0	0%
Planning and Development Commission	0	0	0	0	0%
Ministry of Women, Child, and Youth,	5	5	3	0	60%

Source: Sectoral secondary data collected on gender and climate change (from Dec. 26 to 31, 2020) & ten-year plan matrix (2013 to 2022).

3.6 Capacity building in Gender and Climate Change in NDC

Ethiopia seeks to promote gender responsiveness in undertaking climate actions including mitigation, adaptation, technology development and transfer including capacity building. Gender and Climate related capacity building trainings and awareness raising activities have been undertaken by different actors in the country, such as the Environment, Forest and Climate Change Commission, and nongovernmental organizations and other key stakeholders like MoA, MoWIE, MoT, MoMP, MoUDC and MoWYC. In addition, based on the gaps identified; trainings were provided to middle level managers and practitioners from regions and federal sector institutions. The main areas of capacity development include; Gender Concepts, Gender and the Environment (Climate Change), Gender integration/Mainstreaming in to the environment and climate change.

Given gender mainstreaming as one pillar of the NDC project, various interventions measures taken by the project includes; introducing green technologies that can help reduce the emission problem, which includes; women's capacity development, women's socio-economic and leadership empowerment, gender equality and participation, provision of climate smart technologies, providing fair green job opportunities to both male and female and the like. To help the country reach nationally determined target rate, for each sector, a given rate of emission reduction allotment, all interventions measures taken in each sector consider how they help reach the target.

The main women's capacity development activities in the water sector, for example, focus on provision of trainings on the areas of green technologies, biomass energy, geothermal energy, hydropower, electric generators, cook stove, electric vehicle, wind farm, efficient production technologies, and the like. In connection to this, the capacity development interventions provided for women includes providing capacity development trainings on smart technologies (usage, production and marketing). As a result, significant number of women got a chance to have overseas experience-sharing opportunities in the areas of green economy. Most preferably, the trainers are highly experienced professionals from higher institutions and sector's top experts. The capacity development opportunities capture all selected individuals from all administrative structures; federal, regional, zonal, woreda and kebele levels. While selecting project participants for the training, a selection guideline even includes affirmative actions. As per the KII interview from energy and petroleum sector, *"our sector allocates about 50% of its participant to be women and in case the number is below this threshold, affirmative action will be taken as long as sufficient number of women are available in the sector."*

According to data from line ministries collected in December 2020, the capacity development focus on, training on how to use the latest technology available on the market with experts, including international experts hired to work in some ministries to provide technical support. Organizational level capacity development focused on developing a system that promote organizational level effectiveness while individual level capacity development focus on developing experience, knowledge and skill required to perform a given task most effectively.

Given the triple women's role, gender-based capacity development mainly intended to help women reduce domestic work burden through strengthening their socio-economic and political power. The interventions introduced are environmentally friendly and can help the country reach nationally determined contributions allotted for each sector. Integrating capacity development in CRGE project requires engaging all actors to receive core issues (institutional arrangement, leadership, knowledge, accountability) for effective program outputs.

4. Conclusion and Recommendation

4.1. Conclusion

This gender analysis report followed gender analysis framework for NDC developed by UNDP. Accordingly it tried to identify gender issues in Ethiopian climate policies and strategies, assessed women and men roles in the pillar sectors in line with the adaptation and mitigation actions, explored availability of gender statistics, capacity building and resource dedication for gender responsive climate action. In doing so the consultant rely on desk review of related documents such as national climate policies and strategies (e.g. CRGE, NAP-ETH, NDC and updated NDC), national data sources such as CSA, key informant interviews and secondary data extraction from the pillar sectors.

The review of climate change policies and strategies indicates that most of the intervention identified in agriculture, forest and energy to mitigate climate change are women responsive. For example, promotion of fuel-efficient stoves has the potential to reduce women drudgery by reducing time they spent in firewood collection and through contributing to better women health. Similarly, the promotion of poultry production ahead of cattle will have a positive effect on women, because poultry production is usually dominated by women and income from poultry products is usually controlled by women in Ethiopia. Replacement of animal draft power with mechanical power seems biased towards men as land tilling is usually done by men in Ethiopia. Therefore, other mechanization technologies that focus on agricultural activities that are mainly performed by women (such as weeding, planting, harvesting, and transporting) is also useful. Even though some of the proposed interventions are women friendly and has potential to contribute to women equality, other interventions in transport and transport are gender neutral and hence mainstreaming gender in each sector is needed at the detailed implementation level.

The Updated NDC indicates that Ethiopia's greatest emission reduction potential is in the livestock and energy sector constituting 93% of emissions in 2010. Therefore, one of the priority initiatives under the CRGE is the use of more efficient stoves. Women are often responsible for gathering and producing food, fetching water, and collecting firewood for cooking. With climate change, these tasks are becoming more difficult for women. Extreme weather events such as droughts and floods have a greater impact on the poor and most vulnerable people, which are mostly women. To curb the situation, women should play a crucial role in implementing climate change adaptation and mitigation interventions. Women have the knowledge and understanding of what is needed for the changing environmental conditions and come up with practical adaptation solutions. Restricted land rights, lack of access to financial resources, training and technology, and limited access to political decision-making spheres often prevent them from playing a full role in tackling climate change and other environmental challenges.

The agricultural sector planned to reduce GHG emission from three different activities: crop sub-sector, livestock sub-sector and natural resource sub-sector. By the end of 2030, the three subsectors planned to reduce GHG by average annual rate of 66%, 79% and 90%, respectively. To do so the Updated NDC identified five mitigation interventions including in crop, livestock, forest and NRM. Gender analysis of the mitigation and adaptation actions in the agriculture sector indicates that there are gendered division of labor in most of the activities. In agriculture, livestock and forest sectors women tend to participate in domestic care works (reproductive activities), less paying activities such as poultry and backyard cultivation

of crops. In addition, routine activities such as weeding, and planting crops are done by women. Regarding access and control over resources women have less access to land, extension services, improved seeds, and other inputs and livestock assets. Women have access to small livestock products and poultry while men have access and control over large ruminants. Therefore, green technologies to be introduced should focus on these activities to reduce the burden on women. For example, agricultural mechanization in these activities will benefit women more if it also includes these activities.

In forest women have access to forests for firewood collection, non-timber forest products such as spices and edible fruits while men have access to construction materials, honey production and extraction of timber. Forests are also managed by men than women. In afforestation and reforestation activities women play significant role in preparing seedlings, planting, and watering while men prepare planting space and manage the forest. Since women have limited control over land afforestation activities are usually done at the will of men.

While the areas identified for GHG emission reduction in agriculture, forest and natural resources have immense potential for gender inclusion there is limited genderization of the interventions. There are neither gender specific intervention areas nor gender disaggregated results or indicators to ensure gender mainstreaming in the mitigation interventions identified under the updated NDC. Even though there is improvement the same is true for the adaptation actions of the Updated NDC. For example, out of 66 performance indicators identified to track performance of adaptation interventions only 4 are gender disaggregated and the 8 can be disaggregated by sex. Therefore, there is a lot to be done in the next implementation of the activities particularly in preparing detailed implementation plans at sector level.

The effectiveness of various gender-based climate policy options depend on the how reliable and timely gender-based knowledge management system is implemented. Though many sectors are fully aware of the importance of gender-based knowledge management, sectoral level survey shows lack of organized and easily retrievable gender disaggregated data on various climate change-based performance indicators. Finally, financing is crucial for integrating gender in climate action. But most sectors do not have dedicated financial sources for gender equality, except the program budget which is used for mainstreaming gender. In some other sectors, there is gender mainstreaming fund from Ministry of Finance though not significant. Similarly, others have direct international financing sources with the secondary development goal of increasing gender equality and women's empowerment (mainstreamed support) from various projects.

4.2. Recommendation

Based on the gender analysis the following measures are proposed to improve gender equality while implementing the mitigation and adaptation actions in NDC and CRGE strategies to reduce GHG emissions.

- The NDC implementation must ensure gender mainstreaming is done while developing detailed sectoral plans. This is because most of the mitigation and adaptation interventions are not gender specific or targets are not gender disaggregated. It is right to expect some of the interventions are not gender specific or not gender disaggregated because NDC's main goal is to reduce GHG emissions in the sectors. But at the implementation level the intervention should target women and set gender specific targets through mainstreaming gender equality intervention in their main plan.

- Detailed gender analysis in each sector is needed. Almost all the sectors assessed have adapted CRGE strategies to their respective sectors. Some of them have gender mainstreaming guidelines. To ensure women participate and benefit from the NDC interventions the sectors must conduct further gender analysis at sector level to understand whether the proposed intervention aggravate or improve gender inequality.
- Some of the proposed interventions in updated NDC and CRGE should be gender disaggregated. This can be by adding women specific goals in the adaptation and mitigation interventions and mainstreaming gender in the existing proposed interventions. The targets and baseline set for mitigation and adaptation should be gender disaggregated and the performance of NDC implementation should be assessed following gendered approach. This can be done as part of the NDC updating process.
- The NDC sectors have limited sex disaggregated data and gender specific data, except the ministry of women. Therefore, the sectors should increase the availability of sex disaggregated data and women and men specific data in monitoring and evaluating their NDC implementation. Easily retrievable, reliable, and frequently updatable gender disaggregated data must be available in all sectors. For this to happen efficient knowledge management system need to be developed in all sectors. In addition, linking the sector M&E and knowledge management platforms with the CRGE M&E and MRV system can relieve their data shortage on gender and NDC.
- Empowering women and providing fair representation across different decision making in the CRGE governance and coordination mechanisms to better protect women's interests through equitable resource sharing and genderization of investments is needed. Gender equity funding in the NDC sectors should be scaled to primary objective (i.e. make gender equity their primary targets) from the current mainstreaming system which is taken for grant or used as a scape goat to avoid gender specific interventions.
- Although gender issues are perfectly aligned to various policies, still, its practicality level need to be checked and corrective actions needed to be taken in references to women priority and preference areas. Sectors can develop climate change gender mainstreaming guidelines to solve the problem of limited implementation of gender sensitive interventions.
- Financing is a key driver for effective implementation of gender responsive adaptation and mitigation interventions. Therefore, finance issues need to be factored in at planning stages of NDC and NAP resource mobilization strategies.

5. References

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6. Annexes

6.1. Data collection Tools for Gender Analysis of the NDC

I. Key informant interview Checklist for Sector Offices

A. General

1. How is the roles of women and men in your sector differ? How men and women are affected differently in your sector?
2. What is the status of women access to and control over resources and benefits in the sector?
3. What are the measures taken by your organization/sector to bring equal participation and benefit of women in the sector?
4. How the different policies and strategies are affect women and men participation and benefit in the sector? Explain.

B. NDC Initiatives in the sector

1. What are the key activities/initiatives implemented by your sector in implementing the CRGE or any other climate change adaptation and mitigation activities?
 - 1.1. Discuss the key initiatives, projects and programs implemented by your sector in the CC area? [Check those initiatives planned for reducing GHG emission in the sector].
 - 1.2. What are the key intervention areas? What is the status or achievement of the initiatives so far?
2. How women are anticipated to participate in the initiatives, programs, and projects intended for CC mitigation and adaptation?
 - 2.1. Are there any provisions or criteria for equitable women participation in the endeavors?
 - 2.2. How effective are the provisions in encouraging women participation in the activities?
3. Does your organization collect gender specific data (gender statistics) for performance measurement and accountability purposes?
 - 3.1. Are there sex disaggregated data for performance indicators? What are they?
 - 3.2. Are data that focus on issues that affect women collected in the sector? What are they?
 - 3.3. What are the gaps in availability of data? Check regularity and dependability of the data

C. Gender Budgeting in NDC

4. What are the main budget sources for the NDC activities implementation?
 - 4.1. Is there regular (capital) budget for gender equality in the NDC implementation process?
 - 4.2. Are there additional sources of budget for the NDC implementation? What are they? How women are treated in the budgeting?
 - 4.3. Are gender equality works adequately funded in the sector related to NDC? Why? Or how ?

D. Institutional Coordination

5. What are the key coordination mechanisms for climate change in the sector?
 - 5.1. Are gender equality issues well addressed in the coordination mechanism? What are they?
 - 5.2. Are there women representatives in the coordination mechanism? Are the representatives actively participate in the coordination mechanism? How or why not?

E. Capacity Building

6. Does adequate capacity in climate change and gender equality exist within your sector?
 - 6.1. What are the capacity gaps/constraints in the sector for climate change? Probe on the expected capacity and the actual capacity that exist.
 - 6.2. What measures need to be taken to solve the capacity constraints/gaps?

F. Gaps and challenges for gender equality in the sector

7. What are the major challenges and gaps you faced in ensuring gender equality while implementing the NDC activities in your sector?
 - 7.1. How and why the challenges affect women empowerment and gender equality?
 - 7.2. What are the proposed solutions for women empowerment and gender equality in the sector?

II. Secondary Data Extraction Form*

No	Indicator/Variable	Men	Women	Total
1	(e.g.) Participation in extension service			
2	Number of people trained on [...]			
3				
4				
5				
6				
7				
8				
9				
10				
11				
12				
13				
14				
...				

*Data on key performance indicator in each sector will be collected for five years (2016-2020). The indicators may vary by sector.

6.2. List of People Interviewed

Table 5 Summary of the background information of KII respondents

No	Organization	Name of the respondents	Position
1	Environment, Forestry and Climate Change (EFCCC)	Benti Firdisa	Climate Change and Environment Directorate
		Samrawit	CRGE Expert
2	Ministry of Women, Child, and Youth	Ashenafi Feyisa	MD team leader
		Beshire Sali	Project design monitoring and evaluation senior expert
3	Ministry of Agriculture	Tolesa Benti 0900021647	Monitoring, reporting and Verification expert
		Getachew Amante	Team leader of women, Child and Youth
4	Ministry of Transport	Nesreddin Molla	Environment and Social Affairs team leader
		Showaye Wonde	Team leader of women, Child, and Youth
5	Ministry of Water, Irrigation and Energy	Nasiradin Mohammad 0927395684	Environmental and social affairs
		Worku Ferede	Team leader of women, Child and Youth
6	Ministry of Industry	Esamel Mohammed	CRGE Expert
7	Ministry of Urban Development and Construction	Tigist Alemu (not accessed)	Director of Climate change and Environment
		Mahedere Beyene	Team leader of women, Child and youth
8	Ministry of Mines and Petroleum	Henok Atnafe 0911887046	Senior Occupational health expert
9	Pegassys Consulting	Jeremy Richardson	Consultant (NDC Update)
10	Planning and Development Commission	Abas Mohammed	Technical Advisor
11	Ministry of Finance	Medehin Mekonnen	CRGE Facility

Source: Sectoral KII survey (Dec. 2020)