



AFRICAN DEVELOPMENT BANK GROUP

# **BUILDING CLIMATE RESILIENCE FOR FOOD AND LIVELIHOODS IN THE HORN OF AFRICA (BREFOL)**

Djibouti, Ethiopia, Kenya, Somalia, and South Sudan

## **Annex 2.2. Technical and Economic Feasibility Study Report for Ethiopia**





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### **Feasibility Study on the Program to Build Resilience for Food and Nutrition Security in The Horn of Africa (HoA) Region - Ethiopia**

#### **Draft Technical and Economic Feasibility Study Report for Ethiopia**

**Consultant: ECU Inc. and Groupe Africain d'Ingénierie Conseils (GAIC) SA**

**Client: Intergovernmental Authority on Development (IGAD)**

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## List of Acronyms and Abbreviations

AfDB	African Development Bank
ASAP	Arid and Semi-Arid Pastoralist
CA	Conservation Agriculture
CAADP	Comprehensive Africa Agriculture Development Program
CAHW	Community Animal Health Workers
CIAT	International Center for Tropical Agriculture
CSE	Conservation Strategy of Ethiopia
DRM	Disaster Risk Management
EFAP	Ethiopian Forestry Action Program
EIA	Environmental Impact Assessment
ESAP	Environmental and Social Assessment Procedures
ESIF	Ethiopian Strategic Investment Framework
FFFS	Fisher Folk Field Schools
GDP	Gross Domestic Products
GoE	Government of Ethiopia
HoA	Horn of Africa
IAIP	Integrated Agro-industrial Parks
IBLI	Index-Based Livestock Insurance
ICPAC	IGAD Climate Prediction and Applications Centre
ICPALD	IGAD Centre for Pastoral and Livestock Development
IFRAH	Foundation Acts to End FGM
IGAD	Intergovernmental Authority on Development
IMF	International Monetary Fund
ISFM	Integrated soil fertility management
ISS	Integrated Safeguard System
ITCZ	Inter-Tropical Convergence Zone
IUCN	World Conservation Union
IWM	Integrated Watershed Management
LEA	Livestock Extension Agents
masl	Meters above sea level
MDG	Millennium Development Goals
MoA	Ministry of Agriculture
MoP	Ministry of Peace
MoWR	Ministry of Water Resources
NAP	National Action Program
NEPA	National Adaptation Program of Action
NEPAD	New Partnership for Africa's Development
NGO	Non-Governmental Organization
NRM	Natural Resource Management
OS	Operating Safeguards
PAP	Pastoralists and Agropastoralist
PASDEP	Sustained Development to End Poverty
PCU	Platform Coordination Unit



PSNP	Productive Safety Net Program
PTC	Pastoral Training Centers
RPLRP	Regional Pastoral Livelihoods Resilience Project
RUSACCO	Rural Saving and Credit Cooperatives
SDG	Sustainable Development Goals
SDPRP	Sustainable Development and Poverty Reduction Program
SLM	Sustainable Land Management
SNNPR	Southern Nations, Nationality, Peoples Region
TLDP	Third Livestock Development Project
TAD	Transmissible Animals Diseases
TVET	Technical and Vocational Education and Training
VAW	Violence Associated to Women

## **1. INTRODUCTION**

### **1.1 General Context and Generalities**

Ethiopia remains one of the top five countries in the world where pastoralism is widely practiced both as a way of life and means of livelihood. Pastoral communities in Ethiopia inhabit the peripheral lowlands of the country which account for nearly 60% of the land surface and conventionally classified as marginally arable and non-arable lands (Firehiwot and Yonas, 2015; Berihun Adugna, 2016). These areas are located in the east, northeast, southeast and southern parts of the country where the comparative advantage for sustainable crop-based livelihood transformation is minimal. However, the rangelands inhabited by pastoral communities provide to an estimated 12 -15% of the country's human population with livestock-based direct livelihood support (FDRE, 2019). Pastoralism in Ethiopia contributes roughly 33% of the agricultural GDP, 16% of the national GDP, 42% of the total national livestock population and important source of quality livestock of indigenous breeds (Firehiwot and Yonas, 2015). Pastoralism also contributes to the national economy through generating foreign currency earnings supporting the export of live animals and animal products such as hide and skin.

Despite their economic importance and cultural values, pastoral communities are politically marginalized segments of the society facing multifaceted challenges where gross policy neglect or misguided government interventions remain key challenges. The political marginalization is expressed in terms of their absence from policy making, development planning and their issues not being point of discussion in national development discourses. For the last half century, successive Ethiopian national governments have been implementing different pastoral development policies designed within the framework of and driven by agricultural development based on agrarian assumptions (Berihun A., 2016). The policies have been pastoral unfriendly and lack to take into account the unique socio-economic and natural environments they live in, and more importantly their pressing needs and priorities. As a result, the achievements so far have not been satisfactory and demands further understanding of their contexts which informs development policies and strategies. Policies and strategies need to see pastoralism as a potentially viable and sustainable way of life and production system to be improved, not a problem to be solved.

Pastoral lands in Ethiopia are characterized by increasingly unpredictable and unstable climatic conditions and ecological fragility with complex human-environment interaction making pastoralists communities the most vulnerable groups to climate change. Pastoral communities inhabit the Arid and Semi-Arid Lands (ASAL) of the country characterized by inadequate and erratic rainfall conditions. As a result of low and erratic rainfall and high evapo-transpiration rate moisture stress is the major production limiting factor for sustainable crop-based livelihoods and sufficient biomass production for livestock. On top of inadequacy, extreme variability of rainfall across spatial and temporal scales resulted in serious problem of reliability. Climate change and variability severely constrain the productivity of pastoral herds by reducing water availability, forage production and quality, and hence the carrying capacity of rangelands (Megersa *et al.*, 2014). Rangelands have been badly degraded by decades of droughts and heavy pressure from growing human and livestock Populations (Coppock *et al.*, 2014).

Pastoral areas have come highly vulnerable to recurrent droughts that resulted in deteriorating livelihood conditions. Coupled with non-climatic factors such as political instability, the increasingly frequent and severe droughts have resulted in lower food and nutrition security, rampant poverty and diminished household economic assets which eroded capacity for future resilience and adaptation (Firehiwot and Yonas, 2015). Pastoralist areas in the country are also the most deprived areas in terms of access to social services and

infrastructures which necessitates significant investment. Poor market linkages, lack of access to rural finance facilities, recurrent violent conflicts, limited alternative livelihood opportunities, and poorly developed rural infrastructures including water resources makes life so challenging for pastoral communities to realize their vision for prosperity. Weakening traditional resource governing institutions, limited cross-border movements and governmental development interventions such as expansion of irrigation agriculture and sedentarization projects worsen the situation.

For so long, the GoE with its partners have been responding to drought emergencies which undermined resources available for development programs. Following the 2011 severe drought and its devastating impacts on pastoralist livelihoods in East Africa region, the Heads of States of the IGAD Member States launched a regional strategy called the IGAD Drought Disaster Resilience and Sustainability Initiative (IDDRSI), in November 2011 in Nairobi. In collaboration with development partners, member states including Ethiopia committed themselves to ending drought emergencies by putting in place the necessary investment that enhances pastoral communities' resilience to droughts. The Ethiopian government was also among signatories which committed itself to enhance coordinated investment in pastoral areas aimed at ending drought emergencies through building resilience and sustainable livelihoods.

Through the IDDRSI initiative, Ethiopia invested on the Regional Drought Resilience and Sustainable Livelihood Program (2013-17) through allocating resources with support from its development partners. The DRSLP I benefited hundreds of thousands of pastoral households and communities living Afar, Oromia, Somali and SNNP regions. In addition to the DRSLP I, it initiated and implemented various resilience building projects and programs targeting pastoral communities though the investment remains insufficient as compared to the scale of the problem. Therefore, under the auspices of IGAD's 2019-2024 RPP and in collaboration with its development partners, the GoE is working towards the second phase of DRSLP which aimed at building on gains of DRSLP I through which it identified several strategic interventions that further builds up resilience and sustainable livelihoods for pastoral communities and their institutions.

## **1.2 Description of the Project**

The Drought Resilience and Sustainable Livelihoods Program (DRSLP) is a multi-national investment program developed by the African Development Bank in collaboration with IGAD Member States and the IGAD Secretariat. DRSLP is aimed at addressing the negative impact of recurrent drought and climate change in the Horn of Africa (HoA) Region; and its primary goal is to contribute to poverty reduction, increase food and nutrition security, build drought resilience and accelerate sustainable economic growth among the pastoral and agro-pastoral communities in the HoA region including Ethiopia. The DRSLP is initiated and being implemented within the framework of the IGAD Drought Disaster and Sustainability Initiative (IDDRSI), under the general leadership and coordination of the IGAD Secretariat.

With financing from the AfDB, the implementation of the initial phase of DRSLP started in 2013; and has so far involved the commitment of USD300 million to support the execution of resilience-enhancing projects in 6 IGAD countries - Djibouti, Eritrea, Ethiopia, Kenya, Somalia and Sudan. The first phase of the program made investment across 30 drought hit districts across Afar, Oromia, Somali and SNNP administrative regions. Despite the investment in its first phase, the scale of vulnerability problem remains so high which calls for more investment and efforts to build pastoral communities' resilience. In this regard, the GoE acknowledges the existing resilience capacity gap and the need for putting more efforts in partnership with its development partners. Following several consecutive years of below-normal rainfall, the HoA region

including Ethiopia is again facing a severe widespread drought that has already triggered both national and regional humanitarian crisis with food insecurity and devastated livelihoods. A significant and lasting improvement in the resilience of people in Ethiopia and the HoA region requires not only significant investment but also the widespread adoption of approaches, practices and climate-smart and innovative technologies expected to change behaviours.

It is widely agreed that a sustainable solution to food and nutrition insecurity in pastoral regions in Ethiopia and the HoA region requires improved resilience to climate change, long-term financing of the agricultural sector, and trade development and regional integration. By making sustained, longer-term investments in household resilience, the costs of emergency assistance will be significantly reduced, more resources left for development programs and the cycle of recurrent famines will be broken. This is the most economical intervention option and meets the vital needs of the people of Ethiopia and the HoA region. The IGAD Secretariat has made consultations with IGAD Member States and confirmed that all IGAD Member States have expressed willingness to commit further investment in support of resilience-enhancing projects in the next phase of DRSLP. The second phase of DRSLP aims to build on the progress so far been achieved and leverage the lessons learnt, cover more areas, sectors and investments; and contribute to the consolidation of the objectives of IDDRSI as in the national CPP. The HoA Program has a multinational character with an ambition of regional integration through consultation and cooperation between the member states of IGAD. Its implementation will be based on the participatory approach and on decentralization through the close involvement of the actors concerned, and more particularly the beneficiary populations, based on the definition of the needs and priorities of the intervention areas communities. The national component is part of the regional program which has a geographic focus in 7 IGAD member countries.

### **Program Components**

The program has 4 components and 9 sub-components followed by major activities and sub-activities to achieve abovementioned overall and specific objectives. To achieve these objectives, the HoA Program is structured around the following four components.

- 1) Strengthening the resilience of drought prone areas and pastoral and agro-sylvo-pastoral production systems to climate change,
  - a) Sub-component 1 - Sustainable agricultural land management and sustainable management of pastoral lands,
  - b) Sub-component 2 - Agricultural infrastructure - adapting farming systems to climate change, pastoral infrastructures and economic diversification, and
  - c) Sub-component 3 - Promotion and diffusion/vulgarization of climate smart agriculture technologies, knowledge management and technology transfer and improved nutritional status of households.
- 2) Supporting agrobusiness development
  - a) Sub-component 1 - Access to advisory services, financing and markets,
  - b) Sub-component 2 - Supporting development of entrepreneurship, and
  - c) Sub-component 3 - Promoting domestic bio-digesters and solar energy.
- 3) Strengthening adaptive capacity to climate change
  - a) Sub-component 1 - Development of climate services,
  - b) Sub-component 2 - Building capacity of main stakeholders in the agro-pastoral sectors in the drought prone areas for mainstreaming and monitoring climate change, and
  - c) Sub-component 3 - Strengthening the operational capacity for resilience.
- 4) Program coordination and management

This component will ensure the effective and efficient regional management of the program by the IGAD/IDDRSI Platform Coordination Unit (PCU). It also includes management of national components at national and sub-national levels to achieve the expected outcomes of the Program. It includes the implementation of regional and national coordination of the Program, technical and financial management, supervision of activities, monitoring and evaluation and annual audits.

### **Beneficiaries and Stakeholders of The Program**

The main stakeholders/beneficiaries of the DRSLP II Program are:

- the pastoral and agro-pastoral communities and their local institutions in 30 districts across 4 administrative regions,
- national institutions which directly or indirectly engage in building resilience and supporting the economic and environmental development of pastoral communities in the program intervention area, and
- the National Focal Structures (SFN) which is the Ministry of Agriculture in Ethiopia,

### **1.3 Study Objectives**

The general objective of this pre-investment feasibility study is to assess the viability of the HoA Program through feasibility studies; institutional, social and environmental analysis across the entire value chain; programming of investments and presentation of projects; constraints and opportunities for implementing program components; proposal for improvements, including recommendations on the roles of regional, national and subnational government agencies and prepare a sector investment program to address constraints.

The specific objectives of this feasibility study of the proposed national program are,

- to assess and confirm the technical, economic and environmental feasibility of the proposed program activities across the four program components at the national level, and
- to prepare a national sector development program to improve food and nutrition security in Ethiopia as part of the Horn of Africa regional program for possible African Development Bank (ADB) financing.

### **1.4 Rationale for the Program/Study**

#### **1.4.1 Rationale for the program**

Following several consecutive years of below-normal rainfall, the HoA region including Ethiopia is again facing a severe widespread drought that has already triggered a regional humanitarian crisis with food insecurity and devastated livelihoods. A significant and lasting improvement in the resilience of people in Ethiopia and the HoA region requires not only significant investment but also the widespread adoption of improved approaches, practices and climate-smart and innovative technologies expected to change behaviors and actions. It is against this background that the Heads of States of the IGAD Member States launched a regional strategy called the IGAD Drought Disaster Resilience and Sustainability Initiative (IDDRSI), in November 2011 in Nairobi, to ending drought emergencies in the IGAD region including Ethiopia collaboration with development partners such as African Development Bank.

A sustainable solution to food and nutrition insecurity in the HoA including Ethiopia requires improved resilience to climate change, long-term financing of the agricultural sector, and trade development and regional integration. By making sustained, longer-term investments in household resilience, the costs of

emergency assistance will be significantly reduced, more resources left for development programs and the cycle of recurrent famines will be broken. This is the most economical intervention option and meets the vital needs of the people of the HoA including vulnerable communities in arid and semi-arid lands in Eastern Africa where the proposed 30 districts across the four regions are part and parcel. It is within this framework that the DRSLP is initiated and designed. The purpose of the program is to contribute to poverty reduction, food security and accelerated sustainable economic growth in the HoA through enhanced rural incomes. The main objective is to enhance drought resilience and improve sustainable livelihoods of the communities in the ASAL of the HoA. Participating countries including Kenya, Ethiopia, Djibouti, Sudan, Eritrea and Somalia.

#### **1.4.2 Rationale for the feasibility study**

Multi-sectoral projects and programs often come up with development outcomes, both desired and undesired, with wide ranging implications for the target beneficiaries' economy, the natural environment and social systems. In particular, such big longterm investments in such multisectoral programs need a pre-investment or feasibility study through making an objective and rational assessment of the practicality of proposed activities preceding the technical development and project/program implementation. It is therefore against this background that the feasibility study was initiated and conducted in order to confirm the technical, economic and environmental feasibility of this national project.

#### **1.5 Study Phases**

The feasibility study was conducted through 4 successive phases which eventually led to the development of the national technical/economic feasibility study and ESIA reports. These are - i)Documentary study and making contact with stakeholders, ii)Visit to the proposed program intervention area, iii)Preparation of technical and economic feasibility and ESIA reports, and iv)National validation workshop.

##### **Phase I - Documentary study and making contact with stakeholders**

The first phase of the feasibility study involved review of program related documents, and discussions with key stakeholders at different levels of government. Review and analysis national policies and strategies, regional drought response strategies, agricultural development strategies and programs were reviewed to make sure that the program under consideration aligns with thematic focus, objectives and goals of these initiatives. Accordingly, the IDDRSI Country Programming Paper, National Adaptation Plan/National Climate Change Action Plan, IDDRSI Regional Initiative, Feed-Africa Strategy and CAADP program documents were reviewed which proved strong alignment of this proposed program. Moreover, progress and performance review reports of related national resilience building projects were conducted in order to get background information on different aspects of the proposed program. In addition to this, discussions with key stakeholders including the DRSLP I national team, Ministry of Agriculture, and regional level administration officials was conducted and their views and feedbacks were captured.

Phase II - Visit to the proposed program intervention area was made by the feasibility study's country team covering wide range of thematic expertise. The feasibility study team conducted a field visit to 8 sample selected districts from across the 4 IGAD clusters each represented by two districts. These eight districts represent 4 administrative regions - Afar, Somali, Oromia and SNNP. During the field visit to the proposed intervention area districts, major stakeholders including administration officials from regional, zonal and district levels of government were consulted, and insights and feedbacks received. Moreover, relevant experts at the district level from different sectoral bureaus were interviewed using a questionnaire prepared for data

collection. (See annex iv for list of contacted persons during the field visit). Moreover, secondary data related to human and livestock population, land use, animal health and rural infrastructures were collected from

**Phase III - Preparation of reports and annexes for the country components and the regional component**  
Based on data and information obtained from document review, secondary data collection and major stakeholders view, the country team prepared the national Economic/Technical feasibility study report. With contributions from different thematic experts within the country team, this report was prepared based on the Table of Contents agreed by this FS project team leaders, regional thematic experts, country team leaders and national experts across the seven program countries.

**Phase IV - National validation workshop for the various reports**

A virtual national stakeholders validation workshop was conducted on 28 July 2021 whereby the FS findings were presented and feedback on different aspects of the report were received from the workshop participants.

### **1.6 Objectives of the DRSLP II and Presentation of the Report**

The national component Resilience Building in Food and Nutrition Security Program has well defined overall and specific objectives shared across the program countries including Ethiopia (Further information can be obtained on annex ii).

#### **Overall objective**

The overall objective of the national program stated on the ToR and defined by the AfDB project identification mission of June 2019 is to -

- contribute to improving the living conditions of the populations and food and nutritional security in selected program intervention areas 30 districts across the four administrative regions

#### **Specific objectives**

The three specific objectives of this Resilience Building in Food and Nutrition Security Program are to -

- Increase, on a sustainable and resilient basis, the productivity and production in agro-sylvo-pastoral systems in the selected program intervention areas across the four regions,
- Increase income from agro-sylvo-pastoral value chains, and
- Strengthen the capacity of pastoral and agro-pastoral populations to better adapt to the risks of climate change.

This national report presents the different aspects of the program including general contexts of the program, and findings of the technical and economic feasibility study conducted with a geographic focus in Ethiopia. Chapter one presents the overall context of the program, study objectives and methodology of this study. It also outlines the four study phases the FS went through to finally deliver this output report. Chapter two, explains, how the proposed program aligns with different national and regional policies, strategies and initiatives with focus on drought risk management, smallholder agriculture development and overall poverty reduction strategies. Chapter three explains key lessons drawn from other similar projects including the first phase of the DRSLP project being implemented across four regions. The thematic areas from which lessons were draw cover agriculture, livestock husbandry, water resources management, climate adaptation and natural resources management.

Chapter four characterizes the program intervention area in terms of demography, climate, vegetation, social institutions and etc to give the overall picture of the intervention areas. Chapter 5 examines the political, and institutional frameworks for natural resources management and climate resilience in pastoral and agro-pastoral systems of the country. The sixth chapter analyzes the opportunities and challenges for exploitation of natural resources for building resilience among vulnerable pastoral and agro-pastoral communities in the proposed program intervention areas. Chapter 7 outlines the program components including proposed activities of intervention, implementation strategy and expected results from implementation of this national program. Chapter eight states the intervention approach the program implementation should follow and major stakeholders that would be part of the program planning, implementation, monitoring and evaluation in order to deliver the results.

Chapter 9 outlines the detailed cost of the program by component, sub-component and activities with estimated total cost of the program. Chapter 10 outlines the economic and financial analysis of alternative program interventions and identification of economically feasible options. Chapter 11 states the approaches to ensure sustainability or longterm continuation of the program infrastructures and results so that the benefit lasts beyond the proposed program lifetime. Moreover, it outlines, the exit strategy for program funders and implementers once the program phases out. Chapter 12 outlines the potential risks and on the success of this program and necessary risk minimization and mitigation measures so that the project results are delivered on time and within budget. Chapter 13 lists the list of program goods and services to be generated from this program for major beneficiaries (pastoral and agro-pastoral communities) and other stakeholders. Chapters fourteen and fifteen presents the bibliography referred in this feasibility study and additional materials that provides more information to the reader.



## **2. ANCHORING WITH EXISTING POLICIES AND STRATEGIES**

### **2.1 Country Programming Paper**

Following the 2011 severe drought in East Africa region, the Heads of States of the IGAD Member States in November 2011 consulted and launched a regional strategy called the IGAD Drought Disaster Resilience and Sustainability Initiative (IDDRSI) in Nairobi, Kenya. With endorsement of the IDDRSI, Member States of IGAD and international community have shown a strong commitment to focus on programs that will strengthen medium- and long-term resilience to disaster and ensure that the next disaster does not result in another crisis. The overall goal of the initiative, which is being implemented in three five-year phases, is drought disaster resilient communities, institutions and ecosystems in ASALs of the IGAD region achieved by 2027. The IDDRSI strategy launched in 2013, led to the development of Country Programming Papers (CPPs), which translated the regional resilience programming principles into country contexts which in Phase I identified seven priority interventions areas (PIAs). Accordingly, the Ethiopian government has developed its own CPP that guide investment and intervention to build resilience and ensure sustainable livelihoods for marginalized communities in pastoral and agro-pastoral areas under the framework of IDDRSI.

The Government of Ethiopia through its Ministry of Agriculture (a national IDDRSI coordinating ministry) has prepared Country Programming Paper, the first in 2012 and the second and revised one in 2019, to serve as a Framework for longterm investment and intervention in pastoral and agro-pastoral communities in a more coordinated and development policy aligned manner. The second CPP of Ethiopia identifies eight PIAs intended to facilitate coordination of the programs to ending drought emergencies both at country and regional levels. The 8 identified PIAs are - 1) Natural resource and environmental management, 2) Market access, trade and financial services, 3) Enhance production and livelihood diversification, 4) Disaster risk management, 5) Research, knowledge management and technology transfer, 6) Peace building, conflict prevention and resolution, 7) Coordination, institutional strengthening, and partnership, and 8) Human capital, gender and social development. Though the PIAs are related and complementary to each other, their designation was intended to ensure alignment with national development policies and facilitate coordination of the different programs to ending drought emergencies both at country and regional levels.

The proposed DRSLP II program therefore has interventions streamlined in 4 interrelated and complementary program components - i) Strengthening the resilience of drought prone areas and pastoral and agro-sylvo-pastoral production systems to climate change, ii) Supporting agribusiness development, iii) Strengthening adaptive capacity to climate change, and iv) Program coordination and management. The DRSLP II 1<sup>st</sup> program component is strongly aligned with PIAs 3, 1 and 4; the 2<sup>nd</sup> component with PIAs 2, 5, 4 and 8; the 3<sup>rd</sup> with PIAs 4, 5 and 6; and the 4<sup>th</sup> with PIAs 7, 8 and 5. Though the degree of alignments of the 4 program components with PIAs in the CPP varies, each component contributes directly or indirectly to the different PIAs. Moreover, the DRSLP II program objectives align with the vision of the GoE's National Policy and Strategy on Disaster Risk Management which envisions to see enhanced capacity for withstanding the impact of hazards and related disasters is built at national, local, community, household and individual levels; and damages caused by disasters are significantly reduced by 2023.

### **2.2 National Adaptation Plan/National Climate Change Action Plan**

In response to decision of the 7<sup>th</sup> Conference of Parties (CoP7) of the UNFCCC, the Government of FDRE through its Ministry of Water Resources and National Meteorological Agency prepared the country's Climate Change National Adaptation Programme of Action (NAPA) in 2007. The adaptation plan was submitted to

UNFCCC for consideration towards potential mobilization of financial resources through newly established funding mechanisms namely the Special Climate Change Fund, the Least Developed Countries Fund and the Adaptation Fund. The NAPA, which followed a project approach, identified 20 multisectoral priority project ideas that aimed to address immediate climate change adaptation gaps and needs of the country in different sectors. The project ideas focus in the areas of human and institutional capacity building, improving natural resource management, enhancing irrigation agriculture and water harvesting, strengthening early warning systems and awareness raising.

As a follow up to and building on experiences from NAPA, the Ethiopian Programme of Adaptation to Climate Change (EPACC) was developed in 2011 with a more programmatic approach to adaptation planning and implementation. The programme aimed at integrating climate change adaptation into national/sub-national and sectoral plans which cover agriculture, water, energy, forestry, health, education, infrastructure, integrated DRM, culture and tourism, gender and children, integrated waste management and wildlife sectors. Therefore, the proposed DRSLP II program components and activities strongly align with EPACC's proposed priority adaptation options within agriculture, water, forestry, DRM, gender and children sectors which potentially creates synergy. In particular, the DRSLP II program objectives and interventions under components 1 (Strengthening the resilience of drought prone areas) and 3 (Strengthening adaptive capacity to climate change) strongly align with EPACC's program objectives and interventions with focus on agriculture, water resources and forestry sectors.

Subsequent to the development of EPACC, the Ministry of Agriculture and Natural Resources in 2011 has endorsed a sectoral initiative titled the Agriculture Sector Programme of Plan on Adaptation to Climate Change (APACC) to mainstream climate adaptation in agriculture sector development plans at different levels of government and build farming systems well adapted to changing climatic conditions. The APACC gave emphasis to appropriate adaptation response measures in crop, livestock and forest subsectors which need to adapt to changing climatic conditions ensuring co-benefit of adaptation and productivity enhancement. The strategies and programmes implemented have recognized the peculiarities of agroecological zones of the country across sufficient rainfall areas, Moisture stress areas and Pastoralist areas. Therefore, the proposed DRSLP II objectives, components and planned activities have very strong thematic and geographical focus of the APACC with emphasis in pastoralist and agropastoralist communities and their predominantly rainfed farming systems. In particular, the proposed DRSLP II components including those with focus on C1. Strengthening resilience, C2. Supporting agribusiness development, and C3. Strengthening adaptive capacity to climate change are key program components that align with potential to create synergy with the sectoral APACC.

### **2.3 Poverty Reduction Strategy**

The Government has been formulating and implementing ambitious and robust policies and strategies since the mid-2000s. Plan for Accelerated and Sustained Development to End Poverty (PASDEP) has been implemented during 2005/06 to 2009/10 followed by the First Growth and Transformation Plan (GTP I) that was implemented from 2010/11 to 2014/15 and GTP II 2015/16-2019/20 respectively. Also Sustainable Development and Poverty Reduction Program (SDPRP) (<https://www.imf.org/external/np/prsp/2002/eth/01/073102.pdf>) developed with the help of World Bank and IMF in 2002 and revised every three years since then for implementation (World Bank, 2020). Ethiopia has achieved strong economic growth and expanded social services over the past decade and half. According to official data, economic growth averaged 10.5 percent between 2003/04 and 2016/17. Real per capita GDP

more than doubled from \$32 billion in 2010/11 to \$81 billion in 2016/17 as a result per capita income also doubled from \$396 to \$862 in the same period.

Poverty reduction in Ethiopia continued despite adverse climatic conditions, with the share of the population below the national poverty line decreasing from 30% in 2010/11 to 24% in 2015/16 (World bank, 2020). In rural areas of Ethiopia, the reduction in poverty was relatively slow with the poverty rate decreasing by four percentage points from 30% in 2010/11 to 26 percent in 2015/16. Non-monetary dimensions of welfare, such as education, health, and access to water and sanitation, improved alongside the reduction in poverty. Access to universal primary education reached 100 percent, health coverage 98 percent, access to potable water 65 percent, life expectancy reached 64.6 years and others. Ethiopia has achieved some of the MDGs well ahead of the 2015 timeline and the latest assessment on the MDGs indicated that six of the eight MDGs are either achieved or on track to be achieved by 2015 (UNDP, 2018).

GOE is also implementing a huge social protection program to help the poor maintaining their livelihood. The Productive Safety Net Program (PSNP) is the largest social protection program in Africa which support close to 8 million chronically food insecure people which has been implemented since 2005 was important drivers of rural poverty reduction. In pursuit of its goal of making Ethiopia a middle-income country by 2025, the Government has been investing heavily in economic and social infrastructure, streamlining the public services, revamping the tax collection system, and supporting small and medium enterprises. It has also prioritized key sectors such as industry and agriculture as drivers of sustained economic growth and job creation. Ethiopia has created an enabling policy environment to effectively implement the SDGs at national and sub-national levels (UNDP, 2018).

#### **2.4 Sustainable Land Management/Land Governance Strategy**

Ethiopian government has adopted Strategic Investment Framework (ESIF) for Sustainable Land Management (SLM) (MoARD, 2010). The objective of ESIF-SLM is to rebuild Ethiopia's natural capital assets by overcoming the causes, and mitigating the negative impacts of land degradation on the structure and functional integrity of the country's ecosystem resources. This policy has been enacted and adopted since 2008. Sustainable Land Management linked to government strategies and policies for agricultural development, food security and poverty alleviation program. Nationally, ESIF for SLM linked to the Plan for Accelerated and Sustainable Development to End Poverty (PASDEP), a five years strategic plan, which was adopted and implemented from 2006-2010 (MoFED, 2006). Improving the natural resource base was identified as one of the three PASDEP focal areas. The scope and effect of ESIF for SLM has progressively grown via adopting it in the consecutive Growth and Transformation Plan (GTP I and II) of the country that extended from 2010 to 2020. In Ethiopia, both the Federal and the Regional governments have consistently shown a strong commitment to address the issue of land degradation. There is a profound national and regional sense of urgency as Ethiopians become more and more aware of the imminent and serious ecological threats posed by land degradation and the subsequent negative impacts to national development and livelihoods (MoARD, 2010).

The inclusion of several articles in the federal constitution of 1995 demonstrates the commitment of the country to environmental issues. For example, Article 44 of the constitution guarantees the right to live in a "clean and healthy environment," and Article 92 requires that the design and implementation of programs and projects of development shall not damage or destroy the environment. Numerous other policies and

strategies were developed as well as adopted by the government of Ethiopia such as the “Conservation Strategy of Ethiopia” (CSE) developed in April 1997 with the help of the World Conservation Union (IUCN); the National Action Program (NAP) to Combat Desertification was originally prepared in 1998 and was reviewed and updated in 2007, and advocated a five year (2007-2012) action program involving a range of activities related to managing natural resource. Other environmental strategies and policies include - (i) the 20-year Ethiopian Forestry Action Program (EFAP) formulated in 1994; (ii) the Ethiopian Water Sector Strategy formulated by the Ministry of Water Resources in 2001 and its 15 year (2002-2016) water sector development program; and (iii) the Ethiopian National Biodiversity Strategy and Action Plan prepared in 2005 in fulfilment of the country’s obligations following ratification of the UN Convention on Biodiversity.

Further, Ethiopia played an important role in the formulation of the strategic framework document of the New Partnership for Africa’s Development (NEPAD). NEPAD was formally adopted in July 2001, and is an African driven initiative designed to address the current challenges facing Africa. The challenges and options for change in the agricultural sector are set out in the NEPAD Comprehensive Africa Agriculture Development Program (CAADP). This recognizes that combating poverty and underdevelopment requires an expansion of the area under SLM. One of the focus area of CAADP was extending the area under SLM and reliable water control systems (MoARD, 2010). CAADP’s first pillar is directly concerned with SLM and aims to: (i) reverse fertility loss and resource degradation, and ensure broad-based and rapid adoption of sustainable land and forestry management practices in the small-holder as well as commercial sectors; and (ii) improve management of water resources while expanding access to irrigation. Overall, the ESIF for SLM (MoARD, 2010) is a comprehensive strategy anchored in national, regional and global policies and strategies adopted for natural resources management, conservation of biodiversity and combating desertification with its considerable achievements.

An important factor that allows or motivate land users to develop and ensure the productive potential of the land is tenure security. Land tenure right permit the right and interest to manage the land over a long period. In Ethiopia the right to own the land is exclusively vested on state (EFDR Constitution, 1995; Shapiro *et al.*, 2015). However, according to Article 40 (4) of the constitution, farmers have usufructs - to use, manage and transfer the land to the family members or other lawful heirs. Likewise, Article 40 (5) of the country’s constitution declares that Ethiopian pastoralist have the right to free land for grazing and cultivation as well as the right not to be displaced from their possession. As to the land governance, Federal and Regional Land Administration and land use proclamations provide unlimited period of use right to farmers, pastoralist and agropastoralist (Federal Negarit Gazeta, 2005).

Essentially, Ethiopia has ten regional states and two city administrations. Regional states are responsible to manage land and other natural resources. At local level, both customary and formal laws are interchangeably used for land administration. However, urban land and agricultural investment lands greater than 5,000 hectare is governed by federal government (Hailu, 2016). According to his assessment, communal land and pastoral community area registration and certification was not conducted. Also, land in Ethiopia has been used without having comprehensive land use policy, rural land use planning and communal natural resources management for sustainable development (MoA, 2020; Hailu, 2016). Such prevailing gaps give ways for encroachment of communal natural resources such as forest, wetland, etc. The lack of an integrated planning framework for land directly associated by poor management, less empowerment and involvement of stakeholders in the planning and management process. In line with Hailu (2016) assertion, the tenure system in the pastoralist and agropastoralist area is different and requires policy definition of group (clan) right for

effective formalization of tenure security. Obviously, insecure communal land tenure and land rights in the dry lowlands may aggravates land degradation. According to PPAR (2020) tenure insecurity undermines land users' incentives to invest in SLM practices. The precedence of this activity necessitates promotion of land registration and certification in the new project intervention regions and woredas.

### 3. MAIN LESSONS FROM PREVIOUS PROJECTS AND PHASE I

#### 3.1 Agriculture, Livestock, Fisheries and Related Value-chains

**Bush encroachment** - Rangelands are the main source of feed which globally contributes to about 70% of the feed needs of domestic ruminants and 85% of the total feed needs of ruminants in African and South American countries (Holechek et al. 2005). In Ethiopia, rangelands account for more than 60% of the country's total landmass (Hogg, 1997). Grazing and browsing animals mainly utilize many species of trees, herbacious legumes, and grasses. The main feed resources used for livestock feeding in the area are natural pastures (herbaceous vegetation composed mainly of grasses and forbs and browses (shrubs, tree leaves, and pods). To this effect, there are some grass species known for their palatability and enhancing high milk and butter production. Among others grass species such as *Cenchrus ciliaris* (African fox-tail), *Cynodon dactylon* (Bermuda grass; , *Pennisetum mezianum* (Bamboo grass) , *Enteropogon somalensis*, (horse tail), *Sporobolus* sp., *Eragrostis* sp., *Digitaria neghellensis* , *Alchiso* (vernacular) and *Heteropogon contortus* are to mention a few (Adugna and Aster, 2007).

In contrast to this, sustainable utilization, these feed sources are heavily encountered by invasive species in the ecosystem. These unpalatable species have contributed adversely to reducing animal production and productivity both in terms of quality and quantity parameters. Research done by (Worku & Lisanework, 2016) revealed that a positive correlation between increasing coverage of bush encroachment and mean daily milk yield of livestock (i.e. cattle, goat, and camel). Pastoral producers also perceived the impact of bush encroachment on livestock population trends and milk production and thus applied different adaptation strategies (like feed supplementation and mobility). The government and other development partners have made vital contributions to control the invasion these species of to the extent possible. However, there is still a gap in addressing the problem to the required level. DRSLP I has attempted its best to control the problem through relevant approach. Its coverage in terms of vertical and horizontal coverage is so insignificant.

**Disease and parasites** - Areas controlled and utilized by pastoralists are prone to different animal diseases that are responsible for low productivity of animals, and economical loss encountered due to the high rate of animal mortality and morbidity. The contribution of the livestock sector to the national economy is minimal compared to its potential. One of the main reasons of this mismatch between population size and production output from livestock in Ethiopia is the widespread occurrence of many infectious and parasitic diseases. According to (MoA & ILRI 2013) the annual loss due to mortality ranges from 8–10% for cattle, 12–14% for sheep, 11–13% for goats, and 56.9% for poultry. These figures are much higher for calves, lambs, and kids. The direct and indirect losses from livestock disease have important economic, food security and livelihood impacts on livestock keepers and the national economy. As compared to other parts of the country, the incidence and devastating effects of the animal disease have a pronounced manifestation in pastoralist areas. Disease like anthrax, Lump skin disease, contagious pluro bovine and pasturullois, trypanosomes, and a wide range of internal and external parasites are common in the area under study.

Cognizant of this assumption, the Government of Ethiopia (GoE) and other stakeholders have done their best at least to reduce the devastating effects of these diseases. Especially critical consideration was given to pillars of strategies as means to archive the targeted objectives. Among the intervention areas were, Strong livestock disease surveillance system, mitigating climate impacts of animal disease, focus on eradication and controlling of animal diseases with livelihood and trade importance, improved veterinary public health,

improved quarantine, and inspection system and strengthen the legal frameworks are among the 18 strategic areas that the GoE planning and implementing. Most specifically, the attempt done to strengthen the veterinary service through the deployment of Community Animal Health Workers (CAHW) has brought a significant contribution in designated pastoral areas. These paraprofessional animal health workers have contributed a significant role in vaccination, disease control, and prevention.

During DRSLP I, the project managed to intervene by establishing & rehabilitating animal health posts, capacitating animal health workers, training of CAHWs, and upgrading regional laboratories and animal health-related activities. However, due to huge area coverage and other related barriers it impossible to cover all geographical areas considered as pastoral areas. Furthermore, lack of Veterinary medication, the inability of animal health workers to reside around their posts, and allocation of certain facilities for uncommission activities were among the constraints observed during DRSLP I.

**Animal feed** - Rangelands in many pastoral areas are known for their biomass in a different season of the year. There is also noticeable seasonal variation in availability and quality of feed resources due to pronounced seasonal variation in rainfall distribution. The availability of feed resources (grasses and browses) is adequate during the rainy season. However, the grasses become depleted during the dry season. The over-mature dry grasses also have very low nutritive value. The situation is further aggravated when the dry season is prolonged. Thus, when the dry season is prolonged or during drought years, animals become unproductive, lose condition and market value and eventually die due to inadequate feed and water supply and the very low nutritive value of the available feed. The over-mature dry grasses are characterized by low nutrient content, high fiber content, low digestibility, and low voluntary intake by animals.

The pastoralists have an indigenous mechanism of coping with the problems of feed and water shortage during the dry season and drought years. When grasses become depleted from the grazing land, they lop the leaves and branches of trees and feed their animals. Acacia pods are also used as important sources of dry season feed for goats, camels, and cattle (Tolera & Abebe, 2007). In addition to culturally existing grazing land management mechanisms that have existed for a long period, it is so important to introduce modern rangeland management techniques that fit the values and norms of the community. Besides, government experts and other stakeholders are expected to create awareness to the respective pastoralist about destocking and restocking to be held in times of feed shortage or otherwise. By maintaining the carrying capacity of the rangelands, it would be possible to utilize the feed resource sustainably without interruption,

As discussed by Nigus (2017), rangelands can be upgraded using different strategies. Application of proper pasture management, proper stocking and seasonal grazing, seasonal distribution of grazing land and pasture rotation among strategies are to be considered in rangeland development programs. The same source reveals that, in addition to the rangeland management programs, strategies like under sowing, over sowing, intercropping, back yard forage development & mixed forage and pasture development, and strip planting could complement and supplement the rangeland management plan. In addition to these interventions, the multiplication and distribution of drought-tolerant and quality grass, legumes, and tree fodders should be one area of intervention. This could be happening by establishing different nurseries and multiplication centers for seeds, cuttings, and seedlings.

**Index-based livestock insurance** - In pastoralist areas of Ethiopia where livestock mortality is common due to feeding shortage and animal disease and parasites, an Index-based livestock insurance system can be a

mechanism through which a lost stock of animals can be replaced. The Index-Based Livestock Insurance (IBLI) product controls the strong correlation between a remotely sensed vegetation index and livestock losses associated with forage shortages to offer insurance coverage to pastoralists in regions without access to conventional insurance products (Jensen et al., 2015). The experience that we had from the feed the future innovation has already made groundbreaking contributions to strengthening the resilience and economic viability of pastoralists in East Africa. This project explored index insurance contracts in which payments are based on an easily observable index that is correlated with, but not identical to individual loss (Feed the Future, 2019).

Scaling up the practice of IBLI to the pastoral areas will benefit the community at large by creating stability in their livelihood. It also complements with a culturally existing reciprocal support system as that of *bussa gonofa* in Borena. GoE and other financial institutions are so keen to implement the system in a wider scale to benefit pastoralists who repeatedly lose their stock due to drought and other related factors. As indicated in DRSLP report, there a start in this regard, and the problem further calls the expansion IBLI to the wider areas in the upcoming projects.

### **3.2 Climate Information and Services**

Climate Information Services (CIS) which refers to the packaging and dissemination of climate information to specific users, is vital in supporting well informed and evidence-based response to climate change. In countries like Ethiopia with important climate sensitive sectors, robust climate information can safeguard the economic gains and advances in social development witnessed over the last three decades. Ethiopia's core economic sectors such as agriculture are highly vulnerable to the impacts of climate variability and change which use of CIS will minimize or avoid the risk. However, efforts to adapt in many African countries including Ethiopia are hampered by a lack of access to tailored and timely weather and climate information (Vogel *et al.*, 2019). The capacity to generate, translate, transfer and use climate information has been greatly limited due to a number of economic and institutional factors.

CIS generally help countries, communities, various users and actors in order to better manage the risks of climate variability and change at different levels of decision-making including farms. Farming communities in Africa and Ethiopia for so long relied on indigenous knowledge and innovation systems to identify climate trends and potential impact, and put in place affordable adaptive measures. Such endogenous knowledge systems have helped traditional communities to creatively live with varying and changing climatic conditions (Debela et al., 2020). However, with increasing importance and urgency of the climate change challenge and its impacts, the need for actionable climate knowledge and information to inform policy and practice has similarly emerged as a priority. In this regard, climate services have been growing worldwide including in Ethiopia, with the proliferation of several initiatives directed at developing the capabilities for climate information and services.

Climate information services in Ethiopia rarely exist while those rare ones are project-based initiatives which are short-lived and lack sustainability (Table 1). In 2018, as part of the Global Framework for Climate Services (GFCs), Ethiopia established National Framework for Climate Services (NFCS) which is a coordinating mechanism that enables the development and delivery of climate services at the national level. This is an important milestone as to create the institutional framework and mainstream CIS in development planning at different levels. There are also project based initiatives on CIS often externally funded and with



sectoral focus including Enhancing National Climate Services (ENACTS), and Climate-Smart Villages (CSVs) (Table 1).

Table 1: Summary of key climate information service initiatives in Ethiopia

<b>Title</b>	<b>Duration</b>	<b>Sectoral focus</b>	<b>Aim</b>	<b>Implementing agency</b>
Enhancing National Climate Services (ENACTS)	2008-2011	Agriculture, water, and public health	To support decision-makers in climate-sensitive sectors by filling spatial and temporal gaps in existing climate observations and providing an array of derived products available to users through the Internet.	Ethiopia National Meteorological Agency (NMA)
Climate Information Services for Community-Based Adaptation to Climate change	2015-2017	Pastoral and agro-pastoral systems	To improve the management of climate risks through improving access to relevant and up-to-date climate information	CARE International
Climate-Smart Villages (CSVs)	2017-2019	Agriculture and Food Security	To enhance local actions that ensure food security, promote adaptation and build resilience to climatic stresses, and scaling up successful innovations.	CGIAR Research Program on Climate Change, Agriculture and Food Security
Strengthening climate information and early warning systems in Africa for climate resilient development and adaptation to climate change in Ethiopia	2013-2016	Multi-sectoral	To strengthen the capacity of the GoE to observe, analyse and forecast climate information to enhance their early warning systems and inform climate resilient development and adaptation to climate change	United Nations Development Programme (UNDP)

No doubt, climate information service has become a key tool to deal with the challenges climate change pose on lives and livelihoods. Notwithstanding, the wide range of existing constraints to deliver timely and quality climate services in Ethiopia, more efforts are needed to ensure and enable users with the necessary information. Value chain approach to CIS is a key and much needed that promote active involvement of the actors at different points of the value chain including production, processing, communication and use of the actionable climate knowledge and information.

### **3.3 Environment, Gender and Social Development**

Pastoral and Agro-pastoral development projects have been implemented in Ethiopia since some decades back. Third Livestock Development Project (TLDP) are a first type for being large-scale pastoral development project in Ethiopia financed jointly by the GoE, the African Development Fund, and the World Bank. It was design based on experience and lessons learned from two previous smaller-scale pastoral development projects (Arero Range Pilot Project - ARPP 1965-75 and Second Livestock Development Project, SLDP 1973 - 1981) (Gebremeskel et al., 2019). The major lesson took from ARPP and SLDP includes failure to consult and participate pastoralists and other users along the value chain, and the livestock commercialization activity was overlooked the conflict of interest and resource conflict with pastoralists' livelihoods. Both projects also failed to consider the level of awareness of pastoralists toward the market economy including their prior consultation and readiness for integration with the central market.

In approaches most of pastoralist development projects started to be implemented in ASAL areas decades ago were top-down and overlooked the social fabric of herders, their traditional institutions and local values were not considered in the projects' design and implementation (Gebremeskel et al., 2019). So that the major lesson once could took from failed to deliver of pastoral development programs in the 1980's are the project's design process was based on limited knowledge about how the pastoral system functions ecologically, economically, and socially at large. Different activities planned under each component were also unlikely to be implemented in time because of serious capacity limitations and inadequate institutional arrangements. The regional nature of the projects requires implementation of activities across border, peripheral, and remote woredas, where the administrative and institutional capacities are extremely weak accompanied by a poor infrastructure. Contrary to the situations at the ground the implementation of such activities in ASAL area requires staff of high technical calibre and robust implementation capacity (Gebremeskel et al., 2019).

In its current strategy, AfDB identified the engagement with the Government of Ethiopia governed by the principles of (i) aligning with the GTP, the overarching goal of which is economic transformation through agro-based industrialization driven largely by light manufacturing; (ii) selectivity in the choice of intervention focus areas, guided by the High Fives\*<sup>1</sup>; (iii) sustaining results achieved under previous Bank strategies; (iv) seeking complementarity and synergies with other development programs; (v) focusing on the Bank's comparative advantages, and; (vi) championing green and inclusive growth, gender empowerment and private sector development. In AfDB Ethiopia Country Strategy (2016-2020), the bank committed to continue for focusing on infrastructure and governance taking huge infrastructure and governance deficits as main priority rationale. The two focus areas (infrastructure and governance) have strong linkage with agriculture, industry and poverty reduction. Focusing on infrastructure and governance is also consistent with Bank's principle of selectivity and the Regional Integration Strategy Paper (ADB, 2016a)(ADB, 2016b).

AfDB Country Strategic Programs lesson from Ethiopia includes to expanding the successes from areas of infrastructure and governance and remaining selective with a focus on fewer, but big transformative interventions; continuous flexibility in responding to the country's emerging needs; continuous building of implementing agencies' capacity to ensure effective programme implementation; dedication of adequate resources to knowledge products as these contribute to business development and evidence-based policy dialogue; formulating a robust results framework accompanied by strong project monitoring and evaluation and credible baseline data, continuous dialogue with the GoE in setting realistic targets to ensure their achievability, to improve the business climate, deepen the financial sector and promote regional integration.

Lessons from Previous IDDRSI(IGAD, 2021) based projects funded by ADB in Ethiopia pastoral areas include working to improve the institutional capacity at regional and grass root implementing organizations at pastoral community identified as huge potential in backstopping for smooth implementation of planned future project intervention, giving due emphasis for the coordination of different stakeholders at all levels for the greater delivery of projects intended results. project to sustainably Improving the drought and disaster resilience of the pastoralist community should due emphasis on diversifying the livelihoods options of the household and more diversified livelihood options demonstrated greater risk reduction capacities and resilience rather than spending more resources to addressing emergencies who has short life

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<sup>1</sup> (1) Light up & power Africa, (2) Feed Africa, (3) Industrialize Africa, (4) Integrate Africa, (5) Improve the quality of life for the people of Africa

According to field visit observation and stockholders interview the incense and gum resources are available, the community does not use them for its own benefit, as there is a favorable climate and organizing the community (youth) by providing the necessary training, Apart from increasing its income by developing its resources, it has a significant role to play in the future, as it has a significant role to play in environmental protection, climate change and resilience.

Previous work on environmental protection and development in DRSLP-I and similar projects the ecosystem has been improved by diversifying physical and biological activities soil and water conservation infrastructure such as terraces, water harvesting trenches, check dams, and other civil works; enclosures plus livestock land-use rationalization, invasive aliens species management /Prosopis harvesting and making a charcoal/ , gully reclamation, watering points and wells, and sylvo-pastoral management activities) enriching ecosystem services: .improving regulating ecosystem services, ground water recharge, erosion control, pollution reduction; Provide Provisioning ecosystem services: access for water for domestic livestock, forage for livestock's, and has esthetical value. Efforts to develop and disseminate new technologies low carbon energy solutions, such as solar water pumping, biogas in different institutions are a good experience it should be continued to expand in the future. span while it demands more resources(IGAD, 2021). And there is need for the adoption of a regional, watershed based and long term approach, stronger coordination both at regional and national levels, the use and strengthening of country systems, and the need for instituting strong community ownership and implementation structures workable in the context of each country (ADB, 2014).

The DRSLP I, with different program components, has long-term development objective of improving and building the livelihoods and resilience of pastoralist communities in ASALs of Somali, Afar, Oromia and SNNP regional states, so as to significantly enhance pastoralist capacities to withstand the adverse effects of recurring disasters. The DRSLP comprehensive programming approach helps to assist for effectively enhance resilience, combat chronic food and nutrition insecurity, and transform the pastoralist sector into a more viable, integrated, and resilient economic system. DRSLP I experience show the major development in ASAL areas of Ethiopia should focus on water related infrastructures and other project components including rangeland management, livestock productivity improvement, markets, training and livestock health facilities as well as market development should be based its root along the water infrastructures which is identified as center of gravity for the remaining components.

The DRSLP projects' components and activities balanced well both the livelihood and resilience aspects of communities, developing and protecting their resources as well as meeting their basic needs and services. The cross-border dimensions (cross-border trade, managing and mitigating conflict, disaster risk management, and combatting TADs). The strategic investments in market centers and water points are meant to bring harmony among the borderland communities, minimizing conflicts through mutual sharing of vital resources such as grazing and water. Their comprehensive and holistic approach and cross-border dimensions should be taken as a good lesson (Gebremeskel *et al.*, 2019).

### **3.4 Water Related Infrastructural Developments**

The low land Somali, Afar, Oromia and SPNNRS areas are categorize an average rainfall less than 300 mm per year and hot temperature, reaching 32-40°C. Rainfall throughout the region is bimodal, falling during two distinct periods. However, the occurrence of these periods varies, and the region can be divided into four areas based on seasonal rainfall and temperature patterns: *Spring* season occurring from March to May which

have usually small rainfall, and *Autumn* season from September to November which have almost no rainfall. Winter season from December to April categorized dry season and Summer season from June to August have relatively good rain. Most of the region is well-suited to livestock rearing, with camels, goats, sheep, cattle and donkeys owned to varying degrees throughout the region. Hilly terrain covered with thick, thorny brush, which provides good browse for camels and goats, is found in many areas. In other areas open plains with rich grasslands provide ideal grazing opportunities for cattle and sheep.

### **3.5 Sustainable Land and Water Resources Management**

#### **3.5.1 Sustainable land management**

In Ethiopia, numerous technologies and SLM have been adopted in user-friendly manner to agro-ecology and farming system. However, though comprehensive technologies and approaches were developed or adopted, they have been deployed in top-down or technology supply push approach. Rather, it desires tailoring to different situations and needs through consultation and full participation of the target community in bottom-up planning and implementation approach.

Sustainable Land Management is a comprehensive approach, with the potential of making very significant and lasting differences in the near future, and over the long-term (Liniger *et al.*, 2011). Arid and Semi-Arid Land (ASAL) of Ethiopia is vulnerable to the threats of natural resource degradation, recurrent drought, flash floods, crop and livestock pests and disease, pervasive poverty, and food and nutrition insecurity. These threats are posed by numerous agents such as a high population growth rate, reliance on land (grazing and farming) for livestock and crop production, fragile natural resources and ecosystem, severe erosion and land degradation that compounded by variability and change in climate (Leta *et al.*, 2020; Liniger *et al.*, 2011). However, SLM strategy and technologies that widely adopted in humid areas of Ethiopia is in stark contrast to that of the ASALs of the country.

Managing land through SLM address water scarcity, poor soil fertility, deterioration of biodiversity and improve residents resilience to the precarious issues of disasters that could emerge from multiple sources. In ASAL of Ethiopia, improving water retention and its use efficiency take the priority in SLM. Equally important is the management of irrigation water to ensure effective use and arrest the development of salinity that has negative repercussion on crop production and forage development. Rainwater Harvesting technologies, agronomic practices such as conservation agriculture (CA), mixed cropping or intercropping legumes with cereals, crop rotation, agroforestry and improved grazing land management are among relevant practices to mitigate the severity of degradation and drought while building the resilience capacity of the community. Also, short fallowing and the use of organic fertilizers such as composts and bioslurry not only increase soil organic matter (OM) and moisture retention capacity of the soil but also reduce the use of chemical fertilizers at least by half. Therefore, application of ISFM practices have pronounced effects in terms of reducing cost while ensuring the sustainable productivity potential of the soil resources through the accumulation of OM, a store house of plant nutrients (Leta *et al.*, 2020). Also, it is wise to note and include communal as well as private land registration and certification. Since, it served as cross-cutting activities to incentivize and build trust that spurs effective uses and management of natural resources.

In general, the sickness of land, degradation, leads to its demise known as desertification. However, implementation of SLM does arrest/halt the transition of once productive land to desert via ameliorating the issue and build the resilience capacity of the target community. Therefore, the ESIF-SLM (MoARD, 2010) strategy that promotes integration of development and conservation with emergency response is imperative. IDDRSI Program has been designed in line with the Ethiopian government strategic investment framework

for SLM. In SLM that adopted Integrated Watershed Management (IWM) approach, community must co-determine how land should be used. As there is cross-border mobility of the pastoralist community looking for water and pasture, conflict for natural resource is not uncommon. Essentially, conflicts affects intra and inter-national collaboration and harmony amongst people. Therefore, building on the existing institutional framework such as the IDDRIS Platforms, IGAD Steering Committee and Coordination Unit, etc would enables to build sound harmony and tradition of conflict resolution that assure reliable SLM become in place.

As there is no single panacea to address the multiple issues of land users in ASAL, the choice of appropriate SLM technology/practice in a particular situation will be determined by local stakeholders. In line with ESIF-SLM (MoARD, 2010) objective to meet an urgent need to stop and reverse the current serious levels of land degradation and improve farmers, herders and forest resource users livelihoods, identification of strategic technologies/ practices or approaches tailored to the prevailing problems allows to mitigate all negative impacts taking place in the ASAL of Ethiopia and builds resilience to the dry-land ecosystems. To this end, reiterating some lists of useful SLM technologies/practices tailored to dry-land areas that are also already adopted by DRSLP I as well as suggested to be adopted by IDDRSI Program are identified and illustrated in the following section. These are the integrated soil fertility management, conservation agriculture, rainwater harvesting, smallholder irrigation management, biophysical soil and water conservation, agroforestry, agro pastoral system, pastoralism and rangeland management, and capacity building as briefly presented below.

**Integrated Soil Fertility Management** - Integrated soil fertility management (ISFM) aims at managing soil by combining different methods of soil and water conservation practices. It encompasses, introduction of improved and adaptive crop variety to issues of such as heat, drought, salinity, pest and nutrient deficiency. In Dollo-Ado district with altitude of about 180 m asl, lack of relevant and adaptive variety of grain and vegetable crops to the dry lowland was reported in key informant interviews. Therefore, introducing tolerant varieties of crops to disease, pest, salinity and moisture stress is vital. Also, in ASALs, ISFM maximize the use of organic fertilizers such as composts and bioslurry, minimize the loss of nutrients including via crop residue management, use of bio fertilizer for legumes growing in dry areas, and promote legume intercropping with cereals, and apply crop rotation practices. Overall, ISFM promotes application of Climate Smart Agriculture that need to be embraced by the program.

**Conservation Agriculture** - Conservation agriculture (CA) is a farming system that conserves, improves and makes more efficient use of natural resources via integrated management of soil, water and biological resources with principles of minimum soil disturbance, maintaining soil cover and crop rotation. Conservation agriculture helps to build resilience to climate variability (Liniger *et al.*, 2011). It addresses the physical, chemical and biological degradation. Also, CA is suitable for rainfed and irrigated systems including ASAL areas. However, its suitability pronounced in semi-arid areas on sandy loams and clay loams soil other than compacted hard soils. Essentially, drought and land degradation are among the main problems identified in the old and new DRSLP – II intervention areas. Irrigated agriculture has been practiced in Afar and Somali regions along the main rivers of Awash, Wabshebele, Genale and Dawa. Also, crops such as early maturing maize variety and sorghum used to grow in Barey district and other areas of Somali region by rainfed and supplementary irrigation from ground and surface water. In the study regions, sandy loam and clay loam soils are common that suits to put in place and promote CA. Conservation agriculture need to be fostered in the project intervention site with agro-pastoralsystem. To realize CA and improves farmers commitment to invest in it, secured land use right is vital.

**Rainwater Harvesting** - Rainwater harvesting (RWH) refers to all technologies where rainwater is collected to make it available for agricultural production or for domestic uses through its catchment, conveyance and a storage system. It harvests both from micro and macro catchments and is applicable to ASALs that experience recurrent droughts. RWH at larger scale through constructing earth dams and ponds reduces risks of production failure and build resilience to drought emergency and improve crop and livestock productivity. In most ASALs, ponds and roofed storage pits the so called Birka support the community access water for domestic uses and livestock drinks (Fig.1). As the baseline of DRSLP I-EP (2016) witnesses, rainwater harvesting is used for livestock and domestic purpose in Somali regional state. It is simple and inexpensive techniques to be adopted and managed by smallholders. However, the harvest might be vulnerable to recurrent drought and development of salinity as clearly observed in conveyer areas (Fig. 1). Small earth dams or micro dams and ponds are also water harvesting storage structures that increase water availability for livestock and domestic uses. These are among successful experiences documented by the project that need to be upscale in DRSLP – II.



Figure 1: Water harvesting structure (small pond, left and birka, right) in Somali regional state (Photo: Gerba Leta)

**Smallholder irrigation management** - Smallholder irrigation management (SIM) enhances efficient and effective use of available water to reduce loss/abuse and mitigate the possible accumulation of salinity, a typical issue of irrigated agriculture in ASALs. Similar practical issue was observed along Awash River basin of Afar, and Genal and Dawa Rivers in Dollo-Ado district, Liben zone of Somali region. Smallholder irrigation management increases resilience to climate variability and increase the incomes of the agro-pastoral community. As there is possible surface and subsurface irrigation scheme development in DRSLP/IDDRSI intervention areas, management skills for irrigation water need to be associated further.

**Biophysical soil and water conservation** - Biophysical soil and water conservation (SWC) are measures on slopping lands in the form of contour soil and stone bunds, *fanya juu* terraces that associated by productive barriers such as multipurpose trees and grass strips for stabilizing the structure and reduce runoff velocity and soil loss, thereby contributing to soil, water and nutrient conservation. According to respondents, in Awash River basin and Dollo-Ado woreda of Liben zone flood is the main issue like in the other intervention areas. In the later, lots of physical structures were put in place to reduce the runoff by government and extensive support of development partners operating in the area. However, the issue of flood is yet to be managed. Dikes, gabion and other important physical structures need to be implemented to curb the pervasive



issues of recurrent flood that bedevil the livelihoods of several people. Thus far, the flash flood is detrimental to the established irrigation system near the riverbank as it fills with siltation and collapse the canals. Therefore, maintenance of canals and other structures is commendable. In irrigable areas, the existing notion is terraces with vegetative strips could arrest runoff and reverse land degradation. It builds resilience to the negative effects of natural resources degradation through increased water infiltration, maintain soil fertility and improve crop productivity. In Ethiopia, biophysical SWC is a publicly adopted practice through mobilization of labor in humid and sub humid areas of the country. The approach need to be scaled up in the dry areas. An initiative by DRSLP I shows promising on biophysical soil and water conservation as compared to the setout development plan. Area closure that is associated with biophysical SWC in Afar and Somali region of Ethiopia potentially sources feed through cut-and-carry system. Also, the enclosure area will be potential source of bee forage and believed to reinvigorate the resurgence of biodiversity and eventually build resilience to climate change. Of course, a high level of know-how or skills is required for the designing, establishment and the maintenance of integrated practices such as terraces and bunds (Leta *et al.*, 2018a). In Elidar woreda of Afar region, DRSLP- I integrated various structures in an attempt to build the resilience of the area through combining practices. Accordingly, area closure is associated by contour stone bunds, half-moon (crescent) and trenches. Despite the huge efforts, restoration of the land is masked by extensive dry condition (Fig. 2).

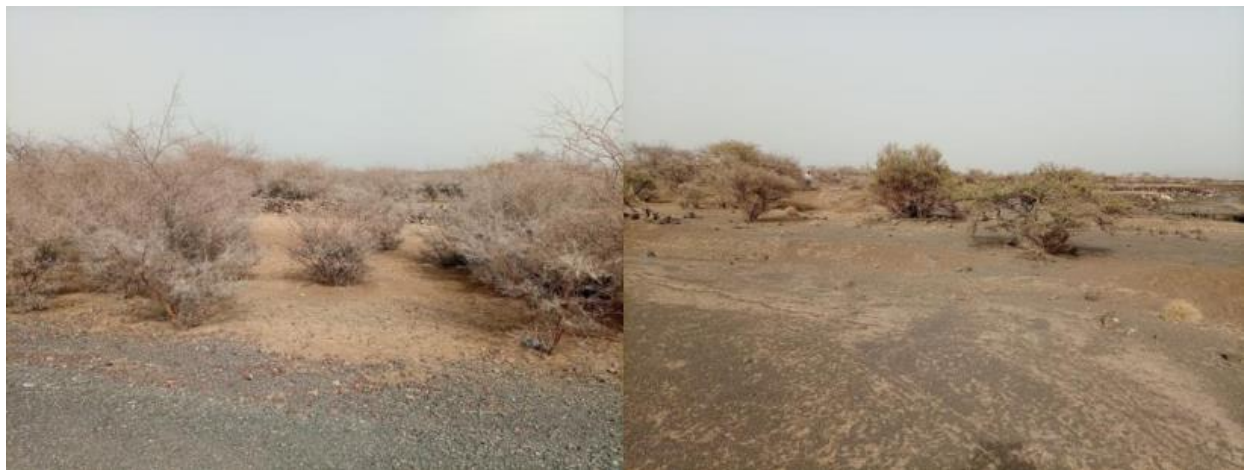


Figure 2: Integrated natural resource management practices in Elidar woreda of Afar (Photo: Gerba Leta)

**Agro-sylvo-pastoral system and forestation** - Agro-sylvo-pastoral system is a collective name for land use systems and practices in which woody perennials are deliberately integrated with agricultural crops/or livestock for a variety of benefits and services. It covers the broad concepts of trees being integrated into cropping and livestock systems. Although rarely applied in dry land areas, it is possible to promote it with adaptive farm trees such as Neem Tree (*Azadirachta indica*), Drumstick tree (*Moringa oleifera*) and other multipurpose trees as it encompasses home gardens, boundary/peripheral tree planting, etc. Particularly agroforestry is suitable for dry areas suffering from strong winds and wind erosion and low soil fertility. It is suitable for different environment and purpose based on selection of compatible tree/fruit species. Although not reported in DRSLP intervention, it is vital to promote around stable settlement, particularly in the homesteads of the agro-pastoral communities. Further, tree planting strongly helps to build resilience to changing climate. Therefore, afforestation of the land with adaptive tree species and enrichment plant within

high value trees such as Gum-incense (*Boswellia papyrifera*) is quite indispensable in high potential areas such as Barey district of Somali region.

**Agro-pastoral system** - Agropastoralism describes settled pastoralists, who lives in villages and cultivate sufficient areas to feed their families and keep livestock as source of cash income or valued property to sustainably support livelihoods and reduce risks of crop loss to adverse conditions. In agro-pastoral area, crop and livestock interact to create synergies and making optimal use of resources. Agro-pastoral systems are common in arid and sub-humid areas. For instance, in the new districts of Dollo-Ado, Gereni and Barey, dry-landism occupies 89%, 27% and 15% of the farming system, respectively. Therefore, paying attention to the combination of pastoralism and agriculture is imperative. Well managed agro-pastoral system increases crop yield and livestock production and contribute to resident livelihoods and resilience building towards climate variability and unforeseen circumstance. Strengthening the practices in respective sites is a paramount important through building management skills of the target community that apparently improve their income and build their resilience to adverse conditions.

**Pastoralism and Rangeland Management** - Pastoralism and rangeland management refers to extensive production of livestock using pastures and browse and is mainly found in arid and semi-arid areas. It is usually associated with the use of common property resources subjected to some group agreements rather than "open access" (Liniger *et al.*, 2011). Management of rangelands revolves around resource utilization, conservation and sustainable practices of the dry-land areas. Rangeland resources support production of goods and services on a sustainable basis for the pastoral and agro-pastoral communities (Mohammed, Farah and Osman, 2020). It is a production system for ASALs. However, pastoralism and rangeland management is increasingly constrained by the fading of traditional governance over communal natural resources, restricted mobility and conflicts that need strong institutions to reverse the situation.

However, from field study, I learned that restricted mobility is uncommon within an ethnic group both in Afar and Somali region. However, conflict over the ownership of three pastoral land kebeles, the case of Gereni district in Afar between the two ethnic groups (Afar and Somali) triggered restriction of mobility. However, the trans-boundary free mobility of pastoralist has become the reason for the transmission of zoonotic disease. Recently, camel disease introduced to Ethiopia Somali from Somalia. Respondents were also cited COVID-19 outbreak was first heard in Kenya before it was introduced to the Liben zone of Somali region.

Apart from disease transmission, free mobility of pastoralist from Somalia to Ethio-Somali region pose pressure on limited resources (water, pasture, browse bush and shrubs). Above all, degradation of land is triggered by overstocking and mismanagement of rangelands. Even then, remarkable conflicts have not been documented. Also, severe competition on natural resources is stimulated by the refugees. Surprisingly, it was reported that the refugees possess large number of livestock over the local resident which is degrading to the environment. Respondents also communicated that the refugees are engaged in deforestation and hunting of wildlife. For instance, in two refugee camps of Dollo-Ado there are 80,000 people. This makes total population of the woreda become 295, 971.

Invasive species are another existing and imminent issues to the Rangelands in addition to the issues of climate variability and changes. *Prosopis juliflora* locally known as Woyane is a tree/shrubs that invade roadside and the rangeland mainly in the river basin of main Ethiopian rivers drained to south and south east



of the country regardless of the uncommon catchments they shared (Figure 3). It's a sturdy plant that remain evergreen, highly thorny, less browsed, poisonous to livestock and human on biting hooves or body, deep rooted and highly resilient in dry season, tolerant to salinity and have suppressing effects to associated indigenous trees, other grass or shrub species (Maundu *et al.*, 2009). *Prosopis*'s deep rooted feature and responses to cutting and burning through its high coppicing power makes it an invincible species. *Prosopis* is a threat to the rangeland so that it is an enemy menacing the life and livelihoods of the pastoralist and agricultural community across the dry lowland regions. It may have positive effect on climate change mitigation as it remains green covering the dry-land all year round. Also, provide tremendous biomass for charcoal production but its thorny feature discourage charcoal producers and compels them to exercise indiscriminate bush burning to reduce the thorny effects before cutting for charcoal production (Fig. 3). As remarked by an expert, charcoal production rather create opportunities to encroach the associated indigenous species with disguise of using *Prosopis* for charcoal production. Thus, the issues in the scene necessitate stringent rangeland management that may employ available management means, imminent innovative technologies/ practices including containment of the species.



Figure 3: *Prosopis juliflora* in the rangeland and along the main roads of Somali region (Photo: Gerba Leta)

DRSLP developed experience of managing invasive thorny bushes and shrubs that are competing with grass and browse (DRSLP I - EP, 2020). The project has been promoting fodder development and forage pasture multiplication. It is a promising approach in which case the project managed to multiply and distributed planting materials to the community. Apart from centralized system of multiplying and distribute forage seed (planting materials), effort was made to multiply on common land, a promising approach to increases sources of planting materials. All successful technologies/ practices of the project need to be packaged and scaled up in the upcoming project. Basically, effective pastoral management depends on livestock mobility and access to dry season grazing sites and water point's, effective communal tenure and governance system as well as herd adaptation. From our field study and understanding, of course, access to water be it ground or surface water is highly commendable. Also, as naturally grown grass and browse is the source of livestock feed both in Somali, Afar and other ASAL regions of Ethiopia, rangelands management needs noticeable attention to eradicate the increasingly expanding non-edible thorny bushes and invasive weed such as *Prosopis juliflora* and *Parthenium hysterophorus*.



Figure 4: Charcoal production from *Prosopis juliflora*, in Afar region (Photo: Gerba Leta)

**Capacity building** - Capacity building at different levels is equally important to develop implementation skills and knowledge of SLM specific to ASAL. As noted by Liniger *et al.* (2011), to be truly sustainable, practices must be environmentally friendly, reduce current land degradation, improve biodiversity and increase resilience to climate variability and change. Therefore, skills are important to help match problems with their respective antidotes. Identifying and putting in place appropriate technologies/practices reduce investment costs in SLM and have the highest on-site and off-site impacts. Capacity building was also among the focused areas of the DRSLP I. However, despite the efforts to establish Pastoral Training Center like Farmer Training Center in humid areas of the country and build the capacity of the pastoralist community through practical demonstration on the plot, it is yet to happen. As knowledge and skills to realize any development and management practices are basic, it needs more emphasis than merely piloting technologies/practices. In general, the focus of the project intervention on these technical and other socio-ecological factors makes it feasible and meets the preset expectation.

### 3.5.2 Sustainable water resource management

Three permanent rivers offer up opportunities for both irrigated farming and flood recession agriculture. These include the Awash in Afar Region, Ganale Dawa and Wabe Shabelle in Somali river basins a part of Oromia and SPNNRS. There are also some rainfed agriculture and the farmlands neighbor to the highlands. Most areas in four regions have a good potential for ground water exploration. Some of region exercised ground and surface water exploration for both drinking and agricultural purpose in DRSLP II program. During 2012 EFY Annual Performance Report that SPNNRS and Oromia in DRSLP program have significant water infrastructure projects. Among of them in SNNPRS eleven borehole and shallow well three Small Dam, two Micro dams and eight Diversion /PUMP from river, in Oromia region twenty borehole and shallow well, one small Dam, one Micro Dams and six Diversion /PUMP from river the bid documents and Design prepared and submitted. Drilling of large water wells in Oromia 19 and SNNPR 9 wells completed. In the construction of small-scale water schemes in Oromia region construct one water ponds (20,000 m<sup>3</sup>), and in SNNPRS five Water ponds (20,000 m<sup>3</sup>), thirty six Spring development without distribution system and 16 Hand dug well and 6 Cistern (Birkas)/Roof catchment constructed.

In the rehabilitation of existing water schemes In Oromia region two spring capping, three water point, one Cistern, one Boreholes, nine Hand dug, five Traditional water well, seven Water ponds are rehabilitated. In SNNPR thirteen Spring Spot, six Hand dug, one Water pond and eleven Shallow wells are rehabilitated

DRSLP I program focus In Afar Region five Woreda ( Adaar ,Elidar, Erebti, Afdera, Bure Mudaitu and Hadele-Era) and in Somali Region nine Woreda (Bikot, Ararso, Raso, Kubi, Hadegala, Golegeno,kebridehar,Mursen and Mubarak). During 2012 EFY annual performance report show that in Somali region two Micro Dams, three Diversion, more than seventy percent of sixteen water wells drilled and fifty-three ponds constructed. In Afar region two small dam, two micro dam and two diversion, more than eighty percent of ten wells drilled and thirty-eight ponds constructed. This show that there are a number of projects ready to be implemented in the coming period and will reduce the shortage of water for drinking and agricultural purpose. This also signify the impact to solve water problem areas.

## 4 CONTEXT AND GENERALITIES

### 4.1 Location of The Program Intervention Area

The DRSLP program intervention has a geographic focus on four IGAD identified clusters namely the Karamoja, Borena-Mersabet, Mandera and Dhikil clusters (See Fig. 5). The national program covers 30 districts across 4 administrative regions namely Afar, Somali, Oromia and SNNP known for their significant number of vulnerable pastoralist communities and vast high potential but less developed rangelands which support livestock-based livelihoods.

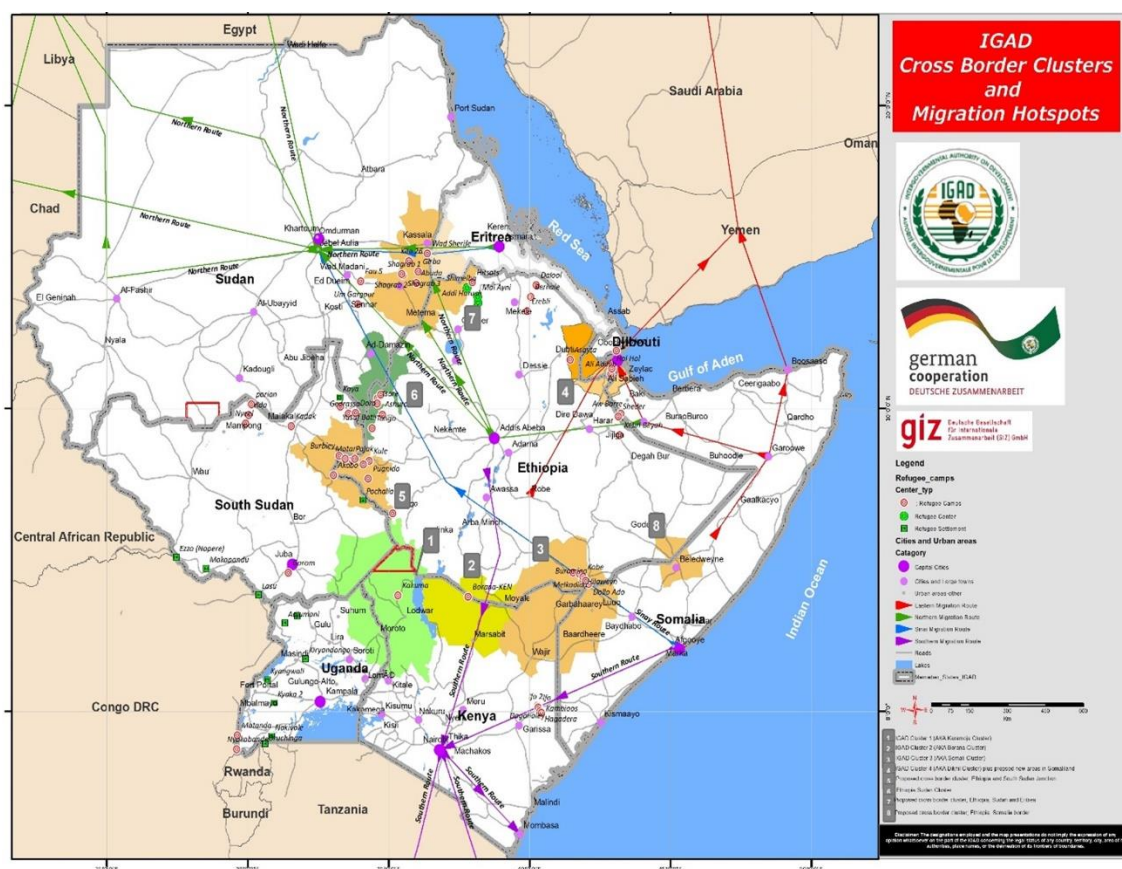


Figure 5: Map of the program intervention, clusters (Karamoja, Borena-Mersabet, Mandhera and Dhikil clusters)

The major beneficiaries of the proposed program will be pastoral and agro-pastoral communities, and their local institutions in 30 districts across the 4 administrative regions (Table 1). The selected intervention districts are drought vulnerable areas which need significant investment for resilience building. The intervention area districts were selected based on different selection criteria including - level of vulnerability to recurrent droughts, potential for rangeland development, whether is border district or not, availability of livestock movement corridor, whether is covered by first phase of DRSLP, absence of similar development intervention, and whether fulfills minimum manpower requirement for program implementation.

Table 2: Proposed program intervention areas (districts) across the four administrative regions

Region	Zone	Selected districts in order of priority	Whether the district is covered by DRSLP I or Not	IGAD's cross-border cluster the district belongs to
Somali	Liben	1. Dollo-Ado	Non-DRSLP I	Mandera cluster
	Afder	2. Barey	Non-DRSLP I	Mandera cluster
	Korahe	3. Higlooley	Non-DRSLP I	Mandera cluster
	Jarar	4. Gashamo	Non-DRSLP I	Mandera cluster
	Jarar	5. Ararso	DRSLP I	Mandera cluster
	Jarar	6. Birkot	DRSLP I	Mandera cluster
	Fafan	7. Goljano	DRSLP I	Mandera cluster
	Sitti	8. Hadagala	DRSLP I	Mandera cluster
Afar	Zone 1 (Awsii Rasu)	1. Gereni	Non-DRSLP I	Dhikil cluster
	Zone 2 (Kilbet Rasu)	2. Berehale Dalol	Non-DRSLP I	Dhikil cluster
	Zone 3 (Gabi Rasu)	3. Gewane Dulecha	Non-DRSLP I	Dhikil cluster
	Zone 4 (Fantena Rasu)	4. Gulina	Non-DRSLP I	Dhikil cluster
	Zone 5 (Hari Rasu)	5. Telalak Dewe	Non-DRSLP I	Dhikil cluster
	Zone 1 (Awsii Rasu)	6. Elidar	DRSLP I	Dhikil cluster
	Zone 5 (Hari Rasu)	7. Hadelela	DRSLP I	Dhikil cluster
Oromia	Borena	1. Dillo	Non-DRSLP I	Borena-Mersabet
	Borena	2. Guchi	Non-DRSLP I	Borena-Mersabet
	Borena	3. Dubuluk	Non-DRSLP I	Borena-Mersabet
	West Guji	4. Dugda Dawa	DRSLP	Borena-Mersabet
	Guji	5. Aga Wayu	Non-DRSLP I	Borena-Mersabet
	Guji	6. Adola Rede	Non-DRSLP I	Borena-Mersabet
	Guji	7. Wadara	Non-DRSLP I	Borena-Mersabet
SNNP	South Omo	1. Nyangatom	Non-DRSLP I	Karamoja cluster
	South Omo	2. Dasenech	Non-DRSLP I	Karamoja cluster
	South Omo	3. Hamar	Non-DRSLP I	Karamoja cluster
	West Omo	4. Gachit	Non-DRSLP I	Karamoja cluster
	Kefa	5. Geregesha	Non-DRSLP I	Karamoja cluster
	Bench Maji	6. Maji	DRSLP I	Karamoja cluster
	Bench Maji	7. Bero	DRSLP I	Karamoja cluster
		8. Goba	DRSLP I	Karamoja cluster

Total = 30 districts; 10 DRSLP districts (33%); 20 Non-DRSLP districts (67%)

## 4.2 Physical Setting

### 4.2.1 Climate and vegetation



Ethiopia has a large land area and diverse topography which results in different climates across the country as well as temperature and precipitation disparity across its regions (Fig. 6). Ethiopia's equatorial rainforests in the south and south-west are characterized by high rainfall and humidity, and the north-east, east and south-east lowlands experiencing desert-like conditions. The highland regions, in the center and north of the country, experience cooler climates. The eastern corner of the country is very arid and experiences very little rainfall where mainly nomads and pastoral communities inhabit. Seasonal rainfall in Ethiopia is driven by the migration of Inter-Tropical Convergence Zone (ITCZ) and there is strong inter-annual variability of rainfall across the country particularly in arid and semi-arid regions of the country. The program intervention areas are parts of the arid and semi-arid areas of the greater horn of Africa where grappling with rainfall variability is an integral part of people's lives. Annual and seasonal rainfall is normally low and highly variable. The droughts and famines during the 1970s and 80s were associated with some of the sharpest declines in rainfall in recorded history (Hulme, 2001).

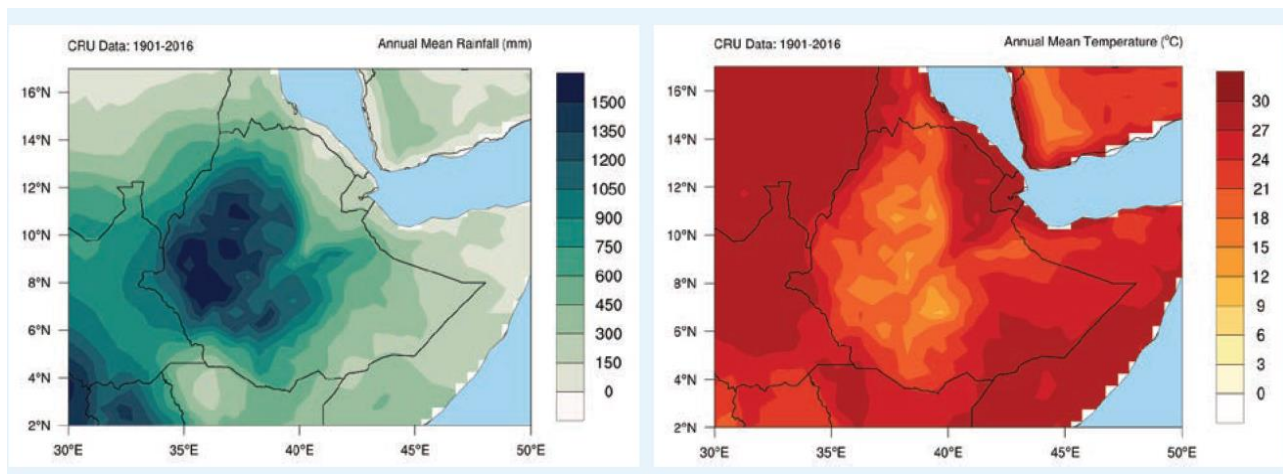


Figure 6: Average annual precipitation (left); annual temperature (right) of Ethiopia, 1901-2016  
(Source: *Climate Risk Country Profile - Ethiopia*, 2020)

Due to its varied topography, Ethiopia has a highly variable tropical climate including in its annual and seasonal temperature and rainfall conditions. Thus strong seasonality and high degree of variability are the key features. Reports suggest that average temperatures in Ethiopia have increased by an average of 1°C since 1960, at an average rate of 0.25°C per decade. Increases have been most noticeable from July through September (World Bank, 2020). The average number of 'hot nights' (the hottest 10% of nights annually) increased by 37.5% between 1960 and 2003 and the average number of 'hot days' per year, increased by 20%; cold days have also decreased. Observed temperature increases have also lead to increased evapotranspiration and reduced soil moisture; higher rates of warming have been observed in the central regions and highland areas. In the eastern and southeastern parts of the country, droughts have increased in frequency and severity with implications for pasture and water availability which pastoral and agro-pastoral communities depend on for extensive livestock production.

Strong variability makes long-term precipitation trends for Ethiopia difficult to determine, however an overall decline has been observed in the last three to four decades, with significant year-to-year volatility. Variability is greater in arid and semi-arid regions of the country where pastoralist inhabit as higher rainfall variability is a typical feature of dry-land areas. While precipitation trends across Ethiopia are highly variable, some areas

of the country are expected to experience a reduction in rainfall. While high degrees of inter-annual variability exist for precipitation trends across Ethiopia particularly its dry-land areas, the incidence of drought increased and the rains have become increasingly less predictable. The rise of sea surface temperatures in the Indian Ocean influences the migration of the ITCZ which can further increase variability in the timing and duration of rainfall seasons, altering traditional rainfall patterns and causing more frequent drought.

Dry-lands cover over 40% of the earth's terrestrial land and encompass unique ecosystems with valuable biodiversity. Rangelands, the largest land-use system in the dry-lands, deliver the requirements for grazing and browsing of animals. Vegetation which are intimate part of pastoral landscape, culture and livelihoods are commonly available phenomenon in parts of Saharan and other parts of Africa. Rangeland plants include grasses of (non woody) monocotyledonous plants in the form of annuals or perennials, browses and herbaceous legumes. These range in size from a few centimeters to 20 m or more in height, and are the main feed for livestock in particular cattle and sheep. Legumes are dicotyledonous plants, and could be annuals, biennials or perennials. Most legumes grow symbiotically with rhizobial bacteria that form nodules on the roots. They are source of feed to livestock in particular to ruminants. Browse is often considered to be leaves and twigs of shrubs, woody vines and trees used as animal feed in particular to goats and camels, and are the main livestock feed during the dry season.

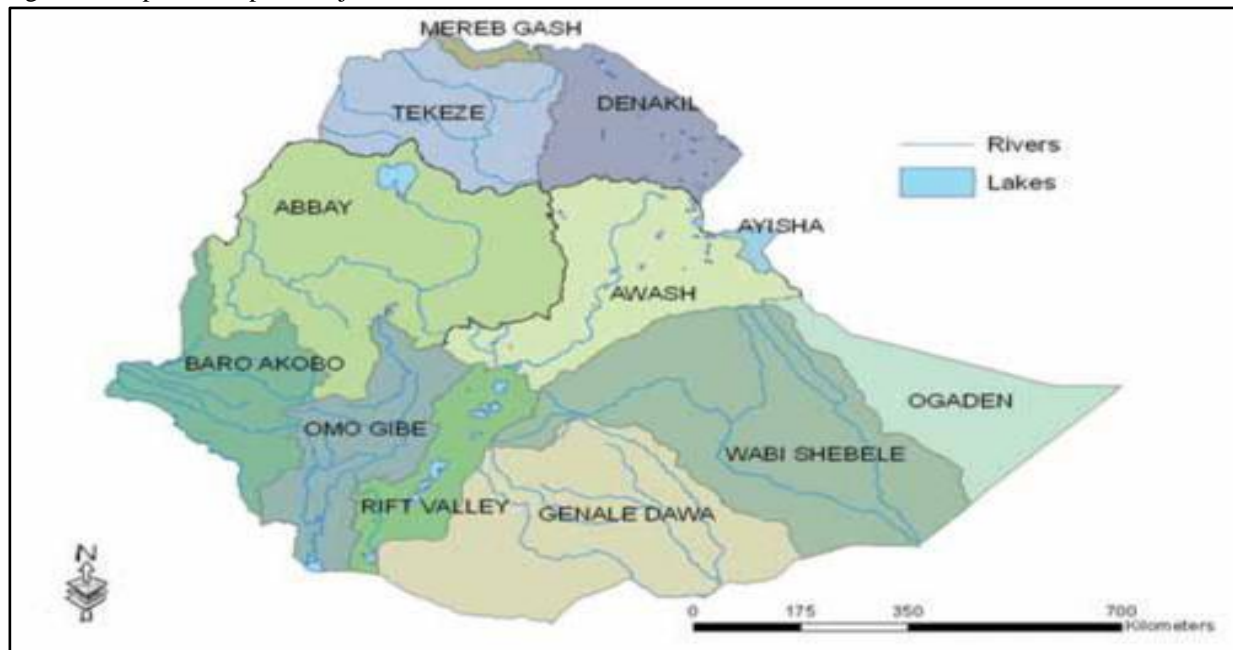
African rangelands constitute about 65% of the total land area on the continent and support 59% of all ruminant livestock in Africa. Moreover, rangelands are also natural habitats to a rich biodiversity of plants and wildlife, for products, such as charcoal, gums, resin, honey, wild food, traditional plant medicines, and for its aesthetic values that are shaped by the beautiful vistas(4) In Ethiopia, in addition to extensive livestock production, rangelands are rich in biodiversity, minerals, water and energy resources, cultural heritage, untapped tourist attractions, and socio-anthropological values related to peoples' wellbeing (3). Despite this variability, the dry-lands make significant contributions to national economies and support millions of people. They are also areas of great-untapped potential, and can play an important role in supplying an increasing demand for livestock, fuels, wild products and sequestering carbon. Despite these opportunities the dry-lands in the region receive little investment and continue to be marred by poverty, food insecurity and conflict. The Pastoral Regions in Ethiopia are found in Afar, Somali, Oromia, SNNPR, Gambela, Benshangul and Diredawa covering 624,880 km<sup>2</sup> (60 % of the total area of 1.1 million km<sup>2</sup> of the country of which 95 % is rangelands

As many and interwoven benefits that pastoralist benefit from this ecosystem, it is highly constrained by range of problems emerging from different directions. Expansion of agricultural practices, the exceeding livestock number from the carrying capacity of the land, encroachment of bush, expansion of weed species, isolation of the system and by the government, climate change, recurrent drought and the resultant water and fodder shortage are among the threats of the vegetation in particular and the ecosystem in general. Improvements in governance, access to markets (infrastructure, providing appropriate credit facilities, livestock insurance and cash and asset-based assistance rather than food aid), bush clearing and thinning program, removal of invasive weed species, application of destocking and restocking programs, and provision of basic services like education, which recognize the value and contributions that pastoralists bring, will help increase the dry-lands' resilience against climate change, facilitate ecosystem management, and allow states to derive benefits from servicing the increasing global rise in demand for livestock products.

#### **4.2.2 Water resources and available/potential infrastructures**

The country has 12 major river basins. The total mean annual flow from all the 12 river basins is estimated to be 122 BMC (MoWR, 1999); although below table shows slightly higher values. This could be further refined when data on recent master plan studies becomes available. Figure 6 below shows the map of Ethiopian River Basins (MoWR, 1999). The idea of a river basin, despite its physical or natural attributes, is more than an engineering concept and encompasses the magnitude and dynamics of a resource that must be harnessed for the common good (Molle, 2006). It has often been advocated that the most logical unit for water resources planning and optimum utilization of available water resources is the river basin. Accordingly, it is desirable that all major river basins in Ethiopia have an integrated development master plan study, and their potential in terms of economic development. The salient features of the water resources development potential of all the river basins is shown in figure 7.

Figure 7: Map of Ethiopia's major river basins



### Somali Region

Dollo-Ado Woreda located in Liben Zone and not supported by DRSLP I, The Woreda have two big rivers Genale and Dawa. Genal river is permanent currently use for irrigation with insignificant amount but Dawa River flow only for maximum ten months, for two months no more water along Dawa river. The Dawa river also use for irrigation purpose. Along two river there are a number of hand dug and shallow wells. In dry part of Woreda, community collects water by constructing Berkads<sup>2</sup>. All Berkads properly covered by corrugated sheet which minimize evaporation and animals' interference. Most of the community in the Woreda is dry-landist only two kebele pure pastoralist. During data collection the Woreda have boreholes (1), hand dug wells (48), Berkads (48 but 7 need maintenance), Ponds (11), hand pump (10 but 2 need maintenance) and river take (1), even though the Woreda have this water infrastructure due to community settle very sector way during dry time some of kebele fully and partially suffer due to shortage of water and community move to search water and animals feed to other area. The other major problem of Woreda due to over flooding of Genale and Dawa river, there are significant deposition silt along river side and that affect agriculture. In

<sup>2</sup> Berkads is underground water reservoir have one in let and one out let with silt trap mechanisms, the top covered by corrugated sheet metal and all side covered by masonry and well plastered by cement.



order to protect overtopping of flood from river embankment it needs some protection structure and it need additional river intake for irrigation purpose.

Barey Woreda located in Afder zone and not supported by DRSLP I, The Woreda have no any permanent river only temporary runoff during rain time, the community have a good practices in water harvesting techniques. The local techniques are Berkads (underground water reservoir) and have one inlet and outlet with silt trap mechanisms. All Berkads properly covered by corrugated sheet which protect from direct exposition of sunlight and animals interference. Community is fully pastoralist. During data collection the Woreda have boreholes (8 but five need maintenance), hand dug wells (40), Berkads (59 but 6 need maintenance), Ponds (1), hand pump (4 but 2 need maintenance) and river take (1), even though the Woreda have this water infrastructure due to community settle very sector and during dry time some of kebele fully and partially suffer due to shortage of water and community move to search water and animals feed.

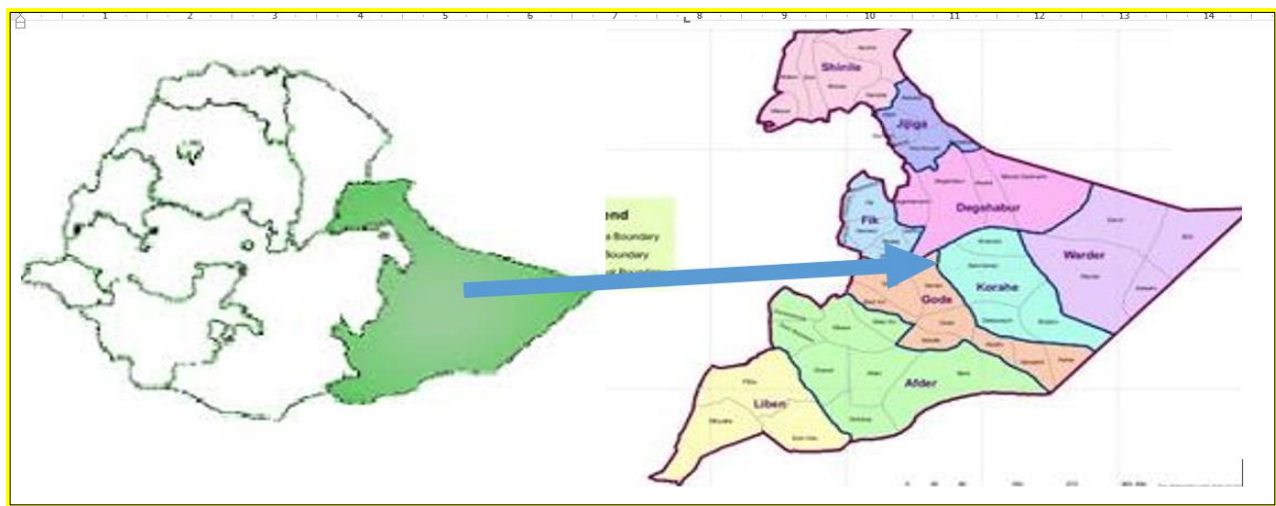


Figure 8: Location map of Somali administrative Region

Higlooley Woreda located in Korahe zone and not supported by DRSLP I, like other Woreda suffer in shortage of water during dry season. During dry period community mobilize to other place to search water and animals feed. During data collection the Woreda have no boreholes, hand dug wells (5 but 3 need maintenance), Berkads (26 but 4 need maintenance), Ponds ( no ponds in the Woreda) and hand pump (4 but 2 need maintenance), even though the Woreda have this water infrastructure due to community scattered settlement during dry time, some of kebele fully and partially suffer due to shortage of water and community move to search water and animals feed.

Gashmo Woreda located in Jarar zone and not supported by DRSLP I, community in the Woreda show a lot of effort in the Construction of Berkads. During data collection the Woreda have boreholes ( 8 but 6 need maintenance), no hand dug wells, Berkads (66 but 25 need maintenance), Ponds 15 but 9 need maintenance and no hand pump , most of water sources not served more than 8 months after rain stop, some of kebele fully and partially suffer due to shortage of water and community move to search water and animals feed to other area.

Ararso Woreda located in Jarar zone and supported by DRSLP I. The project invests significant amount money for Woreda development. One of huge investment is livestock market. During data collection the

Woreda have boreholes (12 but 2 need maintenance), hand dug wells (4 but 3 need maintenance), Berkads (54 but 8 need maintenance), Ponds (7) and no hand pump, most of water sources not served more than 8 months after rain stop, some of kebele fully and partially suffer due to shortage of water and community move a significant distance to search water and animals feed.

Birkot Woreda located in Jarar zone and supported by DRSLP I, During data collection the Woreda have boreholes (15 but 7 need maintenance), hand dug wells (75), Berkads (53 but 23 need maintenance), Ponds (7) and hand pump (3 but three of them need maintenance), most of water sources not served more than 8 months after rain stop, some of kebele fully and partially suffer due to shortage of water and community move a significant distance to search water and animals feed.

Hadagala Woreda located in Sitti zone and supported by DRSLP I, During data collection the Woreda have boreholes (8 but 2 need maintenance), hand dug wells (6 but 1 need maintenance), Berkads (14 but 5 need maintenance), other water infrastructure are not constructed such as ponds, hand pump, and river intake, most of water sources not served more than 9 months after rain stop, some of kebele fully and partially suffer due to shortage of water and community move a significant distance to search water and animals feed.

### **Afar Region**

Elidar Woreda supported by DRSLP I, the average annual rainfall 145 mm, there is permanent water sources, the sources water comes from nearest high land which will be collect stored in ponds and some kebele such as Suite have borehole developed by DRSLP I. The major part of the Woreda suffers seriously in the shortage of water for both human and animals drinking purpose due to these reason community mobiles for more than 50 kilo meter to other place to search water and feed for animals.

Gereni Woreda not supported by DRSLP I. The Woreda has two extreme areas, almost six kebele lay in Awash River and Swamping area and other Woreda highly suffer due to shortage of water and community may be stele for six month after rainy period ended after that community migrate to search water and feedd for animals.

The Hadele'ela Woreda located Zone 5 (Hari Rasu), the Woreda benefited from DRSLP I and have moderate rain fall and extreme hot area during dry season. The livelihood of the community based in agro pastoralist activity. The major sources of drink water collected Run off to local natural ponds; spring fed natural wells (Ella's), hand dug wells, borehole and Ponds (Manmade). Even though Woreda have ten deep wells and four hand dug wells but most of kebels are suffer shortage of drinking water especially during dry period all sources of water except borehole it become dry and community mobilize to other place to search water and feed. In the Woreda DRSLP I have contribute water infrastructure development but still the Woreda suffer in water shortage for drinking purpose.

Talalak Dewe Woreda located Zone 5 (Hari Rasu), the Woreda not benefited from DRSLP I. The Woreda have limited drink water sources, currently have even natural ponds, two springs and sixteen man made ponds, ten hand well and fifteen deep wells. The major problem of the water infrastructure are maintenance and running cost. Due to this problem all borehole not fully functional. Due to periodically maintenance and running cost problem and long dray season the Woreda suffer due to drink water shortage while other water sources have no anymore production to cover drink water demand.

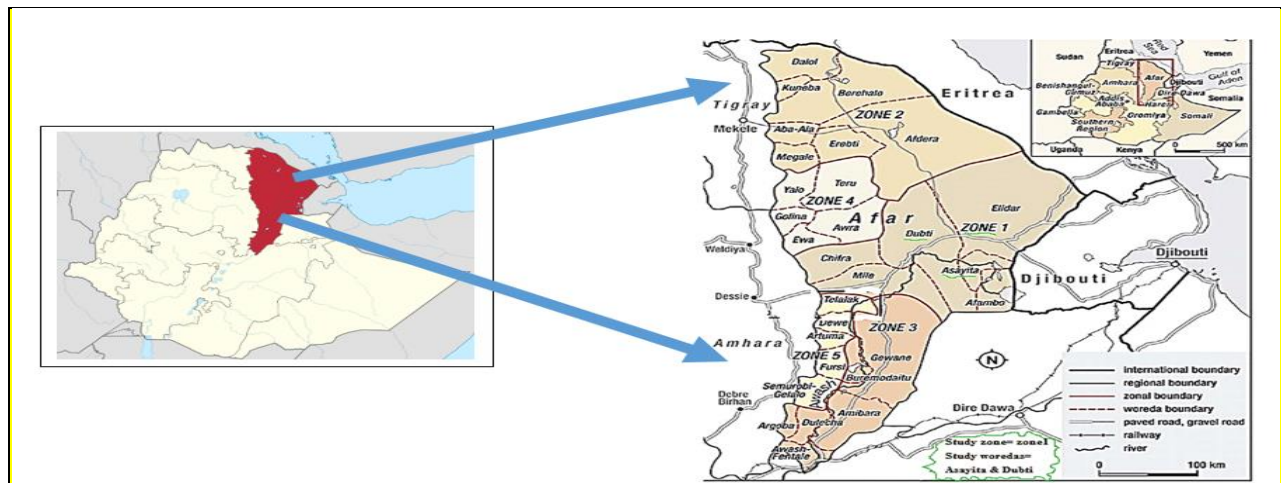


Figure 9: Location map of Afar administrative region

## Oromia Region

Dilo Woreda have a significant water scarce area, community migrate from place to place to search water and food for animals. Annually may not rain not more than three or four times. Community fully is pastoralist.

Dugda, Dawa and Woreda have rain and Small River which can be used for irrigation for production of forage, agronomy, fruit and vegetables. The other water sources are pond, hand dug wells (68), springs and deep wells (8). More than half hand dug wells and deep wells are not functional and need maintenance. The community need some support in on the development of water and livestock infrastructure.

Adola Rede Woreda located in Guji Zone. The Woreda not benefited from DRSLP I. During feasibility study the Woreda have eighteen springs, one hundred twenty-six hands dug wells owned by private and communal. Three deep wells but not functional due to maintenance and running cost. The hand dug wells serve only for six to eight month after rain stop and other water sources such as ponds and springs become dry community move to other place to search water from drinking purpose and animal feed.

Aga Weyu Woreda located in Guji Zone. The Woreda not benefited from DRSLP I. During the field assessment, Woreda have springs, ponds, seven hands dug wells and one deep well and the Woreda suffer highly shortage drink water, especially during dry season.

Wadea Woreda located in Guji zone. The Woreda not be benefited from DRSLP I. The Woreda have natural springs, hand dug wells and shallow wells supported by solar energy. The Woreda have one hundred twelve hand dug wells which are constructed by private, community and different organization. In the Woreda there are no any deep wells. Even though the Woreda have significant number of hand-dug wells, it suffers in water shortage during dry season.

Guchi Woreda located in Borana Zone. The Woreda not benefited from DRSLP I. The drink water sources of the Woreda ponds, springs (6), hand wells (5) and deep wells (10). All water sources successfully operational during rainy season and serve for six to eight month after rain stop. During long dry season the community suffers in water shortage and move to other area to search water and animals feed.

Dubuluki Woreda located in west Guji zone. The Woreda not benefited from DRSLP I. The drink water sources of Woreda pond, springs, and hand-dug wells (9) and deep wells (8). Almost half of hand dug wells and deep wells are not functional it need maintenance. Some part of community in the Woreda suffer in water shortage usually move from place to place to search water from drinking and animals feed.

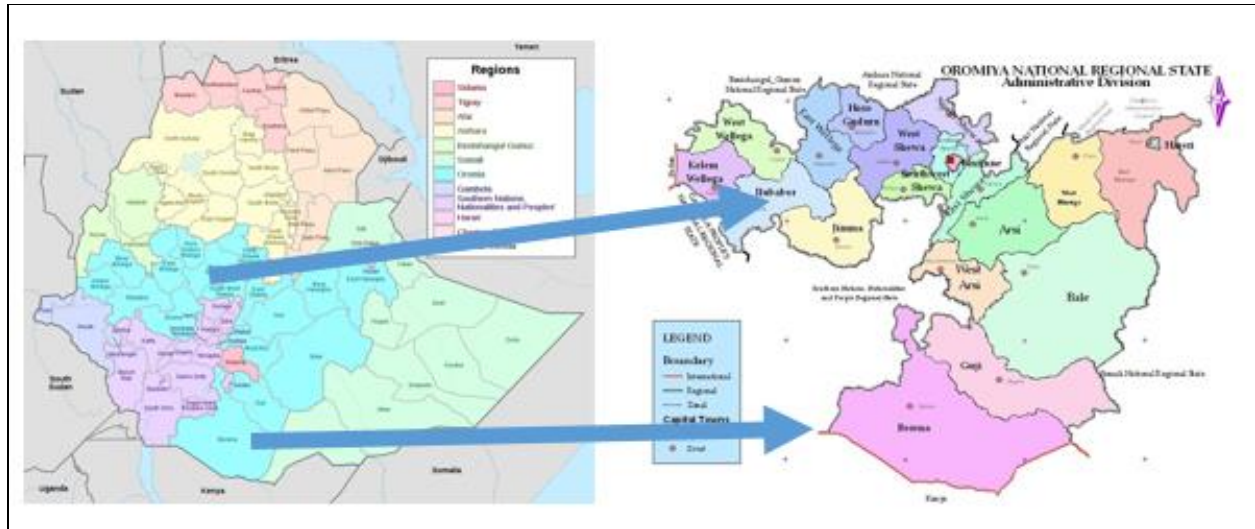


Figure 10: Location map of Afar administrative region

### Southern Nations, Nationalities and Peoples Region (SNNP)

Nyangatom woreda is located in south Omo zone and not benefited from DRSLP I. The territory of Woreda stretches from the Omo River in the east to the Kibish River along the borders of South Sudan and Kenya. The communities are predominantly pastoralists who move from place to place in search of water and pasture for their herds. The Woreda has only 9 hand dug wells and two of them not fully functional. Since the Woreda have two big river, they have a big potential land for agro pastoralists' development by using irrigation from river.

Dassanech Woreda located in South Omo zone and not benefited from DRSLP I. The territory of Woreda stretches south of the Nyangatom and occupy the northern lake shore of Turkana and extends up to the Kenyan border on both the eastern and western sides of the Omo River. The communities are predominantly pastoralists who move from place to place in search of water and pasture for their herds. The Woreda have hand dug wells have 14 but 6 of them not functional and two deep wells.

Hamer Woreda located in south Omo zone and not benefited from DRSLP I. The Woreda lay along Weito River, Neri River and have border with Lake chew river. The Woreda have hand dug well 34 and 7 of them not functional. The communities are pastoralists who move from place to place in search of water and pasture for their herds. Woreda have a good potential for water resources development and can bring significant change in pastoralist development.

Gachit Woreda located in West Omo zone and not benefited from DRSLP I. The Woreda have only two deep wells and three springs. Mmost of the communities fully pastoralist and very few are agro pastoralist. During dry period, community mobilize to other areas to search water and animals feed. In order to improve the

livelihood of the community by diversifying the income water infrastructure development play a catalyst role in the area.

Maji Woreda located in Bench Maji zone and not benefited from DRSLP I. The Woreda have enough water resources throughout the year from Netube, the Mui and Kibish river. Develop the existing water resources basic to improve the livelihood of the community.

Bero Woreda located in Bench Maji zone and not benefited from DRSLP I. The Woreda have a good potential ground water, community easily accesses water from hand dug well and also significant number of developed spring. In the Woreda there are 60 hand dug wells, 10 off them need maintenance. During dry time may suffer for two to three months shortage of water. During rainy period the area have enough rainfall and the vegetation cover enough to feed herds.

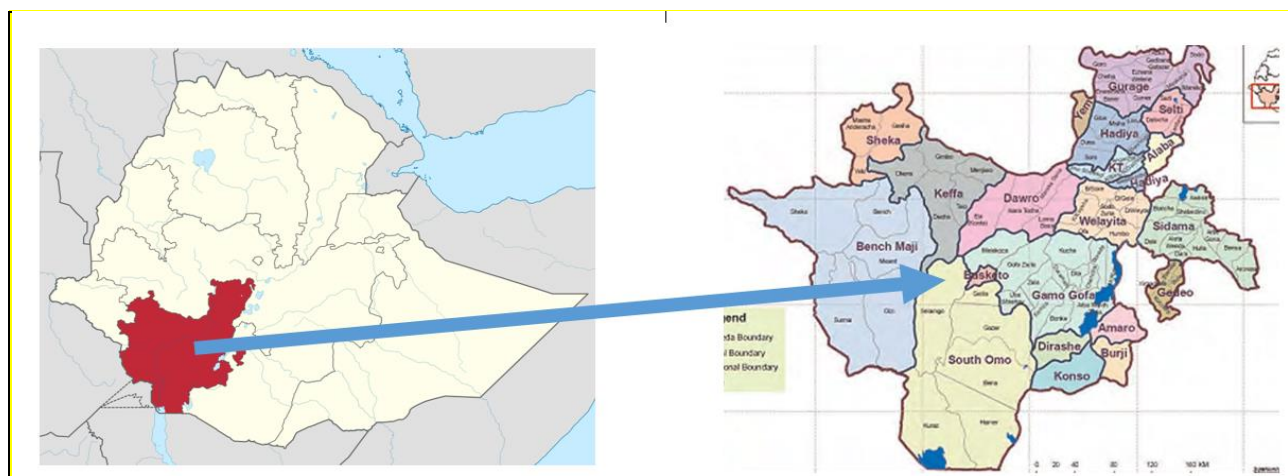


Figure 11: Location map of Southern Nations, Nationalities and Peoples (SNNP) Region

#### 4.2.3 Status of physical land degradation/reclamation/land-use pattern and tenure

Over 85% of Ethiopian land degraded to various degree (Nkonya, Mirzabaer and von Braun, 2016). They further indicated, according to recent estimate of satellite imagery, land degradation over the last 30 years cover about 23% of the land area. Soil erosion is the most common forms of land degradation. Poor land use practices and population pressure are the main drivers of land degradation (Leta *et al.* 2018a; Leta, Schulz, and Alemu, 2020). Despite huge investment and public mobilization to reclaim the degraded land, it is yet demands immense resources and commitment to achieve the targets. Extension system that combines persuasion with coercion, technical inefficiency of development actors, high input and low output prices, non-sustainability of previously built physical structures and uncontrolled grazing systems are potential factors for the unabated degradation. These factors along with tenure insecurity particularly in common lands dissuade farmer motivation to invest on SLM. The problems are further compounded by lack of effective policy and strategy, and development of negligence owing to the continuous public mobilization held every other year to engage community in building another new physical structure disregarding to ensure the sustainability of previously built ones. Every year, the focus is on quantity instead of ensuring the outcome and sustainability. It lacks synchronizing maintenance or management of the previous activities with the new



plan. Also, shortage of farmland and grazing land forced the incompletion of the subjects to the reclamation bylaws.

#### **4.2.4 Carrying capacity of land/environment under different human and livestock populations**

In focus group discussion and individual interviews conducted with partners and experts in the old and newly selected IDDRIS intervention districts, respondents unable to estimate the carrying capacity of the land/environment. Experts suggested, biomass production in the ASALs is very low. Therefore, livestock supposed to cover tens of km a day to browse or graze. Thus far, studies that estimate the carrying capacity of ASAL was not available for the study sites. As a result of scarcely distributed bush/shrubs population, pastoralist livelihoods associated with mobility on daily basis. Essentially, the size of a kebele (lower administrative unit) in the dry-land area might be equal or greater than the size of a district in humid areas of the country.

#### **4.2.5 Soil fertility, structure and texture**

Across the study sites, various soil types were reported. Sandy loam, clay loam, silt loam, silt and sand are the main soil types. The earlier soil types are fertile with good structure and better water retention capacity as compared to silt and sandy soil. The tilth is determined by moisture availability. Most agricultural practices in the ASALs of Afar and Somalia region are limited to irrigable areas of the river basin. Hand digging of the soil with vertic nature reportedly tough when dry and heavy and sticky when it gets wet. Farmlands around the bank of rivers are fertile with good structure but dominated by alluvial soil that inundate the area every other year. Though, it is fertile, it contributes to the change in textural composition and structure of the surrounding soils.

#### **4.2.6 Agro-sylvo-pastoral infrastructure and activities; transhumance and signs of mobility**

Transhumance is a type of mobile livestock farming method that is based on regular, seasonal movements. It is also common in Ethiopia especially in the study area. The movements are mostly predictable; each year, herders follow the pattern of the seasons and travel through trails and pasturelands that they already know. A good example of Transhumance is the mobilization of livestock, especially cattle to Awash River during dry time. In order to maintain and protect livestock from any transmissible disease due to collection of herds in one grazing area consultant recommend Mobile veterinary clinic and transported by animals and have temporary tent and supported solar energy.

#### **4.2.7 Status /Existence of Secondary resources**

Pastoral and dry-land systems in Ethiopia are home to different types of fauna and flora. It supports a people who entirely depended on livestock for their entire livelihood. Livestock production requires the utilization of huge grass and tree species to be consumed by grazers and browsers depending on the ecosystem where they are supposed to live. There is a marked seasonal variation in availability and quality of feed resources due to marked seasonal variation in rainfall distribution. During the dearth period, pastoralists use different coping and survival mechanisms to overcome the problem of feed and water shortage. Regardless of the witnessed imbalance between the number of animals and the grazing lands, rangeland remains the prominent source of animal feed, non-timber forest products (NTFPs), medicinal plants, ecosystem services and incense.

NTFPs faces critical issues in their definition, and thus obtained several definitions encompassing many conceptual and technical pillars that remain unresolved. Debatable (FAO 2001; Ahenkan and Boon 2010) NTFPs includes all products that are derived from forests except for timber. Nonetheless, in the current

context of change, the importance NTFPPs will increase dramatically for pastoral livelihoods and national economies, and for various international processes that address global environmental and economic challenges: carbon sequestration, biodiversity loss, desertification, poverty alleviation. Most significantly, NTFPs are well-known sources of food, feed, medicine, perfume and cosmetics, , utensils & hand craft, construction material and exudates (Chilalo & Wiersum<sup>2</sup> 2011). Food items with NTFPs origin, including honey, mushrooms and fruits can be additional diversity to the pastoral food economy. The contribution of NTFPs to improving nutrition, food and livelihoods security can best be assured through the process of gradual adoption and domestication of edible food plants and animals to the farming system, and most critically by adopting a mechanism and strategy this resource can sustainably utilize.

In pastoral landscapes where ecological conditions are favorable to the tree and other herbaceous plant growth, they are found in a wide range of states and spatial patterns. The concept of Trees outside Forests (TOF) designate trees growing outside the forest and not belonging to the forest or other wooded land. In pastoral and dry-land contexts, TOF is seen used as shade for animals, places of cultural arbitration taking place, and as a source of feed as in the case of the acacia tree. TOF also provide various ecosystem services such as control over soil erosion, nutrient and water cycling, biodiversity conservation or pest control. These types of trees require similar attention as that of NTFPs to sustain the interaction between cultural and environmental parameters (Yadav et al., 2017).

Another important contribution of pastoral and dry-land rangelands are their contribution as home to different medicinal plants. Plants in pastoral and dry-land contexts and Ethiopia, in general, have effective medicinal value to cure different livestock and animal disease. Some studies indicated that there are over 1000 plant species used by people living in different parts of the country where 80 per cent of the people is quite dependent on traditional medicines. (Belayneh et al., 2012). As opposed to this fact, the natural vegetation hosting the medicinal plants are becoming negatively impacted as a result of agricultural expansion, climate change, the practice of charcoal making, population pressure, bush encroachment and invasive species, overgrazing, and human settlement.

For the rangeland to contribute the required ecosystem, cultural and economic service, it is mandatory to put in place participatory resource conservation platforms. Based on the consent of the pastoral community and support from GoE and other donor organizations there should be an intervention whereby the prevailing environmental problems are mitigated and prevented. Among others, participatory implementation of SLM, CSA, and other environmental management and strategies should intervene. Therefore, the study area calls for urgent measures to be taken to rehabilitate and conserve the remaining vegetation with special regard to the NTFPs, TOF, grazing lands and key medicinal plants and preserve the indigenous knowledge on grazing land management, forest protection and medicinal plant utilization for animal and human healing. By doing so, such forested landscapes offer good opportunities for incorporating NTFP production in pastoral and dry-land household diversification strategies within the setting of a multi-enterprise livelihood system. Moreover, as discussed above, they may provide scope for synergy in the marketing of both wild and (semi)domesticated NTFPs.

#### **4.2.8 Climate risks to which resources are exposed**

Climatic conditions in dry-land areas of Ethiopia inhabited by pastoral and dry-land communities exhibit strong seasonality and variability. The seasonality is exploited for the transhumant pastoralism and extensive livestock production and opportunistic cultivation whereby the seasonal distribution is very important. Variability in terms of both rainfall and temperature is increasing which increased unpredictability, a typical feature of dry-land climates which necessitate adaptation and proactive risk management. In particular, the seasonal rainfall demonstrates pronounced level of inter-seasonal and interannual variability which was

locally perceived and identified to be major challenge for the primarily extensive livestock production and opportunistic crop cultivation (Coppock, 1994, Debela 2019). Air temperature in the study area has much less inter-seasonal and interannual variation as compared to rainfall which is similar phenomena to most of the sub-Saharan Africa.

Most areas of the country including the program areas lack sufficient observational data to draw conclusions about trends in annual precipitation over the past century. Niang et al., 2014 in its IPCC 5<sup>th</sup> Assessment Report suggests that precipitation in eastern Africa, where the program area lies, shows a high degree of temporal and spatial variability dominated by a variety of physical processes. It is indicated that over the last 3 decades rainfall has decreased over eastern Africa between March and May/June. The suggested physical link to the decrease in rainfall is rapid warming of the Indian Ocean, which causes an increase in convection and precipitation over the tropical Indian Ocean and thus contributes to increased subsidence over eastern Africa and a decrease in rainfall during March to May/June (Williams and Funk, 2011). Precipitation projections are more uncertain than temperature projections, and exhibit higher spatial and seasonal dependence than temperature projections (Orlowsky and Seneviratne, 2012).

Lying just within the tropical region, Ethiopia experiences little intra-annual and inter-annual variation in temperature. The equatorial and southern parts of eastern Africa, including southern and south-eastern Ethiopia, have experienced a significant increase in temperature since the beginning of the early 1980s (Anyah and Qiu, 2012). Similarly, recent reports from the Famine Early Warning Systems Network indicate that there has been an increase in seasonal mean temperature in many areas of Ethiopia, Kenya, South Sudan, and Uganda over the last 50 years (Funk *et al.*, 2012). In addition, warming of the near surface temperature and an increase in the frequency of extreme warm events has been observed for countries bordering the western Indian Ocean between 1961 and 2008 (Vincent *et al.*, 2011).

Ethiopia including its ASAL regions inhabited by pastoral and dry-land communities are vulnerable to various climate and non-climate risks. The expert interview and discussions held during the field visit with disaster risk management experts and beneficiary communities revealed that recurrent droughts, floods and rangeland/environmental degradation and are key climate related risks that pose existential threat to the pastoral and dry-land communities' livelihoods and long term development. Moreover, resource-based conflicts, bush encroachment and livestock disease pandemic are important farming system constraints. Drought frequency and intensity have been cited as the most important and critical problem felt to have increased in the last three decades. Drought events result in acute shortage of feed resources and livestock water which are critical inputs to livestock production leading to decreased production and productivity including livestock products such as milk. Drought resulted in livestock mortality and morbidity which affected the transhumant pastoralism considered the pillar of the economy, and the main source of food and income for rural households. More importantly, the frequent drought eroded rural communities' capacity to adapt to current and anticipated climate risk and aggravated food insecurity

Flood is also an important climate risk as identified during the field visit which gathered views of the local experts and rural communities. Seasonal flood events cause physical loss of livestock and inundation of vast rangelands which limit access to pasture for livestock resulting in economic damage to pastoral households through decreased revenues and increased costs of recovery. As livestock are the main source of food and income for rural households, flood damages result in food insecurity until full recovery is achieved. Particularly, in low land valley systems where large perennial rivers such as Omo in Karamoja cluster, and



Wabe Shebele in Mendera cluster, flow. The lowland plains of these rivers get flooded during peak rainy seasons displacing hundreds of thousands of pastoral and agro-pastoral households along the downstream sides of the riverine system. Though highly localized in perennial river systems, these are critical climate related problems which need to be addressed including through robust early warning systems and physical protection structures.

Rangeland degradation is another climate related environmental deterioration problem. In many rangeland systems, overgrazing and bush encroachment into communal rangelands resulted in rangeland degradation which significantly reduces rangeland and livestock productivity. Recurrent drought events which increase evapo-transpiration and soil moisture stress limit pasture growth which eventually causes over grazing and rangeland degradation. In addition, bush encroachment and invasion of the communal rangelands with invasive alien species is an additional problem affecting the rangeland vegetation composition negatively affecting rangeland productivity. The encroachment reduces the conducive grazing area with palatable herbaceous species available for livestock and subsequent access to grazing lands. Ayana (2007) reported that despite the huge potential of the rangelands inhabited by pastoral and agro-pastoral communities, these land masses are experiencing increasing pressure from livestock and human populations, bush encroachment and tick infestation.

Ethiopia has a high degree of risk to hydrometeorological hazards and natural disasters and more so for arid and semi-arid lands where climatic variability is relatively larger. Vulnerability is further exacerbated due to the country's high level of poverty and its dependence on key climate sensitive sectors such as- agriculture, water, and forestry. While the country is at high-risk to natural disasters such as drought as well as flooding, its topographic diversity and highly marginalized segments of the population making it more vulnerable. ASAL regions are more so because of their exceptionally variable climate. Additionally, non-climate stressors such as inadequate infrastructure to handle the increasing human and livestock population are also impacting the vulnerability. Climate variability is already negatively impacting livelihoods which are expected to continue. Drought is the single most destructive climate-related natural hazard in Ethiopia including in ASAL regions where pastoral communities relying on rain-fed and extensive livestock production inhabit.

### **4.3 Socio-Demographic Characteristics of the Study Area**

#### **4.3.1 Population disaggregated by Gender and by educational level**

Ethiopian population projected to be 98.6 million, with 49.5 million male, 49.1 million female (CSA, 2019). Average household size in Ethiopia is 4.6 person (5.2 in rural areas and 3.6 in urban). 25% of households are women headed households. Nearly half (47%) of the 110 million population is under age 15. Among the population, 84% are living in rural area with agriculture as the main livelihood. The country is home for more than 80 ethnic groups. Some regions in Ethiopia are dominated by one ethnic group whereas others are minority. The three ethnic groups namely Oromo in Oromia region, Somali in Somali region, Afar in Afar region have a majority status in each region while SNNP regions are shared by more than 50 of different ethnic groups each have specific districts within SNNP presented with majority status in demographic and political context. Most popular religion in Ethiopia are Christian and Muslim, the two have religion followers shared nearly equivalent amounts at country level while it has varied along regional states. Accordingly the four project region namely, Oromia region - Christian (47%) and Muslims (47%), SNNP - Christians (75%)

and Muslims (14%) while in Somali (98%) and Afar regional states majority of the Population are Muslims (FDRE - Population Census Commission, 2008).

Since the majority of the households are rural and agriculture is the dominating economic activity, houses in Ethiopia tend to be congested, with poor-quality flooring, walls, and roofing, structure, and lacking basic utilities like improved sanitation, urban households are more likely than rural households to use improved sanitation (16% versus 4%). Seventy seven percent of households depend on firewood for cooking makes biomass still remain the most important source of fuel for cooking in both rural and urban areas (CSA, 2017)(CSA and World Bank, 2020).

With an average national average of 1 hectare of farmland, farming household has in Ethiopia, majority (near to 77 percent) of cereal crop produced in the farm go for household food consumption and the land ownership varies among households in gender spectrum (male-headed households own 1.12 ha while female-headed households own 0.6 ha). Fertilizer is usually applied in about half of maize, wheat, barley, and teff farm though improved seed usage remained very low and limited widely to maize and wheat. Based on self-reports of crop yield average productivity in quintal per hectare for major crops in the 2018/19 meher (main Ethiopian production) season was: maize, 34.4, sorghum 17.6, wheat 14.7, barley 13.3, and teff 10.9. Food is scarcer in the major planting season in major parts of rural Ethiopia, April to September. Rural households tend to be the most affected by seasonal food shortages. Major shocks that affect rural households are illness of a household member, unexpected rises in food prices, drought, and higher prices of inputs. To cope with major shocks, households mainly deplete savings or sell livestock (CSA and World Bank, 2020).

Farm households tend to sell teff and other higher-value crops and consume lower-value cereal crops like sorghum (CSA and World Bank, 2020). Most of Ethiopian farmers and pastoralist primary income is crop and livestock production, additional income generation non-farm enterprise remained at low, only 23 percent of households have at least one nonfarm enterprise. The three main barriers to establishing non-farm enterprise in Ethiopia include lack of financial services, access to transportation and markets. In rural Ethiopia clothing and shoes are the most important non-food items bought. Households also spend substantial amounts on ceremonies, detergent, kerosene, fuel wood, charcoal, transport, taxes, and levies. The average household expenditure is lower in rural area than the urban one (CSA and World Bank, 2020).

Although access to education steadily increased with some regional disparity, school dropout rates remains high. 35 percent of boys and girls aged 7–18 years (2.6 million) children in the primary school age group are out of school. Of these, the largest numbers include in Oromia, SNNP, Afar and Amhara. These regions consist primarily of pastoralist, Agro pastoralist and agricultural communities often affected by natural and/or human-made disasters denoting regional inequities linked to exposure to conflict and natural disasters (UNICEF- Ethiopia, 2020). Educational attainment among women in Ethiopia is low, half of all women age 15-49 (48%) have no formal education, 56 % in rural and 22 % in urban areas. Women's educational attainment also differs among regions. The highest proportions of women with no education are in the Somali and Afar regions (75% and 74 %, respectively), and the lowest is in Addis Ababa (14 %). While this figure for Oromia and SNNP are 48% and 43% (CSA, 2014)(CSA, 2017). School enrolment is significantly higher in dry-land than in pastoral households (Berhanu Gebremedhin, Mengistu Woldehanna, Fiona Flintan & Poole, 2017).

Pastoralists and Dry-landist (PAP) in Ethiopia constitute around 18% of Ethiopia's population and they lived in vast majority 60% of Ethiopia land area in Afar, Somali, Oromia, SNNPR, Gambela, Benishangul and Diredawa occupying 42 zones, 122 districts and covering 1.1 million km<sup>2</sup>, 95 % of these is rangelands while agriculture and unproductive land occupy 1.0 % and 4.0 % respectively (Birch, 2018). The main livelihood activities of PAP in ASAL areas are largely livestock production with a practice of traditional and extensive livestock rearing system (cattle, camels, goats and sheep). The agropastoralists also make their livelihood from mixed agriculture system, mainly those households residing along the permanent rivers. Livelihood of PAP based primarily in ASAL areas faced with vulnerabilities due to recurrent drought, chronic water shortages, conflicts, market shocks (livestock and cereals price fluctuations), animal and human diseases. The livestock herd size per household in PAP is reducing radically as a result of shortage of pasture while PAP livestock resource remains share amount of countries livestock resources. Now livestock population of PAP accounts for 40% of livestock population in total (30% of the nation's cattle, 70% of goats and sheep and 100% of camels' population in the country) and is among the largest in Africa. The livestock sub-sector in Ethiopia contributes 12% to total GDP and 45% to agricultural GDP (MoP, 2019a).

### **Oromia Region**

Oromia regional state is the largest region in Ethiopia with a total land area of 353,000 km<sup>2</sup>, and accounts for almost 32% of the country. Oromia population in 2019 is 37 million (18.68 million male and 18.58 million female) (CSA, 2019). Oromifa is the official language. It constitutes 83.5% of the spoken language. Other major languages are Amharic 11%, Guragigna (Sebatbet, Sodogna, Siltigna and Hadiyigna together), 0.98%, Gedeogna 0.98% and Tigrigna 0.25%.

Oromia regional state shares boundary with all regions in the country except Tigray; to the east, it is bounded with the Somali region; to the north, the Amhara Region, the Afar Region and the Benishangul-Gumuz Region; to the west, South Sudan, Gambella Region, and Southern Nations, Nationalities, and Peoples' Region; and Kenya to the south. Oromia is a region of great physiographic diversity. Its landscape includes high and rugged mountain ranges, undulating plateaus, panoramic gorges and deep incised river valleys, and rolling plains. Mountain Batu (4607 m.a.s.l) is the highest peak of the region. Oromia is endowed with varied geographical features which in turn creates varied climatic condition and other rich natural resource bases.

The climatic types prevailing in the region may be grouped into three major categories: the dry climate, tropical rainy climate and temperate rainy climate. The dry climates is characterized by poor sparse vegetation with annual mean temperature of 27 °C - 39 °C, and mean annual rainfall of less than 450 mm. The hot semi-arid climate with annual temperature varying between 18 °C - 27 °C is area of pastoralist and agropastoralists. It has a mean annual rainfall of 410-820 mm with noticeable variability from year to year. Awash, Wabe-Shebele, Genale, Gibe, Baro, Dedessa and Guder are major rivers in the region. The crater lakes such as Green Lake, Bishoftu, Kuriftu, Bishoftu-Gudo, Hora-Kilole, Horsa Arsedi, and the rift-valley lakes of Ziway, Abiyata, Shala, and Langano are found in this region. These water bodies are suitable for recreation and fishery development. Oromia region have also home for around 800 bird species and more than 100 wild animals. Endemic wild animals such as Red Fox and Menelik Bushbuck are found in the Bale mountains national park. The Awash National Park is home to the Oryx, Kudu, Caracal, Aardavark, Colobus Monkey, Green Monkeys, Baboons, Leopard, Klipspringer, Hippo, Seemering's, Gazelle, Grevy's Zebra and Cheetah. The Awash National Park has also bird sanctuary some of which include Limburger, Wattle Crane, Anger

Buzzard, Verreaux Eagle and long eared owls. Water Fowls, Shore Birds and the colourful Ruddy Shelled Duck as well as the endemic Blue-winged Goose are common in the marshy areas of the park.

Majority of Oromia region population 88% are from Oromo ethnic group. The remaining 12% accounted for Amhara, Hadiya, Sidama etc. 48% of the population in the region are adherents of Islam, followed by 30% Orthodox Christians, 18% Protestants, 3% traditional believers, 0.5% Catholic, and 1% others. The economy of Oromia Regional State depends on agriculture, which contributes about 66% of the regional GDP and provides an employment opportunity for more than 89% of the regional population. Mixed farming dominates the livelihood of the region. Oromia accounts for 51% of the total Ethiopia crop production, 45% of the area in the region are under temporary crops. Coffee is the main cash crop in the region. The major crops grown in the region are coffee, wheat, barley, teff, sorghum and oil seeds.

The region is also endowed with livestock resources (44% of the total livestock population of Ethiopia). Traditional range management practices have deteriorated, and development in the water sector for various purposes has led to the degradation of some wet season grazing areas. Grazing land has been taken away from pastoralists for irrigation and for resettlement. Bush encroachment to the grazing lands is also a serious problem the naturalist and agro pastoralist is currently facing threatening their livelihood.

The Oromia Region consists of 21 administrative zones and 180 woredas. Pastoralism is practiced in 7 zones and 42 woredas in Oromia covering 152,070 km<sup>2</sup> of predominantly savanna-type grassland that supports cattle, Camels, and small ruminants. The pastoralists in Oromia are transhumant. The Borena zone in southern Oromia hosts the largest pastoralist group in the region. Pastoral and agropastoralist in Oromia are less diversified and less market integrated. Borena Zone, (MoP, 2019b). West Guji Zone and Guji Zone are the three Oromia zones where the 7 project woredas are identified.

**Borena Zone:** bordered on the south by Kenya, on the west by the Southern Nations, Nationalities, and Peoples Region, on the north by West Guji and Guji and on the east by Dawa Zone Somali Region. Borena Zone population is projected to reach 1,312,944 (661,825 men and 651,119 women) by 2019 (CSA, 2019) and average household size is 5.28. With an area of 45,434.97 square kilometres, Borena has a population density of 21.18. The three largest ethnic groups reported in Borena zone were Oromo (88.78%), Gedeo (4.42%) and Burji (3.17%). Dillo, Guchi and Dubuluk are the three woreda identified as project woreda in Borena Zone.

**West Guji Zone:** bordered on the south by Borena, on the west by the Southern Nations, Nationalities, and Peoples Region and Sidama Region and on the east by the Guji Zone. Its administrative centre is Bule Hora. Dugda Dawa woreda identified as project woreda in West Guji Zone. The population of Dugda Dawa Woreda is 197,551 (100,312 Men and 97,239 Women) as projected by 2019 (CSA, 2019).

**Guji Zone:** bordered on the south by Borena, on the west by SNNP, on the north by the Ganale Dorya River which separates it from Bale and on the east by the Somali Region. Guji zone has a total projected population of 1,899,600 (956,792 men and 942,808 women) by 2019. Aga Wayu, Adola Rede and Wadara woreda identified as project woreda in Guji Zone.

## **SNNP Region**

SNNP region population in 2019 is 20 million (9.95 million male and 10.13 million female) (CSA, 2019). The region is located in the southwestern part of Ethiopia. The SNNP region borders with Kenya to the south, part of Lake Turkana, the Ilemi Triangle (a region claimed by Kenya and South Sudan) to the southwest, South Sudan to the west, the Ethiopian region of Gambela to the northwest, the Oromia Region to the north and east, and the Sidama Region to the east. SNNP comprise 10% of the total area of the country.

Amharic is the working language of the state while multi-ethnic groups that add to more than forty-five indigenous ethnic groups characterize the state. predominantly spoken languages in the region include, Gruagigna 14.72%, Wolayitagna 11.53%, Hadiyigna 8.53%, Keffigna 5.22%, and Kembatigna 4.35%. Other languages spoken in the State are, Gamoigna, Malo, Goffa, Gedeo and many others. The working language of the state is Amharic. Based on ethnic and linguistic identities, the region is divided into 13 Zones. These are sub-divided into 126 Woredas (districts) and 8 special Woredas. 56 ethnic groups are found in the region with diverse and distinct languages, geographies, cultures, identities, survival mechanisms and socio-political histories. The region covers a total area of 113,539 km<sup>2</sup>. It enjoys environmental diversity and diverse cultural life. The lowland areas are characterized by arid and semi-arid while the highlands have cool temperate climate and high rainfall.

The mean annual rainfall ranges from 500-2200 mm. Its intensity, duration and amount increase from South to Northeast and Northwest. The mean annual temperature in general ranges from 15 °C - 30 °C. Many perennial and seasonal rivers are found in this State. These include, Omo, Gojeb, Mago, Segen, Woito, Akobo, Dima, Wabi, Wolga, Bilate, and Genale River. Among the known Rift Valley lakes are Awassa, Abaya, Chamo, Chew Bahir and Rudolf. These rivers can be utilized to produce food crop and fish and for irrigation and hydroelectric development. There are 23 kinds of wild animals and 300 species of birds. Some of the wild animals found in this region are Elephant, Lion, Giraffe, Leopard, Zebra, Monkey, Lesser kudu, Water Buck, Crocodile, Rhinoceros, Warthogs, and Buffalo. The State is rich in natural resources. These include water, mineral, fauna and flora. Some of the minerals of the region include gold, coal, mineral water, clay, ditomite, scoria, limestone, mica, nickel, iron-ore, and asbestos (MoP, 2019b).

Coffee is the most important cash crop. Other major crops of the region include maize, teff, enset, potato, and wheat. Coffee is the most important cash crop. Other major crops of the region include maize, teff, enset, potato, and wheat. Coffee is the most important cash crop. Other major crops of the region include maize, teff, enset, potato, and wheat. Some of the major tourist attractions of the State are lakes, Tropical forests such as Kaffecho, Shekecho and Omo zones are wonderful places. The Nechsar, Mago and Omo national parks are found in this state. These national parks are centres of tourist attractions.

Three of the SNNP Zone have pastoralist and agro pastoralist cover an area of over 12 woredas. Pastoralists in SNNPR are transhumant and move seasonally in search of grazing areas and water. They keep cattle and small ruminants. Their economy is very poorly diversified and not very integrated with the market. South Omo, West Omo, Kefa and Bench Maji are the 4 zones from which 8 project woredas are identified.

South Omo Zone - bordered on the south by Kenya, on the southwest by the South Sudan, on the west by Bench Maji, on the northwest by Keffa, on the north by Konta, Gamo Gofa and Basketo, on the northeast by Dirashe and Konso, and on the east by the Oromia Region. The administrative center of Debub Omo is Jinka. Based on the 2019 population projection report South Omo Zone has a total population of 755,767 (376,774

men and 378,993 women)(CSA, 2019); with an area of 21,055.92 square kilometres, Debub Omo has a population density of 27.23. While 43,203 or 7.53% are urban inhabitants, a further 25,518 or 4.45% are pastoralists. A total of 125,388 households were counted in this Zone. Nyangatom, Dasenech and Hamer woreda are identified as project woreda in South Omo Zone.

**Kefa Zone** - Based on the 2019 population projection report from CSA, this Zone has a total population of 1,152,223 (565,902 men and 586,321 women)(CSA, 2019). The four largest ethnic groups reported in this Zone were the Kafficho (82.72%), the Bench (5.05%), the Amhara (3.67%), and the Oromo (3.5%). Geregesha woreda are identified as project woreda in Kefa Zone.

**Bench Maji Zone** - bordered with South Sudan in the west, on the northwest by the Gambela Region, on the north by Sheka, on the northeast by Keffa, and on the east by Debub Omo. The Omo River defines much of its eastern border with Debub Omo. The administrative center of Bench Maji is Mizan Teferi. Zone has a total projected population of 888,923 (438,157 men and 332,424 women)(CSA, 2019); with an area of 19,252.00 square kilometres, Bench Maji has a population density of 33.89. Maji and Bero woreda are identified as project woreda in Bench Maji Zone.

**West Omo zone** - Gachit and Goba woreda are identified as project woreda in West Omo Zone.

## **Somali Region**

Somali Regional State is the second largest region in Ethiopia next to Oromia regional State at approximately 280,000 km<sup>2</sup>. The Somali region population in 2019 is 6 million (3.23 million male and 2.81 million female) (CSA, 2019). The region is located in the south-eastern part of the country. Jijiga is the capital of the Somali Regional State the region has also longest Ethiopia international border that shares with Somalia, Djibouti, and Kenya. The region also shared long border with Oromia and Afar Regions of Ethiopia. Cross-border and cross-regional access to grazing resources and markets are critical for Somali region pastoralists.

The majority of the region has an altitude of 900 meters above sea level and in some areas the altitude reaches 1600 meters. Of the total area size of the State approximately 80% is flat & 7% mountainous. Regarding climate, 80% of the region is classified as lowlands, 5% highland, and 15% of the area fall under temperate category. The maximum temperature reaches 32 °C-40 °C. In the temperate areas the temperature is within 20 °C-28 °C. The mean annual rainfall of the State is estimated to be 300-500 mm. Most of Somali Region is arid and semi-arid, the Somali region have many rivers (Wabeshebele, Genale and Weybe Rivers) that can be harnessed to expand irrigation and sustainably produce food crops to pastoral and agro-pastoral communities of the region.

Most of the people of the state of Somali mainly earn their livelihood by rearing livestock. Some people in the region also practice crop production as well. The major crops cultivated in the region are sorghum and maize. Wheat and barley are also harvested in a smaller amount each year. Commercial activity is another occupation that is significantly exercised in the region. The region is inhabited by one of the largest pastoral communities in the HoA and the largest in Ethiopia. About 70% of the population in the region are pastoralists who keep cattle, camels, and small ruminants. The region is estimated to have about 15.2 million domestic animals out of which sheep constitute 53%. Goats and cattle are the second and third most important domestic animals in the region accounting for 20% and 15% respectively. Camels are actually the most important animals in day to day life of Somali pastoralists, and they constituted about 9% of the livestock (MoP, 2019b).

Low rainfall, high temperature, lack of infrastructure is the major constraints in Somali region. The development of irrigated agriculture in fertile areas of the above rivers basins and the exploitation of perennial springs, seasonal floods and rain water harvesting elsewhere in the region for irrigated crop and pasture production can be identified as potential development intervention. In the rain fed areas, the use of drought resistant crop varieties together with soil and water conservation techniques have potential to improve farm production and productivity. Liben, Afder, Korahe, Jarar, Fafan and Sitti zones are the six Somali region identified zones were 8 projects woredas are potential candidate for the projects.

Liben Zone - bordered on the south by Kenya, on the northwest by the Oromia Region, on the northeast by Afder, and on the southeast by Somalia's federal state of Jubaland. Liben Zone has a total population of 732,830 (387,716 men and 345,114 women)(CSA, 2019). Dollo-Ado woreda are the identified project woreda in Liben Zone.

Afder Zone - bordered on the southwest by the Ganale Dorya River which separates it from Liben, on the west by the Oromia Region, on the north by Nogob Zone, on the northeast by Shabele Zone, and on south by the Somalia federal states of Hirshabelle, South West and Jubaland. The administrative center of Afder is Hargele. Zone has a total population of 772,964 (424,570 men and 348,394 women)(CSA, 2019). 55% of zone population were pastoralists. Barey woreda is the identified project woreda in Afder Zone.

Korashe Zone - bordered on the southwest by the Gode, on the northwest by Fiq, on the north by Degehabur, on the east by Werder, and on the southeast by Somalia's federal state of Galmudug. The largest city in Korahe is Kebri Dahar. Zone has a total population of 425,526 (233,233 men and 192,293 women)(CSA, 2019). 20% of the population are urban inhabitants while majority of the zone population (80%) were pastoralists. Higlooley is the identified project woreda in Korashe Zone.

Jarar Zone - bordered on the south by Korahe, on the southwest by Nogob, on the northwest by Fafan Zone, on the southeast by Dollo, and on the northeast by Somaliland. Zone has a total population of 650,282 (350,690 men and 299,592 women). 13% of Jarar zone population are urban inhabitants while half of zone population (46.8%) were pastoralists. Gashamo, Ararso and Birkot are the identified project woreda in Jarar Zone.

Fafan Zone - bordered on the south by Jarar, on the southwest by Nogob, on the west by the Oromia Region, on the north by Sitti, and on the east by Somalia. Fafan Zone total population projected in 2019 was 1,324,156 (693,390 Men and 630,766 Women) 11.6% of zone population was pastoralists. Goljano is the identified project woreda in Fafan Zone.

Sitti Zone - bordered on the south by Dire Dawa and the Oromia Region, on the west by the Afar Region, on the north by Djibouti, on the east by Awdal, Somalia, and on the southeast by Fafan Zone. Sitti Zone has a total population of 623,134 (322,560 men and 300,574 women)(CSA, 2019). Majority of the zone population were (pastoralists). Hadagala is the identified project woreda in Sitti Zone.

## **Afar Region**

The Afar National Regional State is situated in the North-eastern part of Ethiopia and has an area of about 94,760 square kilometres. Afar region population in 2019 is 1.9 million (1.03 million male and 0.86 million females) (CSA, 2019). The region has common boundaries with the State of Eritrea in the north-east, with Tigray in the north-west, with Amhara in the south-west, with Oromia in the south, with the State of Somalia in the south-east and with the Republic of Djibouti in the east. The State of Afar capital city is Semera, the

state consists of 5 administrative zones, 29 woredas and 28 towns. Afar region is the origin of human species, where a 4.4 million years old humanoid is recently discovered.

The Afar pastoral community is leading a communal life (using natural resources communally) moving from place to place in search of water and grazing. The major livelihood and economy of Afar region is livestock and the natural resources. Livestock in the region is not properly managed in line with the availability of grazing and water distribution has contributed to the degradation of the natural vegetation, the loss of the fertile topsoil through wind and water erosion; and intensification of desertification. The region exhibits a physical feature that is mostly plain and an altitude of less than 1500 meters above sea level, an altitude that further falls from west to east. The lowest point in the Country, Dallol depression is 126 meters below sea level. The lowland areas of Afar are generally below 1600 meters above sea level. The highest peak, mount Mussa-Alle is 2063 masl.

The climatic condition of the region is mostly hot, desert type and partially dry. As a result, the region exhibits high temperature, and low rainfall that is not distributed uniformly. Temperature varies from 25°C during the rainy season (September-March) to 48°C during the dry season (March-September). The average annual rainfall registered for 11 years at Dubti station was 187.9 mm. 22.4% of the total area of the region could be developed for agricultural activity and 25.7% of the total area of the region is suitable for grazing purposes. On the other hand, about 70.9% of the region land mass is denuded and devoid of vegetation. In the rainy season that is usually scarce, about 54.9% of this denuded part of the region gets little rainfall. The grasses that are grown as a result of the little rains in this area are used for grazing purposes and remained only for a short period of time.

The Awash River, Mille and Logia which are tributaries of the Awash River cross the region. Abbe Bil, Afambo and Adebelle lakes which are connected to the last section of the river Awash, are found in the region. Salt, Potash, Sulfur, Manganese, Bentonite, Aluminium, Marble, Gypsum and Petroleum are possible major resources of the region. The state has also a plausible source for solar energy. Yagund-Ras national park and the Dallol depression are some of the tourist attraction sites in the Afar region. Wild animals in the park include Abyssinian wild ass, Grevy's zebra, beisa oryx, crocodiles, lions, greater kudu, wild (bat eared) fox, wild cat, cheetah, Grant's gazelle, and warthog. At Global scale the region also known for its archeological significance Hadar, which is 4.4 million years old humanoid is found in this region (MoP, 2019b).

Afar people belong to the Cushitic-speaking language groups in Ethiopia and the society is structured into clans and sub-clans. 80% of the population in Afar region are pastoralists and the remaining 20% are agropastoralists. Afar pastoralists are transhumant; usually move out seasonally to manage their livestock production system. Awash river valley is an important grazing area for livestock and also provides opportunities for irrigated agriculture.

Afar pastoralist livelihoods systems are becoming increasingly vulnerable. Human populations are rising, the climate is changing, and international markets are setting ever-higher barriers for access. Infrastructure is poorly developed; education and literacy levels remain very low and competition for scarce resources is increasing. Five zones are identified in Afar regions were 7 project woreda are identified.

Zone 1 (Awi Rasu) - is bordered on the south by Administrative Zone 3, on the southwest by Administrative Zone 5, on the west by the Amhara Region, on the northwest by Administrative Zone 4, on the north by



Administrative Zone 2, on the northeast by Eritrea, and on the east by Djibouti. The largest town in Zone 1 is Asayita. Rivers in this Zone include the Awash and its tributaries the Mille and Logiya Rivers. Zone 1 has a total population of 604,580 (324,685 men and 279,895)(CSA, 2019), with an area of 30,242.10 square kilometres zone has a population density of 13.58. 43.47% of zone population were pastoralists. Gereni and Elidar woredas were identified as project woreda in zone 1.

Zone 2 (Kilbet Rasu) - bordered on the south by Administrative Zone 1, on the southwest by Administrative Zone 4, on the west by the Tigray Region, and on the northeast by Eritrea. The administrative center of Zone 2 is Abala (also known in the highlands as Shiket). Also located in this zone is the former mining settlement of Dallol, which set the record for the hottest inhabited place on Earth. Zone has a total population of 454,737 (248,088 men and 206,649 women)(CSA, 2019), 10.93% were pastoralists. Berehale Dalol woreda is the identified project woreda in zone 2.

Zone 3 (Gabi Rasu) - bordered on the south by the Oromia Region, on the southwest by the Amhara Region, on the west by the Administrative Zone 5, on the north by Administrative Zone 1, and on the east by the Somali Region. Zone 3 has total population of 291,851 (157,614 men and 134,237 women)(CSA, 2019). 27.33% are urban inhabitants while 12.11% zone population were pastoralists. The three largest ethnic groups reported in Zone 3 were the Afar (64.78%), the Amhara (12.01%) and Argobba (10.72%). Gewane-Dulecha woreda is the identified project woreda in zone 3.

Zone 4 (Fantena Rasu) - zone is bordered on the south and east by Administrative Zone 1, on the southwest by the Amhara Region, on the northwest by the Tigray Region, and on the north by Administrative Zone 2. The administrative center of the Zone is Kaluwan. Zone 4 has a total population of 312,583 (173,738 men and 138,845)(CSA, 2019). Among these 3.83% are urban inhabitants and 48.09% were pastoralists. Gulina woreda is the identified project woreda in zone 4.

Zone 5 (Hari Rasu) - Stretching along the eastern base of the Ethiopian highlands, this Zone is bordered on the south and east by Administrative Zone 3, on the west by the Amhara Region, and on the north by Administrative Zone 1. The zone has a total population of 237,247 (132,873 men and 104,374 women), 6.67% are urban inhabitants and 26.96% were pastoralists. Telalak Dewe and Hadelela woreda are identified as project woredas in zone 5.

#### **4.3.2 Customary laws, norms and values in natural resource management**

Pastoralism and dry-landism are the major livelihood in ASAL area, PAP as a livelihood and way of life has strongly linked with solid cultural and social ties, ethnicities, identities, and traditional institutional settings spanning the international border. Since most of pastoralist communities of Ethiopia shared and their livelihood are usually crossed intra and international borders, these communities engage in a wide range of cross-border activities and adopted different sharing arrangements around the common natural resources, as well as the trading of livestock, livestock products and other commodities, exchange of information (on livestock prices and water and pasture availability) and sharing of basic services (Pavanello and Levine, 2011).

Customary conservation activities and rules in relation to pasture and water (two limited resources who needed dearly by the pastoralist livelihood), have also long been used by pastoralist communities to maximise

efficiency, sustainable use of land use and increase its productivity. Livestock mobility is also guided by *finna*, a complex concept referring to the overall quality of the grazing environment, which enables animals to get the best benefit out of it. There are customary rules for establishing pasture reserves (called *kallo* in Oromo) near to pastoral settlements for use by weak, young and lactating animals that cannot move long distances during the dry season. Customary rules named *Meri* also govern the use of water sources as recorded among Boran community where animals are not directly watered from a water source such as pond instead animals drink from filled water on scraped tree *Meri* helps to ensure that the water source remains clean while serves both livestock and the community (Pavanello and Levine, 2011).

Among Ethiopian pastoralists communities, customary law and norms also developed to be used as Indigenous conflict resolution mechanism. They are helpful for controlling and resolving conflicts, and for decades these customary laws used in resolving of conflict while being overlooked by government to recognise and considering customary practices as alternative conflict resolutions mechanisms (Mussa *et al.*, 2017).

Elder's council has been used widely for inter and intra conflict among pastoral communities and they are practically proven for effectiveness in resolving conflicts with sustained efficacy since customary ones are more socially and culturally friendly. For this reason the management and resolution of conflicts through customary institution remain widely preferred and utilized in different pastoral areas of the country (Mussa *et al.*, 2017). The pastoral community of Oromo, Somali and Afar in Ethiopia has well developed conflict resolution mechanism that involves elders and clans leaders to solve disputes in the context of traditional law (Mussa *et al.*, 2017).

#### **4.3.3 Cross-community conflict management arrangements (Local conventions, Protocols and Treaties)**

Conflict among Ethiopian pastoralist usually grouped in one of the following conflict typology - (1) Between groups within a clan, (2) Between clans of same ethnic groups, (3) Between farmers and pastoralists, (4) Between pastoralists and investors, (5) Between pastoralists and the states, (6) Between ethnic groups, and (7) Trans-border conflict (Mussa *et al.*, 2017). Strategic decisions directed to attain improved livelihoods in pastoral and dry-land communities should follow proper consultation and participatory planning system that respects pastoralists' rights to free mobility, minimizing political interference, and recognizing indigenous conflict resolution mechanisms. Incidence of conflict especially grows in number and magnitude in times of drought, when competition for scarce water and pastures intensifies result to conflicts of violent one. Major drivers of conflicts between different ethnic groups reportedly disputes over political and administrative boundaries and borders (between regions/zones), ethnic or clan rivalries, weakness of governance and rule of law structures, and communal revenge attacks (Gebremeskel *et al.*, 2019).

Pastoral and agro-pastoral communities in Ethiopia have two conflict-resolution options, the formal (Ethiopian legal system) and the informal (customary). Customary institutions have long been under multiple external pressures. Formal policies and programmes rarely take into account customary institutions, and tend to see natural resources management, in as much as they recognise it at all, in purely technical terms. Where institutional arrangements around natural resource management have been repeatedly side-lined and undermined, the consequences for peace and stability, and for the economic security of pastoralist communities (Pavanello and Levine, 2011).

The modern systems of conflict resolution are conducted in the court through litigation and are officially recognized by the government. Their procedures are more strictly examined and monitored for signs of impartiality, entrenched inequities and lack of due process while the Indigenous systems of conflict resolution among the pastoralist are an ancient set of practices in almost all the pastoral societies in Ethiopia. Leaders of indigenous institutions play a significant role in local and grassroots communities in relation to socio-cultural and economic development, and the administration of justice in the modern political system.

Leaders of indigenous institutions play a proactive role to promote social cohesion, peace, harmony and co-existence; and a reactive role in resolving disputes which have already occurred. The indigenous institutions usually involved in inter and cross community conflict resolution to find appropriate solutions to the existing conflicts based on the values, norms, complexity and culture of the society, and accordingly of significance to the conflicting parties. Most important elements involved in such mechanisms are the traditions of forgiveness and of respect for elders because of their symbolic authority to enforce decisions and implement compensation. Indigenous conflict resolution typically incorporates consensus building based on open discussions to exchange information and clarify issues (Zigale and Tenaw, 2021).

The pastoral community of Oromo, Somali and Afar in Ethiopia has well developed conflict resolution mechanism that involves elders and clans' leaders to solve disputes in the context of traditional law. The *Xeer* of Somali, *Gadaa* system of Oromo and *Mada'a* of Afar are some of the indigenous conflict resolution and management systems which are governed by an unwritten law that is transmitted from generation to generation. The Somali, Borana and Afar pastoralists used their indigenous institutions led by *Ogaz*, *Abba Gadda* and *Kedo Abba* respectively for the well implementation of customary conflict resolution laws. The Ethiopian pastoral communities have usually developed two different types of law for resolving the intra and inter-ethnic groups' dispute (Mussa et al., 2017).

In Afar, the intra-ethnic conflicts among different clans are managed by *Madaa* based on customary that set the *Madda*, not representing members in disputes are selected from different clans. The decisions by the council of elders are effective due to the tradition of forgiveness, respect for elders, and the transfer of resources as compensation. All Oromo clans have common indigenous conflict resolution mechanisms in which '*Gumma*' is the known one. *Gumma* is a conflict resolution technique related to killing particularly unintentional killing of individual from other or within the same clan. It helps to avoid grievances and revenge that follow the case of killing. In the case of the Somalis, there is a well-developed, relatively well-structured conflict management mechanism, where the *Guurti* elders act as judges and jury, and their decisions are largely followed to and respected by the community. The customary law of the Somali is exercised by the experienced elders, and the governing unit is the *Guurti* (Council of elders). The institutions that elders developed are generally respected because elders are seen as trustworthy and knowledgeable people in the community, and are believed to make rational decisions. In addition to solving the conflicts, the elders take measure to prevent conflict through monitoring and punishing individuals who plan to trigger it and through pushing clans to respect the inter clan agreement in place (Mussa et al., 2017; Pavanello and Levine, 2011).

In addition to resolving conflict, elders/clans that lead the traditional customary conflict resolution procedures also help to foster coordination and cooperation in jointly undertaken activities, and promote the reconciliation of varied interests. These kinds of indigenous conflict resolution, reconciliation and

development procedure reflect fundamental understandings among affected individuals, who must deal with each other within the context of a particular problem arena and overcome dilemmas of collective action.

Some of the cross border conflict incidence and pastoralist community conflict management in Ethiopia ended with local made convection, one of this kind of peace convention know by cross border area of Ethiopian pastoralist and the local governance is the Lokirama Peace Accord (FAO and IGAD, 2019): a peace agreement (treaty) between the Turkana people in Kenya and the Matheniko of Uganda signed in December 1973 as an obligation of both parties to coexist peacefully. The chord gets its name from Lokirama, a remote town in the Turkana district in Northwest Kenya, which is inhabited by the Turkana. Festive events dedicated to harmony and to reaffirm the obligations of all parties in upholding their content are held every year. In addition to the Turkana and Matheniko, commemorative events bring people together Topos and Didinga the people of southern Sudan, other Karamoja people of Uganda and Nyangatom of Ethiopia. Conflict Early Warning and Response Mechanism approach to conflict prevention and mitigation, focusing on supporting locally-driven initiatives and combining modern and customary ways of conflict resolution management and methods is increasingly recognized as an effective approach in peace-building (FAO and IGAD, 2019).

#### **4.3.4 Social infrastructures (Cooperatives, credit unions, markets, Internet, Electricity)**

More than one-quarter (26%) of Ethiopian households have electricity. Nearly all urban households (93%) have electricity, compared to 8% of rural households (CSA, 2017). Connection to the main grid supply systems seems to be better in the agro-pastoral than in the pastoral households of Afar and Borana. In Afar, about 11% of agropastoralists and about 3.83% of pastoralists are connected to the main electric supply system. In Borana, about 14% of agropastoralists and about 3% of pastoralists are connected to the main supply system. Solar power supply is more widely available than the main electric supply both in the pastoral and agro-pastoral areas. Between 6.74% (SNNPR) and 11.71% (Afar) of agropastoralists reported access to solar power, while between about 4% (Borana) and about 10% (Somali region) of pastoralists reported access to solar power. No pastoralist reported access to solar power in SNNPR (Berhanu Gebremedhin, Mengistu Woldehanna, Fiona Flintan & Poole, 2017). (Gebremedhin *et al*, 2017).

More than half of Ethiopian households have a mobile telephone (56%), 28% have a radio, and 14% have a television. Urban households are more likely than rural households to own a mobile telephone, radio, or television. 15% of women and 25% of men use a bank account. The mobile ownership among men reached to 55% and 25% among women, among mobile phone owners, only 5% of women and 9% of men use the phone for financial transactions (CSA, 2017). Access to Finance is yet underdeveloped sector in Ethiopia. In 2018/19 only 30.4 percent of adult Ethiopians had an account at a formal financial institution. Financial inclusion is higher among males, in urban areas, and among those who are more educated and wealthier. About 59 percent of Ethiopians live more than 5 kilometres away from the nearest financial institution. Proximity to financial services is significantly worse in rural areas. The top reasons for being unbanked are insufficient funds, distance to nearest financial institution, and poor understanding of the benefits of owning an account. About 26 percent of Ethiopians reported saving over the last 12 months. Most people reported saving not on a regular basis but whenever funds are available. About 16 percent of households reported having taken out a loan in the past 12 months. Relatives are the most important sources for loans (35 percent) followed by SACCOs (19 percent) (World Bank; NBE and CSA, 2020).

Pastoral and agro-pastoral communities depend on family members, clan members and neighbours for price information, rarely are the formal sources of price information such as extension agents, government offices, televisions, radios, newspapers, NGOs or association/cooperatives used as sources of price information. The role of mobile phones in accessing price information has been reported by significant proportion of survey households. Between 6.8% (Afar) and 45.9% (SNNPR) of baseline survey respondents reported mobiles as important means of accessing price information (Berhanu Gebremedhin, Mengistu Woldehanna, Fiona Flintan & Poole, 2017). About 21.6% in Borana and 23.6% in the Somali region reported mobile as means of accessing price information. Pastoral and agro-pastoral communities also receive non-price market information such as information on disease outbreaks, number and type of buyers, transaction forms and conflict and security on route to markets. As with price information, the sources of non-price market information are predominantly informal, including family and friends, clan members and neighbours. Formal sources are not important sources of non-price market information for the pastoral and agro-pastoral communities. As with price information, mobile phones are emerging as important means of obtaining non-price market information. (Berhanu Gebremedhin, Mengistu Woldehanna, Fiona Flintan & Poole, 2017)

The quantity and quality of social networks and access to larger institutions in society are critical resources that people need to survive and draw on to improve their livelihoods in Ethiopian pastoralist community. These Social interactions and networks are complex, with many traditional mechanisms for community cooperation and control. Informal support from relatives, neighbours, or friends (e.g., loans, gifts, or remittances) is done far more often than formal support from government or NGOs (e.g., food rations and food- or cash-for-work) (USAID, 2015).

Agro-pastoral and pastoralist systems in Ethiopia ASAL are thought to contribute 35% of red meat and 56% of milk to Ethiopia's livestock sector GDP. Livestock traded figures from informal uncontrolled cross-border is estimated at four to six times that of formal exports by volume, and twice formal exports by value (Birch, 2018). The sale of livestock is the most important contributor to the cash income of both pastoral and agro-pastoral households in all four lowland regions under. Next to livestock sale, the second most important contributor to cash income (all households) varies by region - crop farming in Oromia (Borana) and SNNPR, business in Somali region, and miscellaneous sources such as the Productive Safety Net Program (PSNP) and other transfers in Afar. Pastoralist area of Ethiopia is usually far from central market and close to international borders. A number of studies have proven the importance of location, particularly for market access. Poverty rates have been found to increase by seven percent for every 10 kilometers distance from a market town in Ethiopia. Agricultural, agro-pastoral growth has shown a strong impact on poverty reduction in Ethiopia, this has only been in areas close to urban centers of 50,000 people or more who had a great market demand and premium price for urban inhabitants traded with their product (Birch, 2018).

Regarding the ASAL area extension services in Ethiopia, baseline study in 2017 found that even if several woredas report that veterinary clinics are available, they are reportedly partially malfunction lack of veterinary drugs and services delivery. They blame the lack of efficient veterinary services for ongoing disease problems. In Afar, respondents indicated that they largely rely on CAHWs (Community animal health worker) and livestock extension agents (LEA), whereas they lack access to private or official veterinarians or veterinary drug stores. A similar picture was seen in the Somali region, but with better access to drug stores. Relatively high coverage of veterinary drug stores was reported in Oromia and SNNPR with more than 50% of households reporting access. Good access to official veterinarians was reported in Oromia with

76.7 and 64.3% in pastoralist and agro-pastoral households, respectively. Access to private veterinarians was low across systems and region (Gebremedhin *et al.*, 2017).

Ethiopia ASAL areas have huge potential to become the hub for industrialized red meat and camel milk to supply domestic and export markets if received massive private sector engagement. The private sector could mobilize capital for constructing large-scale livestock facilities for livestock product processing and mobilise both technical and business capacity to run such facilities efficiently. In 2016, 14,453 financial cooperatives were existed throughout Ethiopia, some of these cooperatives covered in ASAL areas of Ethiopia, relatively low in coverage and numbers in related to other parts of the country both public and non-state initiatives have contributed for the gradual increase of cooperative that targets pastoralist community development. Rural Saving and Credit Cooperatives (RUSACCOs) are demonstrated as effective tools to facilitate diversification of income and to create employment opportunities in pastoral areas. Due to the very reason that conventional banks' and microfinances' service are inaccessible for the majority of pastoralist, RuSACCOs are the option to bridge this gap (Getu *et al.*, 2016).

A wealth of experience from previous pastoral development project demonstrated cooperatives and other financial arrangements in ASAL areas enhance entrepreneurship and contribute toward wealth creation and poverty reduction, particularly if managed properly and technically supported in business identification and development to the pastoralist women and youths. The success will be strengthened further if members have some level of literacy, got human capital capacity building, business environment has favorable business policy and good market linkages are established. Baseline report from 2017 in the ASAL areas of Ethiopia shows various ways of savings are used among PAP, most saving is made at home, except in Borana. About 82.5% of savers in Afar, 75% of savers in the Somali region and 73.68% of savers in SNNPR reported saving at home. Only about 21.37% of savers in Borana saved at home. Use of savings and credit groups to save money is very low in Afar (only 2.5% of savers used it) and the Somali region (only 8.33% of savers used it). More than a quarter of the savers in Borana used saving and credit groups, while about 19% of savers in SNNPR used this means. The use of saving and credit associations/cooperatives is very low in Afar and the Somali region. While only 2.44% of savers used this means in Afar, none used it in the Somali region. Saving and credit associations/ cooperatives are important in Borana, where about 36.75% of savers reported using it, followed by 13.68% of savers using it in SNNPR. Interestingly, banks seem to be important as means of saving in the pastoral and agro-pastoral communities. About 85% of savers in Afar saved in banks. Between 16.67% and 30.77% of savers also used banks in the Somali region, Borana and SNNPR (Gebremedhin *et al.*, 2017).

#### **4.3.5 Capacity building actors**

Capacity building is one of the pillars of pastoral development policy and strategy of Ethiopia. The state and non-state stakeholders who have a role in the institutional, human, and system capacity building on Afar, Somalia, Oromia and SNNP includes the public extension services, public development projects, local and international NGOs, and public R&D systems.

The capacity building in pastoral and agro pastorals mostly involves strengthening absorptive, adaptive and transformative capacity of the system, assets and the people to different climatic calamities. The capacity building actors has also stake in strengthen the service delivery capacities through organizational and human resource supports, establishing Pastoral Training Centers and strengthen the extension system.

Major capacity building intervention includes rangeland management, natural resource management, improved basic social service delivery, promotion of climate smart agriculture, supporting research and

development to develop new locally adaptable climate smart technologies, market linkage, small-scale irrigation, and livelihood diversification (WB, 2019).

### **Government Extension Services and Public Projects**

Pastoral and agro pastoral development programs in Ethiopia currently implemented under the auspices of Ministry of Agriculture and Ministry of Peace. Main public services include the public extension service and public development projects. Ethiopian public extension system is arranged across different level from national, region, zone to woreda and kebele level with little variations in arrangement in Afar, Somali, Oromia and SNNP. At kebele level pastoralist training center, field school, livestock health center and clinic are setup and staffed with development workers and experts to provide the public extension including training, services and supervision of pastoralist developments.

Though Ethiopia public extension is one of the largest public extension in the world that involves an estimated of 10 thousand kebele level training centers and 50 thousand development workers graduated with minimum of diploma degree, but most of the pastoral training centers found in ASAL areas are both under developed and under staffed.

Ethiopia also implemented different public projects usually in five-year base using fund raised from public as well as grant and loans from World Banks, IFAD, AfDB and other international and regional institution. These public projects are involved in development of major infrastructures, education, health, agriculture and resilience activities. These are major public funded development projects in pastoral and agro pastoral areas of Ethiopia.

- Productive Safety Net Project (PSNP) – aimed to improve household food security, livelihoods and nutrition; and enhance household and community resilience to shocks. The safety net system provides appropriate, timely, and accessible transfers to beneficiary households, including in response to drought shock; creates productive and sustainable community assets and improves access to social services through public works; and, supports livelihood interventions that build assets, promote increased productivity, and encourage diversification at the household level. Since first started in 2005 PSNP mobilize and create a large part of Ethiopia that includes pastoral area; the infrastructure, system and institutions created could be used for capacity building interventions for DRSLP II.
- Pastoral Community Development Project (PCDP) - is reportedly to be ended to the end of 2019 after operates in 113 woreda of pastoral areas for 15 years in three phases, so PCDP supported systems, institutions and human resource are resources that could be used in capacity building interventions and collaborations.
- Regional Pastoral Livelihoods Resilience Project (RPLRP)- also reportedly to be ended on 2019), it has worked in 21 Lowlands woredas within the IDDRSI framework of action, RPLRP seeks to develop regional solutions to challenges faced by pastoralists who reside in the ASALs. In woredas where the RPLRP project was implemented, DRSLP II shall identify it to prevent duplication of activities and to build upon RPLRP.
- One WaSH-work in areas of Water Supply, Sanitation, and Hygiene through water resource development and small-scale irrigation, the second phase of the one Wash that are aligned to the second Growth and Transformation Plan (GTP-II) launched in 2018. The new approach aims to break the vicious cycle of vulnerable infrastructure affected by recurrent droughts in drought-prone areas of Ethiopia and create a virtuous circle of climate resilient water supply systems that provide safe and sustainable access to water to the communities.
- Development response to displacement impact project (DRDIP)- work to improve living conditions for refugees camped across five regional states in Ethiopia (hosting nearly 0.8 million refugees originated from Eritrea, Sudan, South Sudan and Somalia). Refugees camped in Tigray, Afar, Gambella, Benishangul-Gumuz and Somali states along with respective host communities are targeted by this project.

- Agricultural growth program (AGP)- AGP is a multifaceted investment program supporting agricultural productivity and commercialization focusing on high agricultural potential areas to address some of the key constraints to agricultural growth and thereby contribute to overall economic growth and transformation. AGP found in some DRSLP II project woredas of Oromia and SNNP regions
- Low land resilience program (LLRP) –is a new WB funded program aims to enhance rangeland management, livelihood improvement and diversification, and market dimensions to promote livelihoods resilience. LLRP implemented in 100 woredas of Oromia, the Southern Nations Nationalities and Peoples (SNNP), Gambella, Benshangul-Gumuz, Afar and Somali regional States.
- Enhancing Shared Prosperity through Equitable Services (ESPES) – is WB funded program to improve equitable access to basic services and strengthen accountability systems at the decentralized level. The program aims to improve service delivery for the whole population of Ethiopia by improving results in health, education and agriculture services in the most poorly performing woredas and strengthening the overall decentralized service delivery system. It provides budgetary support to several bureaus (agriculture, pastoral, and others) to pay salaries of agricultural extension staff.

## **NGOs**

In Ethiopia NGOs involved in the relief, humanitarian and development work. NGOs adopted their own institutional arrangement, office structure and full-time workers that coordinate their activities from national to region and woreda level. Since pastoralist areas of Ethiopia are affected with sustained poverty and frequent drought, different NGO's are found in the four project regions with interventions of emergency humanitarian assistance, development interventions, tackling traditional harmful practices and gender-based violence. The presence of NGO and their level of engagement varies from region to region and from locality to locality, the following NGO are identified for their presence across the Afar, Somali, Oromia and SNNP project woredas based on the findings from the field visit and discussion made in the four regions for feasibility study.

- UNHCR.
- UNICEF.
- WFP.
- USAID.
- CARE.
- Oxfam.
- World Vision.
- Mercy corps.
- Danish refugee council.
- IRC.
- SOS Children's Villages Ethiopia.
- Save The Children.
- Wetlands International.
- GOAL.
- Action against Hunger.
- Plan International.
- Farm Africa.
- Mercy Corps.
- VSF.
- Pastoralist Forum Ethiopia (PFE) established as local umbrella NGO.

## **Research and Development (R&D)**

For achieving development results in pastoral areas with building capable human resources and creating stable systems, different public institutions are identified who are involved in a research and development



activities to come with tailored made livelihood improving innovations and building trained workforce in pastoral areas to respond to the growing demand for skilled labor.

Based on their vicinity to the four project regions and the thematic research involvement related to pastoral livelihood in ASAL , the lists below are identified research and development capacity building actors involved on conducting research and technology development on areas of rangeland management , breed improvement, rainfed and irrigated agriculture in arid and semi-arid areas, livestock production and productivity technologies and improved practices, socioeconomic research in pastoral areas, and piloting innovative approaches such as the provision of specialized business development services and others thematic research pertinent to improving the pastoral and agro pastoral livelihoods.

- Afar Pastoral and Dry-land Research Institute
- Somali Region Pastoral and Dry-land Research Institute
- Yabello Pastoral and Dry-land Agriculture Research Centre
- Oromia Agricultural Research Institute
- Southern Agricultural Research Institute
- Jigjiga University
- Kebri Dehar University
- Samara University
- Borana University
- Bule Hora University
- Madda Walabu University
- Wachemo University
- Mettu University
- Addis Ababa University - College of Veterinary Medicine

Since pastoral areas have lower human resource, organization, working process, and implementation capability, there is a strong need arise for working and collaborate with the available capacity building actors during the implementation of DRSLP II for avoiding duplication of efforts, creating synergy and brought great cumulative impacts.

#### **4.4 Macroeconomic Framework**

##### **4.4.1 Industries and factories, by type**

Ethiopia has pursued an active industrial policy since the early 2000s with a large set of carefully designed policy instruments. These include the promotion of exports and productive investment, industrial financing, and the use of state-owned enterprises (SOEs) to shape strategic sectors such as leather and leather goods, apparel and textiles, meat processing, food processing and beverages, cement and steel and horticulture (Oqubay, 2018). The industrial strategy envisions to build an industrial sector with the highest manufacturing capability in Africa, one which is diversified, globally competitive, environment friendly, and capable of significantly improving the living standards of the Ethiopian people by the year 2025 (MoI, 2014).

Industrial Parks (IP) proclamation of Ethiopia (886/2015) puts the following objectives of industrial parks establishment: 1) regulating the designation, development, and operation of industrial park; 2) contributing towards the development of the country's technological and industrial infrastructure; 3) encouraging private sector participation in manufacturing industries and related investments; 4) enhancing the competitiveness of the country's economic development; and 5) creating ample job opportunities, and achieving sustainable economic development (Azmach, 2019). More Recently, an integrated agro-industrial parks development (IAIPs), a geographic cluster of independent firms grouped together to gain economies of scale and positive externalities by sharing infrastructure and taking advantage of opportunities for bulk purchasing and selling,

training courses and extension services are flourishing. IAIP include open area production zones, controlled environment growing, knowledge hubs and research facilities, rural hubs, agri-infrastructure, collection centres, primary processing hubs, social infrastructure and agri-marketing infrastructure and have modern infrastructure. General infrastructure includes - roads, power, water, communications, drainage, sewerage, a sewage treatment plant and an effluent treatment plant and specialized infrastructure consists of cold storage units, quarantine facilities, quality control labs, quality certification centres, raw material storage and central processing centres. Each IAIP is served by a network of rural transformation centres which provide linkages to producers (UNIDO, undated).

#### **4.4.2 Local NRM enterprises including tourism and ecotourism**

Ethiopia has a long history of conservation. The country's geology, archeological sites and landscape as well as cultural diversity have been contributed for tourism development and promotion. The ecotourism includes journeys for bird viewing, sport fishermen, botanists and other ecologists, who interested on wildlife perspectives (Amare, 2015). Nature based tourism offers high revenue away from agricultural production. Although Ethiopia possesses ample untouched resources, ecotourism is still in its infancy. With such huge potential, the country should work hard for enhanced community-based ecotourism development with progressive natural resource management (Wassie, 2020). Although Borrena-Guji, South Omo and Afar are known destination of tourism and eco-tourism, most tourism operators and beneficiaries are not local communities. Community based tourism development is equally important to improve the benefits of tourism to promote community development and encourage local culture, authentic experiences and support a successful local tourism industry (Admasu, 2020).

#### **4.4.3 Trade and marketing networks**

Market infrastructure, especially fenced-off auction yards with watering facilities, has been a favorite investment by donors and government, but its impact on livestock trade often has been minimal. There are cases where improved market yards and loading facilities for animals sold at the market have proved to be beneficial. A recent study shows that their benefit to traders and herders in terms of reduced transaction costs and higher sales volume and prices is limited, which means that careful analyses need to be conducted before investing in specific market infrastructure. In fact, traders and sellers often avoid new market facilities because of the higher taxes and fees that are charged with new infrastructure. Instead, they are often found outside of new and expensive market facilities transacting their business.

Communications infrastructure, especially the expansion of cell phone networks, has positively affected livestock trade in the lowlands and it remains a sector where benefit–cost ratios are likely to remain favorable in the future. With increasingly better technologies, the potential to use mobile phone technology, including smart phones, to make trade more efficient and beneficial for all actors is considerable. If the past five years of rapid change are even a partial road map for the next five years, we can only expect greater innovations in trade and market behaviour and patterns in the future as a result of telecommunications.

It should be noted at the outset that livestock trade functions reasonably well in IGAD countries. There is impressive growth in the volume and value of trade in livestock and animal products in the region since 2001, markets are functioning reasonably well. A rough estimate is that trade in livestock and livestock products in the IGAD countries (Djibouti, Eritrea, Ethiopia, Kenya, Somalia, South Sudan, and Sudan) equals USD 1

billion or more in foreign exchange in many years, and probably 5-6 times that amount in local currencies (Aklilu *et al.*, 2013).

In the case of Ethiopia, during the seven years up to 2012, the volume of the informal cross border livestock trade was four times that of formal exports; however, this varies with animal species. Goats are the major species informally exported at 49% of the total, followed by cattle with 27%. The largest difference between formal and informal exports is goats (informal goat exports are more than 63 times formal exports), followed by cattle and sheep. About 74% of goats cross the border through Somali region, 24% through Afar region, 1% through Oromia and 1% through Southern Nations, Nationalities and People's Region (Legese and Fadiga, 2014).

Ethiopia's informal cross border livestock exports are now directed to Somalia, Djibouti and more recently, to Sudan. While cross border exports from Ethiopia into Kenya and Sudan are destined mainly for the domestic markets in those countries, Ethiopian exports to Djibouti and Somali (Somaliland and Puntland) are mostly re-exported to the Middle East (Aklilu, 2008). Desta *et al.* (2011) reported that live animal exports from Berbera and Bosaso have often reached a peak of 3 to 3.5 million per year. About 65% of this volume is believed to originate in Ethiopia. Informal markets positively affect the livelihood and food security of market agents, though the lost revenue adversely affects long-term development goals of the government through its impact on the tax base (Legesse and Fadiga, 2014).

This feasibility study found that establishing legal custom posts with up-to-date market information to facilitate cross border trade would benefit IGAD countries and significantly boost integration efforts. Moreover, instead of negotiating on individual livestock establishing weight-based marketing would increase market efficiency and time consumption on dealing with each and individual livestock.

#### **4.4.4 Marketing and trade capacity building support by government /Banks**

Ethiopian Government has made efforts for Cooperatives and Union development and capacity building through cooperative Promotion Agency. Serious efforts are being made to strengthen capital of cooperatives base through increasing members' subscription, mobilization of savings and value addition. The cooperatives were thus permitted to exchange their members' product, improve market access and directly provide their produce to the market through improving the bargaining power of members. Cooperatives in Ethiopia are playing an active role in the fields of banking, input and output marketing, agro-processing, storage, dairy, and many other social and economic activities (Abebaw and Dejen, 2019).

During this feasibility study field visits the team found multipurpose cooperatives, saving and credit cooperatives and commodity specific cooperatives in each district and Kebele that serve the communities very well. However, they needed finance, further trainings on business development, saving and credit and leadership to transform the sector they involve and exploit the maximum potential of resource available and make their community more resilient. Government and private commercial banks are potential sources of financing for businesses in pastoral and agro-pastoral areas. The governing issue is that all the banks need security (physical assets) for the loan, but it is difficult for most new business operators engaged in the livestock business and smallholder livestock producers to provide such security.

Microfinance institutions are the other important sources of financing for agribusinesses, including the livestock sector. The microfinance institutions need group collateral to extend loans to small business operators and farmers/ pastoralists. In addition to their demand for group collateral, the amount of money these institutions make available for lending to individual borrowers is too small to run livestock businesses. A high interest rate is also prohibitive for the target users. They charge as high as 18% per year and although they serve both urban and rural dwellers, the interest rate is higher for rural borrowers because follow-up costs are higher. The short gestation period of microfinance credits does not take into account the nature of livestock production. Farmers and pastoralists are required to start repayment of the credit before the animals start to give birth or achieve better condition (by fattening) and to be sold at higher prices. This means rural youth who are keen to start livestock businesses lack credit.

The Ethiopian microfinance market is dominated by a few large MFIs, all of which are linked to regional state government ownership (Ebisa *et al.*, 2013). The four largest institutions account for 71% of market share in terms of borrowing clients and 82% by loan provision. Owing to the lack of such services from mainstream sources, livestock traders were given financial credit by non-government organizations (NGOs) on two separate occasions in the past five years to purchase drought-stricken animals in Ethiopia. In such cases, substantial numbers of animals were purchased and the loans were repaid in full. However, the absence of similar financial services in normal market operations means that most livestock transactions in pastoral areas take place on credit (Aklilu *et al.*, 2013).

Potentially adding value to livestock produced in the pastoral production system, service providers, largely providing veterinary services to producers. To the extent that animals are disease free and healthy, they are able to access higher returns in domestic and international markets. Another subgroup of animal finishers purchases livestock produced in the rangelands and over a short period provides the animals with commercial feed and care that renders them higher-value commodities. Value addition can also be practiced in some areas of the rangelands by using windows of opportunity over a short period. Doing so could potentially transform the mind-set of pastoralists to producing for the market and increase the income they receive per animal unit.

#### 4.5 Beneficiaries of the project/site, disaggregated by Gender

The proposed national program will have a target beneficiary of pastoral and agro-pastoral communities living across 4 regions and 4 respective IGAD clusters. The program aims to benefit 428,852 vulnerable households which make up a population of 2.27 million (Table 3 and 4). The beneficiaries include men, women and youth vulnerable to recurrent droughts whose lives and livelihoods are being affected. Gender equity is considered as the main pillar of the project intervention and project activities aim to benefit rural households regardless of disaggregating by gender. Therefore, 50:50 proportion of male to female rural communities are expected to benefit from the project intervention. In particular, members of the pastoralist and agro-pastoral communities vulnerable to climate change and climate variability will be given utmost priority. From the previous DRSLP - I experience, female pastoralists and unemployed group of the community were involved in the business opportunity created by the project.

Table 3 Number of program beneficiary population and households across districts

Region	District	Population/Households				
		Male	Female	Total	%Female	# of Households
SNNP	Bero	39,597	34,620	74,217	46.6	14,439
	Daseneche	35,300	36,637	71,937	50.9	13,996
	Gechit	63,639	67,582	131,221	51.5	25,529
	Goba	46,479	52,333	98,812	53.0	19,224
	Gorgesha	16,134	16,827	32,961	51.1	6,413
	Hamer	49,016	39,167	88,183	44.4	17,156
	Maji	23,571	24,827	48,398	51.3	9,416
	Nyangatom	13,237	13,296	26,533	50.1	5,162
Oromia	Adola reda	42,885	42,204	85,089	49.6	16,554
	Aga Weyu	39,341	41,367	80,708	51.3	15,702
	Wadera	36,797	46,197	82,994	55.7	16,147
	Dugda Dawa	83,985	14,924	98,909	15.1	19,243
	Dilo	23,511	23,829	47,340	50.3	9,210
	Guchi	28,812	28,526	57,338	49.8	11,155
	Dubuliki	54,861	49,015	103,876	47.2	20,209
Afar	Berahle	59,099	45,580	104,679	43.5	20,366
	Dalifage	29,146	20,909	50,055	41.8	9,738
	Dewe	28,693	24,443	53,136	46.0	10,338
	Dulesa	14,281	12,825	27,106	47.3	5,274
	Elida'ar	53,273	47,408	100,681	47.1	19,588
	Gereni					
	Gulina	36,625	29,536	66,161	44.6	12,872
	Hadele'ela	27,544	23,745	51,289	46.3	9,978
Somali	Gashamo	100,991	108,455	209,446	51.8	40,748
	Dolo-Ado	107,379	108,592	215,971	50.3	42,018
	Hadagalo	45,124	34,774	79,898	43.5	15,544
	Barey	72,484	50,314	122,798	41.0	23,891
	Higloley	28,420	29,580	58,000	51.0	11,284
	Ararso					
	Goljano					

	Birqod					
<b>Total</b>		<b>1,200,224</b>	<b>1,067,512</b>	<b>2,267,736</b>	<b>47.1</b>	<b>441,194</b>

Table 4: Total number of beneficiaries across the 4 regions and 4 IGAD clusters

<b>Region/Cluster</b>	<b>Population</b>	<b>Number of households</b>	<b>%age of Total</b>
SNNP (Karamoja cluster)	572,262	109,620	25.2
Oromia (Borena-Mersabet cluster)	556,254	105,984	24.5
Afar (Dikil cluster)	453,107	86,391	20.0
Somali (Mandera cluster)	686,113	126,858	30.3
<b>Total (Intervention area)</b>	<b>2,267,736</b>	<b>428,852</b>	<b>100.0</b>

## **5. Political and Institutional Framework for Natural Resources Management**

### **5.1 Environmental Protection and Sustainable Development**

The key purpose of the ESAP is to improve decision-making and project results by ensuring that Bank-financed operations conform to the requirements laid out in the OSs and are thus sustainable. It is with this goal in mind that the ESAP require that environmental, climate change and social considerations are assessed early in the Project Cycle and are reflected in project selection, site selection, planning and design.

#### **5.1.1 Adhesion to international and regional conventions**

##### **a) International level**

Since environmental assessments were first promoted in the US under the 1969 National Environmental Protection Act (NEPA), they have been embraced by a large number of national legal systems. Numerous international conventions, the policies of multilateral development banks, and various non-binding instruments adopted at the regional and global level – all now call for the use of environmental impact statement EIAs (Sands, 2003). Agenda 21 calls on all countries to assess the environmental suitability of infrastructure for human settlements, to ensure that relevant decisions are preceded by EIAs and to take into account the costs of any ecological consequences. It also calls on countries to integrate environmental considerations in decision-making at all levels and in all ministries and to ensure that transparency and accountability prevail when economic or other policies have environmental repercussions.

Reviewed applicable International Conventions to which Ethiopia is a party includes:

- Convention on Biological Diversity.
- Framework Convention on Climate Change.
- Vienna Convention on the Protection of the Ozone Layer.
- United Nations Conventions to Combat Desertification.
- Stockholm Convention.
- Convention on International Trade in Endangered Species of Fauna and Flora.
- Basel Convention.

##### **b) African Development Bank integrated safeguard systems**

The AfDB environmental and social assessment procedures (ESAP) revised version 2015 will have followed and adopted the Integrated Safeguard System (ISS) as a tool for identifying risks, reducing development costs and improving project sustainability. The ISS promotes best practices in these areas but also encourages greater transparency and accountability and protects the most vulnerable communities. The bank has now adopted five Operating Safeguards (OSs) to achieve the goals and the optimal functioning of the Integrated Safeguards System. These OSs are:

- OS1 Environmental and Social Assessment: The project has been categorised as Category 1 and therefore requires a full environmental and social impact assessment;
- OS2 Involuntary Resettlement: Land Acquisition, Population Displacement and Compensation The project will cause physical and economic displacement necessitating the preparation of a full resettlement action plan;
- OS 3: Biodiversity and Ecosystem Services: The project is to be located in a habitat where there may be potential biodiversity impacts or in areas providing ecosystem services upon which potentially affected stakeholders are dependent for survival, sustenance, livelihood or primary income, or which are used for sustaining the project.

- **OS4 Pollution Prevention and Control, Greenhouse Gases, Hazardous Materials and Resource Efficiency:** Construction and operational activities will create some pollution in the form of dust and vehicle emissions and sediment loading of water courses, and will use gravel, hard stone, water and sand resources.
- **OS5 Labour Conditions, Health and Safety:** The project will require a labour force comprising both skilled and non-skilled workers whose working conditions, health and safety should be respected, while at the same time the local communities must be protected from adverse social interactions with the contractor's labour force.

Based on this the current assignment was Environmental and Social Assessment Procedures and National requirements. The updating exercise includes identification of all environmental and social impacts associated with the proposed interventions. It also comprises development of appropriate mitigation measures for each identified negative impacts to ensure that the construction and operation activities under this proposed project are implemented in an environmentally sound and socially acceptable manner with no or minimum impact to the nearby biophysical and social environment. This detailed study document is included in SESA.

#### c) **National levels legal framework for EIA**

**The FDRE Constitution** - Being a supreme law of a land, a constitution provides the basic framework on which detailed laws shall be developed for various sectors. The 1995 Constitution of the Federal Democratic Republic of Ethiopia contains provisions that support the enactment of EIA legislation. In this regard, it stipulates that the design and implementation of development programs and projects in the country should not damage or destroy the environment; and recognizes the right of the people to be consulted and express their views on the planning and implementation of environmental policies and projects that affect them (Art. 92). In addition, the constitution recognizes the right of citizens to live in a clean environment, and, where they are displaced or their livelihood has been adversely affected by the development projects undertaken by the government, the rights to get commensurate monetary or alternative compensation, including relocation with adequate state assistance (Art. 44). These provisions provide a perfect constitutional basis for the development and implementation of an effective EIA process.

**Environmental impact assessment law** - The Ethiopian government introduced the Environmental Impact Assessment Proclamation (Proclamation № 299 of 2002). The proclamation requires an EIA process for any planned development project or public policy which is likely to have a negative impact on the environment. With regard to development projects, the proclamation stipulates that no person shall commence implementation of a proposed project identified by directive as requiring EIA without first passing through environmental impact assessment process and obtaining authorization from the competent environmental agency (Art. 3(1)). In line with this, project proponents must undertake EIA and submit the report to the concerned environmental body, and, when implementing the project, fulfill the terms and conditions of the EIA authorization given to them (Art. 7).

**Business law** - Business is one of the economic activities that has an impact on the environment. Thus, EIA should be integrated into the laws and regulations that regulate the licensing and operation of businesses. The licensing and operation of business activities in the country at present are regulated by the Trade Registration and Business Licensing Proclamation (Proclamation № 67/1997). The proclamation subjects the undertaking of commercial activities in the country to the requirement of business license. Article 21 of the proclamation



stipulates that no person may carry on commercial activity without obtaining a business license. Article 22(2) of the proclamation requires presentation of a certificate from environmental agencies to the effect that the intended business activity does not violate environmental protection laws as precondition for the granting of business license. The proclamation also states that, if a licensed business is ascertained to have violated environmental protection laws, its license may be suspended until the violation is rectified.

Given that environmental impact assessment is one component of environmental laws, it can be inferred that the Trade Registration and Business Licensing Proclamation (Proclamation № 67/1997) has integrated EIA into the framework regulating the licensing and the operation of businesses. In other words, the proclamation provides a legal basis to require a business license applicant to seek an EIA authorization from environmental agencies before the trade license is issued, and to suspend or revoke the trade license should the business owner fail to comply with the conditionality's specified in the EIA authorization.

**Investment law** - Investment is an expenditure of capital by private individuals to establish a new business or to expand or upgrade a business that already exists. Legislation often seeks to provide incentives to promote private capital investment, especially by promoting participation of foreigners in the national economy. In Ethiopia, where investment has boomed in recent years, causing deleterious effects on the environment and natural resource base of the country, it is crucial that EIA be integrated with the current legal framework for investment. The Investment Proclamation № 280 of 2002 (as amended by Proclamation № 375/2003) and Investment Regulation № 84 of 2003 are the laws that regulate investment activities in the country at present. According to the Investment Proclamation, having an investment permit is a requirement for foreign nationals to undertake any commercial activities in Ethiopia; they cannot carry out commercial activity in the country without first having an investment permit.

**Land law** - The legal framework governing how land is allocated for investment presents other possibilities for the incorporation of EIA. Regarding the utilization of land for investment, Ethiopia's 1995 Constitution provides for the right of investors to obtain land for investment purpose on lease in accordance with conditions to be specified by subsidiary laws (Art. 40). In line with this, the Rural Land Administration and Use Proclamation (Proclamation № 456/2005) recognizes the right of investors to obtain and use rural land, provided that priority is given to peasants and pastoralists (Art. 5(4) (a)). Once land has been allocated, the proclamation obliges landholders to sustainably use and manage the property. Land users thus face the threat of losing their right to the land in the case that the holding is damaged due to misuse and mismanagement, in accordance with details to be specified by regional land laws.

Having provided the guiding rules, the Rural Land Administration and Use Proclamation (Proclamation № 456/2005) leaves the particulars to be legislated by regional states, allowing for the spirit of the law to be interpreted in harmony with the situation on the ground in their respective regions. Accordingly, regions have issued their regional rural land laws in recognition of the rights of investors to obtain and use rural land. The Rural Land Administration and Utilization Proclamation of the Southern Regional State (Proclamation № 110/2007), for instance, recognizes the rights of private investors to obtain rural land for investment, with priority given to peasants and pastoralists (Art. 5(15). and Art. 10(5) of the proclamation further stipulate that the development plan submitted by investors seeking land must not lead to the degradation of the land or surrounding environment). In addition, it obliges investors to sustainably manage their holding, including any and all natural resources therein (Article 10(6)). While the rural land law of the Southern Nations Regional State stipulates that the development plan that investors present to obtain rural land must not lead to land or environmental degradation, it fails to subject the allocation of rural land to the requirement of EIA.

**Fishery law** - The government has ratified fishery legislation with a view to ensure the conservation, development and utilization of fishery resources in the country (Proclamation № 315 of 2003). Fishery laws seek to ensure the sustainable use of fishery resources in the country. To this end, the proclamation stipulates that federal or regional organs should ensure that development programs and projects will not have a negative impact on the fishery resources of a basin (Art. 8). In addition, it states that any subsidiary fishery laws and regulations to be developed under the proclamation should incorporate EIA. Furthermore, it states that permits for the establishment and operation of an aquaculture for commercial purposes shall not be issued unless there is sufficient land and water resources and unless it has been ascertained by the competent authorities that the intended aquaculture will not cause negative impact on the surrounding environment and natural resources (Art. 6). While the proclamation contains important provisions that support EIA relevant to the sustainable utilization of fishery resources, it does not specifically require fishery developers to submit an EIA report to environmental agencies.

**Wildlife law** - The management and utilization of wildlife resources in the country was regulated, until recently, by the wildlife legislation issued in 1980 (Proclamation № 192 of 1980), which remained unchanged in spite of the new trends in wildlife management. A new Wildlife Proclamation was finally enacted with the view to adapt the management of wildlife to existing realities (Proclamation № 541/2007). Recognizing that the previous strategy to conserve wildlife was not working, the new Wildlife Proclamation seeks to enable the active participation of local communities living around wildlife conservation areas and private investors in the conservation, development and utilization of wildlife resources; and to enhance the contribution of wildlife resources to poverty reduction by maximizing their economic benefit. In relation to maximizing the economic benefit from the wildlife resources of the country, the proclamation encourages investment in wildlife-based tourism, to be conducted in such a way that shall not endanger the ecological integrity of protected areas (Art. 11). In addition, it requires that any economic activity to be undertaken in wildlife conservation areas shall be carried out in accordance with the proclamation, and its corresponding regulations and directives (Art. 10).

**Water law** - The conservation, utilization and development of water resources in the country at present is regulated by the 2000 Water Resources Proclamation (Proclamation № 197/2000) and the 2005 water resources regulation (Regulations № 115 of 2005). The Water Resources Proclamation aims to ensure that the water resources of the country are duly conserved and protected from harmful effects and utilized for the highest social and economic benefits of the country. Accordingly, the proclamation describes the measures that must be taken for the conservation and protection of waterways and the conditions under which water resources may be exploited. The proclamation prohibits the release of any waste that endangers the lives of humans, animals or plants into water bodies. In addition, it prohibits the clearing of trees or vegetation and the construction of residential houses along the banks of water bodies so as to ensure their protection. Related to the utilization of water resources, the proclamation establishes a system of water resource utilization based on permits. For example, permits are required for the construction of waterworks and for the supply or transfer of water, even if the water is received from another supplier. The water resources regulation lays out the conditions for the issuance, suspension or termination of a water use permit. In this regard, it stipulates that a water use permit will not be issued if the plans entail the creation of pollution or harmful effects to the water resources and the environment. In addition, it states that a water use permit may be terminated or suspended if the water resource in use is temporarily or permanently depleted, or if the usage of the water resource has caused negative impact on the environment. While the water law seeks to ensure the sustainable use of water

resources, it falls short of making EIA a mandatory requirement for the issuance of water use and development permits.

**Mining law** - The Mining Proclamation (Proclamation № 52/1993) and the Mining Operations Regulation (regulation № 182/1994) regulate the mining of mineral resources in the country. These mining laws contain provisions aimed at ensuring that mining activities are carried out in a way and manner that shall not cause significant damage to the environment. In this respect, the mining laws determine the rules on the utilization of water and timber resources in a mining area. While the mining law allows a miner to use water and timber found in the leased area for the mining operation, it requires at the same time that the use of water should not result in substantial reduction of the quantity or quality of the water needed by other users. It also stipulates that one cannot construct dam or divert watercourses without the prior approval of the appropriate government body. With the exception of the clause on pollution, the mining law does not strictly prohibit uses of water by miners that may cause other environmental problems, such as damage the ecosystem, reduce biodiversity or degrade water resources. Holders of a mining license may log and use timber as dictated by other applicable laws and must submit a restoration plan. Moreover, the mining law obliges a licensee to conduct the operation in a manner that minimizes damage or pollution to the environment. It also requires a licensee to immediately notify the licensing authority of anything likely to jeopardize the property or the environment and to immediately take the necessary steps to mitigate the impacts.

**Genetic resource law** - Following the Convention on Biological Diversity, the government of Ethiopia enacted legislation which provides for community rights and access to genetic resources and traditional knowledge (Proclamation № 482/2006). The proclamation subjects access to genetic resources and community knowledge in the country to the requirement of permit from the Institute of Biodiversity Conservation, and stipulates the conditions under which access to genetic resources may be denied. Though the proclamation does not directly stipulate that an access application should first go through an EIA process as such, it does contain provisions meant to ensure that access to genetic resources is carried out without causing harm to the environment. In this regard, it states that access may be denied if the planned use may cause, inter alia, an undesirable impact on the environment, an ecosystem, human health or the cultural values of local communities (Art. 13). It also obliges an access permit grantee to respect the laws of the country, particularly those relating to sanitary control, biosafety and environmental protection (Art. 17). Again, however, the law fails to require applicants wishing access to genetic resources to conduct a formal EIA process.

### **The Institutional Framework of EIA**

The current system of government in Ethiopia is organized into a federal structure, comprised of a federal government and 10 regional states. Government administration of EIA in Ethiopia is thus shared between the federal government and regional states. This section provides an overview of the institutions responsible for, and relevant to, the administration of EIA in the country.

The former Environmental Protection Agency and the current Environment, Forest and Climate Change Commission is the lead federal environmental organ with the objective of formulating policies, strategies, laws and standards to ensure social and economic development activities in the country sustainably enhance human welfare and the safety of the environment (Art. 6). Specifically, it is responsible for developing a directive that identifies categories of projects likely to have negative impact and thus require EIA, and for issuing guidelines that direct the preparation and evaluation of EIA study reports (Proclamation № 299/2002,

Art. 5 & 8). In addition, EPA is responsible for evaluating the EIA study reports on projects subject to federal licensing, execution or suspension and on projects likely to create inter-regional impacts. The EPA is also responsible for auditing and regulating the implementation of such projects.

**Regional environmental agencies** - The Environmental Protection Organs Establishment Proclamation (Proclamation № 295/2002) requires regional states to establish or designate their own regional environmental agencies. The regional environmental agencies are responsible for coordinating the formulation, implementation, review and revision of regional conservation strategies; and for environmental monitoring, protection and regulation (Art. 15). Relating to EIA specifically, the Environmental Impact Assessment Proclamation (Proclamation № 299 of 2002) gives regional environmental agencies the responsibility to evaluate the EIA study reports on projects that are licensed, executed or supervised by regional states and that are not likely to entail inter-regional impacts. Regional environmental agencies are also responsible for auditing and regulating the implementation of such projects.

**Sectoral environmental units** - The other environmental organs created by the Environmental Protection Organs Establishment Proclamation (Proclamation № 295/2002) are the “Sectoral Environmental Units,” which are mandated to be established at every competent agency with the responsibility of coordinating and following up activities in harmony with environmental protection laws and requirements (art. 14). Such sectoral environmental units can play important role in ensuring that EIA is carried on development projects and public instruments initiated by government institutions. Given that environmental impact assessment is one component of environmental laws, it can be inferred that the Trade Registration and Business Licensing Proclamation (Proclamation № 67/1997) has integrated EIA into the framework regulating the licensing and the operation of businesses. In other words, the proclamation provides a legal basis to require a business license applicant to seek an EIA authorization from environmental agencies before the trade license is issued, and to suspend or revoke the trade license should the business owner fail to comply with the conditionality specified in the EIA authorization. All these instruments attest that EIA has been adopted both at national and international levels as a substantive and procedural legal tool for predicting the possible positive and negative environmental impacts and formulating mitigation strategies.

### **5.1.2 Contribution to sustainable development goals**

Ethiopia, like many African countries, has endorsed the Millennium Development Goals. It has also elaborated a national development strategy which has passed through 3 stages of implementation, each of which has been for 5 years. These are Poverty Reduction Strategy Paper (PRSP) (2000/2001 to 2005/2006); Plan for Accelerated Sustainable Development to End Poverty (PASDEP) (2005/2006 to 2010/11) and the current one called Growth and Transformation Plan (GTPI) (2010/11 to 2014/15) and Growth and Transformation Plan II (GTP II) (2015/16-2019/20). Environmental sustainability has been given due attention in all the past development programmers and environmental goals have been set within the GTP and its offshoot, the Climate Resilient Green Economy (CRGE) vision and strategy. A series of consultations at all levels had been conducted before the strategy was approved. To implement the CRGE, new institutions and/or organizational structures have been put in place since then. Key among these is the establishment of the former Ministry of Environment and Climate Change and the current Environment, forest climate change commission to oversee and coordinate the implementation of the CRGE strategy.

Ethiopia-Djibouti Transport Corridor Project Phase I Program (approval date December 2005)

The objective of the project was to provide improved and sustainable road transport infrastructure that will service Ethiopia's key trade route, deliver bankable designed road projects in Djibouti and build capacity of the Djibouti's Transport sector and expected to play a key role in achieving the objectives of Growth and Transformation Plan II (GTP-II) and in driving sustained poverty reduction in Ethiopia.

In GTP I, pastoralists as well as those engaged in mixed farming benefit from development, measures related to indigenous animal disease prevention and control; water and pasture development and strengthening marketing systems have been undertaken. Moreover, to ensure sustained benefits to pastoralists, they have been encouraged and supported to lead sedentary life on voluntary basis by developing irrigation farming systems. To this effect, beneficiary focused livestock development need to be given utmost emphasis in all development endeavors pertaining to pastoralists and semi pastoralists. In sum, progress made, lessons drawn and experience gained during GTP I will serve as a strong foundation for sustaining growth, accelerate poverty reduction.

During GTP I and GTPII periods, efforts were made to coordinate the mobilization of women and youth organizations with the development and governance programs of governmental bodies. This was first and foremost accomplished by effectively mainstreaming women and youth agendas in the national development and governance strategy of the country. Regional and local governments have also followed suit in mainstreaming women and youth issues in their development plans. The progress made in mainstreaming women and youth agendas in all socioeconomic sectors has therefore been very encouraging.

### **5.1.3 Implementing Institutions, Support Agencies and Challenges**

#### **Implementing Institutions**

Several stakeholders, such as federal institutions, regional state institutions, city administrative, non-governmental organizations and professional societies, private sectors, international partners, and local communities. The duties and responsibilities of some stakeholders are accorded through legal mandate articulated in the respective establishment proclamations. Environment, Forest and Climate Change Commission re-established in, and its mandates originated from the former EPA and the forest sector from Ministry of Agriculture. The powers and responsibilities of the EFCCC include:

- preparing, reviewing and updating the preparation of environmental policies, strategies and laws and upon approval, monitor and enforce their implementation;
- establishing a system for environmental impact assessment of public and private projects, as well as social and economic development policies, strategies, laws and programs; and
- undertaking consultation with competent agencies to formulate environmental safety policies and laws in relation to alien species.
- The Proclamation also has provisions that treat the conditions under which sectoral environmental units and regional environmental offices are to be established.

#### **Challenges**

Ethiopia is ancient country practicing crop cultivation for centuries. As a consequence and because of population growth coupled with changing climatic conditions over the past several decades, environmental degradation has drastically affected the natural resources and socio-economic infrastructure of the country are -

- Lack of Awareness: The EIA in Ethiopia is very little known among different stakeholders, and this makes its implementation difficult. It is even believed that those who are in a position to implement the

law at different levels, especially at Zonal and District levels do not have sufficient knowledge about EIA and related laws.

- Lack of capacity: The issue of capacity is very important in determining the full implementation of EIA process. Training and education in EIA contribute to capacity building.
- Lack of Incentives: It is assumed that the use of economic incentives is important to identify and understand different activities and forces that comprise the economic causes of environmental loss.
- Massive deforestation and de-vegetation takes place for want of cultivable land so as to accommodate the increasing rural population. This has exposed the soil for wind and running water erosions; thus depleting the soil nutrients.
- Industries are releasing untreated effluent/discharge into the surrounding rivers and streams,
- lack of environmental awareness concerning the linkage between environment and development in general,
- Weak participation of the people and community-based organizations in environmental management activities are some of the environmental challenges Ethiopia is facing nowadays,
- There were limitations in implementation capacity at different levels to achieve the targets set for different sectors.

**Invasive Alien Species (IAS)** - About 35 IAS are reported in Ethiopia, of which, the major six IAS have been reported as causing environmental, socio-economical and health damages. For example, *Parthenium* sp., *Prosopis* sp., and *Lantana* sp. cause significant damage to crops, and rangeland species leading to changes in vegetation composition, *Eichhornia* sp. has been causing an enormous problem in lakes, ponds, reservoirs and irrigation canals, and *Dactylopius* sp, and the parasitic weeds such as *Striga*, *Orobancha* and *Cuscuta* species affect agricultural production and productivity. These problems continue to grow and causing greater socio-economic, health and ecological cost in the country.

The escalation of negative impacts of IAS associated with invasions has led to an increasing in the number of projects that aim to reduce the negative effects of these invasions. However, the management efforts are fragmented and there no a comprehensive policy and strategic action plans in place to manage IAS that could guide responsible actors to integrate and converge their efforts and resources. In addition, there are no clear mechanisms to translate the existing policies into actions. Invasive alien species (IAS) is becoming increasingly problematic in Ethiopia and is the second most important factor that affects environment and biodiversity in global perspective (GEF, 2003, UNEP 2010). Despite several efforts to manage the IAS in Ethiopia, the problem continues unabated.

In certain cases, there has been specific strategies developed for the purpose of controlling or managing the IAS as is the case of, the Ethiopian Prosopis Strategy (MoLF, 2017) and the National Water Hyacinth Strategy (MoWIE, 2019). Along with the Ethiopian Prosopis Strategy initiative for the control or management of Prosopis, other initiatives of national IAS management guidelines were also prepared that are highlighted above.

The general objective of this strategic document is to establish a national framework and action plan by which responsible federal and regional institutions, stakeholders, and partners will be guided for their efforts in planning, implementing and evaluating the prevention, control and management of IAS so as to reduce adverse impacts of IAS and achieve sustainable economic development. A strategic plan 2021-2030 for the

prevention of Invasive Aliens Species infestation is currently being developed and reviewed by stakeholders. According to the review; it is preparing to release the final document.

## **5.2 Agricultural Development and Valuation of Natural Resources**

### **5.2.1 Linkages with IGAD Regional Strategy and Regional Programming Paper**

The IGAD Regional Strategy Framework (2016-2020) stipulates that IGAD member states at its establishment have identified 20 areas of cooperation that are regrouped into four pillars. The four pillars are - Pillar 1: Agriculture, Natural Resources and Environment, Pillar 2: Economic Cooperation, Integration and Social Development, Pillar 3: Peace and Security; and Humanitarian Affairs, and Pillar 4: Corporate Development Services (IGAD, 2016). In particular Pillar 1 has a thematic focus of regional development in five key areas including - a) agriculture, livestock and food security program, b) natural resources management program, c) environmental protection program, and d) climate variability and change and disaster risk management areas the DRSLP II focuses on. This therefore gives the proposed DRSLP II program to have a very strong alignment with IGAD's regional strategy objectives and thematic focus that guides its engagement with its member countries. Moreover, IGAD's Regional Strategy Implementation Plan (2016-2020) identifies four key intervention areas - a) appropriate Development Policies, b) development Information and Knowledge Sharing, c) capacity Building, and d) research, Science and Technology Agendas. The proposed DRSLP II program areas, in particular, render to have strong alignment with abovementioned intervention areas including those on capacity building and appropriate development policies. Moreover, the programmatic approach that the IGAD strategy promotes strongly supports the DRSLP II multi-sectoral and programmatic approach.

The IGAD IDDRSI Regional Programming Paper (2019 - 2024) provides a common framework for regional programs aimed at ending drought emergencies, enhance drought resilience and build sustainability in IGAD region. The RPP identifies eight priority Regional Strategic Intervention Areas (PIAs) that guide programming across IGAD's member states. The PIAs are PIA1: Natural resources and environmental management, PIA2: Market access, trade and financial services, PIA3: Enhanced production and livelihood diversification, PIA4: Disaster risk management, PIA5: Research, knowledge management and technology transfer, PIA6: Peace building, conflict prevention and resolution, PIA7: Institutional strengthening, coordination and partnerships, and PIA8: Human capital, gender and social develop (IGAD, 2019). All the intervention areas and components proposed in the national component of the DRSLP II therefore have a very strong alignment with the RPP. The alignment primarily comes from the fact that dry land areas and drought-prone communities in IGAD region face common challenges and are often interconnected through, *inter alia*, natural resource sharing, livestock movement, regional trade and trans-boundary human and animal diseases.

### **5.2.2 Linkages with AfDB Feed-Africa Strategy 2016-2025**

The Feed Africa Strategy 2016-2025 envisions to transform African agriculture into a competitive and inclusive agribusiness sector that creates jobs and wealth, improves lives and secures the environment. The strategy targets initial set of agricultural commodity value chains and agro-ecological zones identified as being initial lead areas for investment. The lead areas for investment include - 1) achieve self-sufficiency in key commodities (rice, wheat, fish, palm oil, horticulture, cassava), 2) move up the value chain in key export orientated commodities (cocoa, coffee, cotton, cashew), 3) creating a food secure Sahel (sorghum, millet, cowpea, livestock) and, 4) realizing the potential of the Guinea Savannah (maize, soybean, livestock). To

achieve this, the strategy at the outputs level promotes - 1) large-scale dissemination of productivity-increasing technologies, inputs and capital, 2) sufficient hard and market infrastructure to ensure competitiveness, and 3) well-funded private sector capable of scaling emergent agribusiness successes. Though the initial lead areas primarily focus on food and cash crop commodity value chains, it also has intervention areas in the livestock sector (including Fish) with a geographic focus on the Sahel and Guinea Savannah.

Therefore, the proposed DRSLP II program components and subsequent interventions have strong alignment with the Feed-Africa Strategy regional program focus areas. In particular, the program interventions in Component 2 (Supporting agribusiness development), and Component 1 (Strengthening the resilience of pastoral and agro-sylvo-pastoral production systems to climate change) have a very strong alignment with the livestock component interventions of the Feed-Africa initiative. Moreover, Component 3 (Strengthening adaptive capacity to climate change) which aims to strengthen agricultural support services around specific and targeted value-chain transformation agendas has also considerable alignments with Feed-Africa Strategy objectives and interventions. More importantly, the Feed Africa Strategy and the DRSLP II program calls for the active involvement and strong alignment of the public sector, private sector and development actors to achieve the agriculture sector transformational goals.

### **5.3 Land Management**

Essentially, land is a true asset for about 85% of the Ethiopian whose livelihood based on agriculture. Land management is a remedy for the degraded and potentially degradable land. It helps to increase production and productivity and reducing seasonal fluctuation in yields and build the resilience capacity of the community to adverse situations. Therefore, SLM is about people looking after the land for the present and for the future. The main objective of SLM is therefore to harmonize people's coexistence with nature over the long-term. Thus, people can enjoy the livelihood supports and ecosystem services drawn from well managed land.

Public mobilization to derive free labor for SLM draws power from political support and impetus catered by the federal, regional, and local governments (Leta *et al.*, 2018a). In order to reinforce subsequent implementation of SLM, political directions are issued from the umbrella down to lower levels such as the district (*woreda*) and the *kebele* (lower-level administrative unit). Accordingly, each *woreda* implement SLM activities with the participation of the *kebele* cabinets, extension units and relevant lower-level development actors, tasked to follow-up and assist the mobilization and implementation of SLM.

As to the institutional framework, the government of Ethiopia has formally established a National SLM platform comprising of multi-sectoral and multi-stakeholder National Steering Committee and Technical Committee supported by a secretariat and chaired by the State Minister for Federal Ministry of Agriculture and Natural Resources. Likewise, the regional bureau, zonal and *woreda* office of agriculture have established SLM platforms with representative cabinet members from multi-sectoral offices in the six regional states of Amhara, Benishangul-Gumuz, Gambela, Oromia, Southern Nations, Nationalities, and People Region (SNNPR) and Tigray (MoARD, 2010). Apart from the formal institutions and representative sector offices at different levels, informal institutions such as *Iddir* (self-help association) helps to reinforce the management of natural resources (Leta *et al.*, 2019).

#### **5.3.1 Linkage with UNCCD/Global Mechanism's-Land Degradation Neutrality (LDN)**



IDDRSI is strongly linked with Drought Resilience, Adaptation and Management Policy Framework (DRAMPF) of the UNCCD (Crossman, 2019). The intent to raise the awareness and build the capacity and increases the resilience among communities to the rising threats of land degradation and desertification triggered by climate change and drought is an overarching goal that the IDDRIS shared with DRAMPF. Further, Land Degradation Neutrality (LDN) also provides a supporting framework to manage both land and water resources sustainably at landscape level (UNCCD and FAO, 2020). It encourages the adoption of a broad range of measures to arrest or reduce land degradation through appropriate participatory planning, implementation and scaling up of SLM practices. Thus, the IDDRSI shared not only the feature but also the principles with UNCCD and LDN.

### **5.3.2 Implementing institutions, support agencies and challenges**

International donor communities and financial institutes such as the World Bank, AfDB, and KFW finance and support the implementation of SLM. IGAD is also a regional partner promoting institutional development and implementation of SLM through building partnerships amongst countries in the horn of Africa. The nucleus actor for implementing SLM in Ethiopia is the government through its Ministry of Agriculture (MoA). The government of Ethiopia at different levels: national, regional, zonal, district and *kebele* level through the leadership of public administration and frontline agricultural actors adopt and implement SLM. Essentially, the government has been implementing SLM activities since 1980s. As of 2006, SLM activities have been included in the country's subsequent five-year strategic plans (MoFED, 2006). Also, the agricultural extension system along with NRM units plays indispensable role in facilitating/implementing, follow-up and scaling up/out significant land management technologies and practices. Similarly, in the ASAL of the country such as Somali region, Livestock Resource & pastoral Development Bureau and line offices at different levels through its NRM department and the pastoralist and dry-land community, tasked with role of implementing SLM. Actually, naming of the institutes/organizations may vary from region to region. For instance, the implementing organization in Afar region is known as Livestock, Agriculture and Natural resources bureau or line offices along with the pastoralist and dry-land community. Regardless of the distinction in naming, all the regional bureaus are operating under the umbrella of MoA.

Other flagship programs such as productive safety net program (PSNP), Sustainable Land Management Program (SLMP), Managing Environmental Resources to Enable Transitions to more sustainable livelihoods (MERET) project of the world food program (WFP) and agricultural growth program (AGP) are supporting/implementing institutions. Also various non-governmental organizations (NGOs), bilateral and multilateral cooperation such as the Sustainable Use of Rehabilitated Land for Economic Development (SURED) of the GIZ, FAO, etc., have played key roles in implementing the SLM activities. For more information on multiple supporting institutes to the implementation of SLM in Ethiopia, please refer chapter 2.4 of this report. Further, institutional framework for NRM/SLM described under chapter 5.3. Basically, several challenges encounter the implementation of SLM. Challenges vs existing potential are thoroughly presented under chapter 6.8 of this report.

## 6 Exploitation of Natural Resources for Resilience

### 6.1 The Potential of Water Resources

In Ethiopia, under the prevalent rainfed agricultural production system, the progressive degradation of the natural resource base, especially in highly vulnerable areas of the highlands coupled with climate variability have aggravated the incidence of poverty and food insecurity. Water resources management for agriculture includes both support for sustainable production in rain-fed agriculture and irrigation (Awulachew *et al.* 2005). Not overlooked activity is also soil management and improving fertility. Currently, the Ministry of Water Resources has identified 560 irrigation potential sites on the major river basins (See Table 5). The total potential irrigable land in Ethiopia is estimated to be around 3.7 million hectares.

Table 5: Irrigation potential of the river basins in Ethiopia

River Basin	Area (Km <sup>2</sup> )		Runoff (BM <sup>3</sup> )	Potential Irrigable land (ha)		Gross Hydro-electric potential Gwh/year	Estimated ground Water potential (BM <sup>3</sup> )
Tekeze	82,350	***	8.2	83,368		5,980	0.20
Abbay	199,812		54.8	815,581		78,820	1.80
Baro-Akobo	75,912		23.6	1,019,523		13,765	0.28
							0.13Recharge/year
Omo-Ghibe	79,000	*	16.6	67,928		36,560	0.42
							(.10)Rech /yr
Rift Valley	52,739	*	5.6	139,300	*	800	0.10
Mereb	5,900		0.65	67,560		-	0.05
Afar /Denakil	74,002	**	0.86	158,776		-	-
Awash	112,696	**	4.9	134,121		4,470	0.14
Aysha	2,223	**	-			-	-
Ogaden	77,121	**	-			-	-
Wabi-Shebelle*	202,697	***	3.16	237,905		5,440	0.07
Genale-Dawa	171,042	***&****	5.88	1,074,720		9,270	0.14
<b>Total</b>	<b>1,135,494</b>		<b>124.25</b>	<b>3,798,782</b>		<b>155,102</b>	<b>2.86</b>

(Source: Integrated River Basin Master Plan Studies, MoWR, 1998)

### 6.2 Soil Suitability for Cultivation

Soil suitability for cultivation lays on soil characteristics. Texture, surface stoniness and drainage are amongst typical traits that determine suitability of soil for cultivation. Further, steepness of the slope is another factor

that limits its suitability for cultivation. In the study areas, only 15 – 31% of the land is suitable for cultivation both in rain-fed and irrigation. Basically, the majority of agriculture is practiced under irrigation closer to main rivers such as Awash, Wabi-Shebele, Genale and Dawa rivers. Little grain and vegetable production are operating under rainfed with supplementary irrigation from pond water. Despite the suitability of soil for cultivation, drought and land degradation limit its use. Let alone allocating for farming, large size of land remain barren for pastoralism itself. Highly erratic and erosive rain stimulated runoff, degradation and development of salinity (Fig. 14)



Figure 12: Degraded soil with gully formation, fragile and susceptible for perpetual loss (Photo: Gerba Leta)

### 6.3 Diagnosis of Crop Production and Value Chains

According to DRSLP baseline report (2018), of all crop technologies, improved seeds and fertilizers were used by 27-54% of the households (Table 6). Given the nature of the ecosystem under which these households operate, the adoption of drought tolerant crops is below expectation and only 19% households reported to use such crops. Likewise, the adoption of high value and dual-purpose crops is limited to 10% of the households.

Table 6: Crop technology adoption rate by pastoral and agro-pastoral areas

Zone	Drought tolerant crops	Dual purpose crop varieties	Row planting	Improved seeds	High value crops	Grinding mill	Chemical fertilizers	Organic fertilizer	Manual plough	Water pump
Borana	21.1	5.9	13.7	21.5	1.9	69.6	4.1	15.6	20.4	4.4
Guji	21.1	5.2	25.2	21.5	4.1	77.8	29.3	32.2	23.3	22.2
South Omo	18.9	13.3	17.8	25.6	2.2	15.6	14.4	8.9	13.3	0
Bench Maji	13.3	19.4	43.9	48.9	20	19.4	56.7	13.9	25.6	0.6
Kaffa	11.7	15	26.7	36.7	35	41.7	43.3	20	30	1.7
Total	18.6	9.9	24.8	28.6	8.6	54.3	26.6	20	22.3	8.5

(Source: DRSLP baseline II, 2018)

DRLSP II project (2020) reported that in project areas of Oromia region, *Moringa* & Papaya are distributed and planted by pastorals and agropastorals. Additional seedlings (350 Moringa, 150 Papaya, and 55 Mini tree seedlings) distributed to local communities in 2020 cropping season. Moreover, improved drought tolerant seeds (12.3 quintal of crop seeds *i.e.* 2.7 quintal teff and 9.6 quintal haricot bean seed) was distributed by

DRSLP project to 412 households that covered 217.6 hectare and produced 2,548.85 quintal (of which 1,148.15 quintal teff and 1400.7 quintal of haricot beans).

The best practices have replicated by new 336 HHs for drought tolerant teff production and 222 households have introduced drought tolerant Haricot bean. In SNNPR, 4,250,618 seedlings were produced in seven nursery sites and in 2020 fiscal year 704,122 seedlings (Turmeric, Banana, Mango, Avocado, and Papaya) were distributed to communities. Moreover, 85,000 poly bag made for coffee seedling plantation. Furthermore, in order to introduce drought tolerant high value crops, production of seedling and seed have been undertaken in seven sites. Accordingly, 444,682 seedlings and cutting (mango, avocado, *Moringa*, banana, enset and casava etc) and 20 quintal hybrid seed of maize and 41 quintal of sweet potato cuttings were distributed for pastoral and agro pastoral community. However, the DRSLP I and II reports and baseline survey lacks value chain approach of crop production in pastoral and agro-pastoral areas.

RPLRM project intervention supports fruit and vegetable production at Dasenech district, SNNPRS. The project supported establishment of two banana producer cooperatives and the two cooperatives able to supply more than 100 tone banana to central market. Dasenech District is around Omo River with irrigation potential. Also there are few large scale farming investments including more than 1,000 ha banana plantations with prospects of further expansion. The area is bordering Kenya and nearby to South Sudan for cross border trade.

Moreover, irrigation-based vegetable production is expanding as well. Hence, primary cooperatives, SMEs and more private sectors would be interested to operate in the areas that include, Bena tsemay, Nyangatom districts as far as government and NGOs support on financing, business model development, capacity building and market linkage. Cooperatives and SMEs could get inputs and mechanization service from commercial farms as part of contract farming or other arrangements. Teff and maize production in the Guji and Borena districts of Oromia region looks going up. Teff straw and maize stalks serve as alternative feed for cattle especially during drought. Crop residues would become a dominant feed lot supported by molasses from nearby Kuraz sugar processing plants to improve the palatability.

#### **6.4 Livestock and animal production sector value chain**

The main source of information for this study was generated from desk review and fieldwork. This study is expected to come from different published and unpublished sources, reports, policy dialogues, project implementation manuals and other relevant documents per se. Among others, the following documents reviewed: Country programming report, National Adaptation plan, Poverty reduction strategy, and Ten-year EFDRE plan. The animal health strategy document Lowlands Livelihood Resilience Project, DRSLP I report.

Endowed with various agro-ecological settings, Ethiopia has huge and untapped livestock resources. The is believed to have the largest livestock population in Africa (Belachew and Jemberu, 2002). This makes the country first in Africa and tenth in the world. Contrary to this, the contribution of the sector to household and national food security in particular and national GDP is so minimal. Among other things, poor veterinary service, shortage of feed, the low genetic potential of local breeds, and poor livestock husbandry remain responsible for the recorded poor performance of the sector (Addis, 2017).

The pastoral and agro-pastoral areas of Ethiopia are regarded as a place with imperative agro-ecology and resource endowments. Pastoralists and agro-pastoralists in Ethiopia inhabit about 63% of the country's

landmass. Pastoralists in Ethiopia raise a large proportion of the national herd. It approximately holds 42, 70, 25, 20, and 100 percent of cattle, goat, sheep, and equine and camel populations of the country (MoFPDA, 2018). As reported by (Addis, 2017) Pastoralism and agro-pastoralism are significant means of livelihood for more than four million people, with most pastoralists living in the Somali, Afar, Oromia, and Southern Nations regions with huge potential for the livestock sector. Despite the huge potential in livestock number and other resource endowments, the pastoral and agro-pastoral areas remain risk-prone, with the frequent collapse of livestock population, exposing the population to food insecurity. The livestock sector is however, challenged by drought and unreliable rainfall, little investment on livestock, limited support services (Animal health, input supply, and extension and financial) degradation of rangelands. Animal health services are the major felt needs of the pastoral communities and the lack of them tends to cripple the very hand that feeds the community (MoFPDA, 2018).

- i. **Livestock marketing** - Livestock marketing involves the sale, purchase, or exchange of products such as live animals, and livestock products such as milk, meat, skins, wool, and hides for cash or goods in kind. According (Lemma et al., 2005) livestock marketing includes all activities of exchange conducted by producers and intermediaries in commerce to satisfy demand related to livestock and livestock products. Different studies conducted in the highland of Ethiopia showed that livestock account for 37–87% of the total farm cash income of farmers. Despite the contribution of livestock to the economy and to smallholders' livelihood, the production system is not adequately market-oriented (Belachew and Eshetu, 2002).

Currently, the livestock marketing system faces several constraints. The current export market depends on the Middle East countries. Demands from those countries are seasonal and depend on the religious calendar. The local market is also affected similarly by seasonality. When seasonality coincides with climate shocks, pastoralists become more vulnerable to risks. Cross border, trade is regarded as illegal; the current practice of letter of credit arrangement for livestock export has several associated problems such as bureaucratic bottlenecks. Besides, the live market in Ethiopia faces many and interwoven problems like the prevalence of contraband tirade, clan conflict, absence of market information system, shortage of infrastructures and market centers, poor coordination among actors, lack of standard, harsh weather condition, and absence of credit are to mention a few.

Increasing awareness among herders to make livestock production market-driven is among the major focus areas of the Ethiopian Government. Building and regularizing feed markets, improving availability of consumer goods in markets next to livestock markets, ensuring regular and strategically defined market days, and moving market transactions from dyadic negotiation to auctions were among interventions made by the actors in the center. In this regard, the government issued a live animal marketing proclamation in 2014, even though the practical implementation is still at an early stage. The provision of accurate and timely market information is vital for pastoralist producers. In addition, access to information technology is important to get information on input supply and output markets. Pastoralist producers and traders acknowledge the role of information technology such as a mobile phone in livestock production and marketing alike.

- ii. **Bush encroachment and invasive species** - Rangelands are the main source of feed which globally contributes to about 70% of the feed needs of domestic ruminants and 85% of the total feed needs of ruminants in African and South American countries (Holechek *et al.*, 2005). In Ethiopia, rangelands account for more than 60% of the country's total landmass (Hogg, 1997). Grazing and browsing animals mainly utilize many species of trees, herbaceous legumes, and grasses. The main feed resources used for livestock feeding in the area are natural pastures (herbaceous vegetation composed mainly of grasses and

forbs and browses (shrubs, tree leaves, and pods). To this effect, there are some grass species known for their palatability and enhancing high milk and butter production. Among others grass species such as *Cenchrus ciliaris* (African fox-tail), *Cynodon dactylon* (Bermuda grass; *Pennisetum mezianum* (Bamboo grass), *Enteropogon somalensis*, (horse tail), *Sporobolus* sp., *Eragrostis* sp., *Digitaria neghellensis*, *Alchiso* (vernacular) and *Heteropogon contortus* are to mention a few (Adugna and Aster, 2007).

As opposed to this, sustainable utilization, these feed sources are heavily encountered by invasive species in the ecosystem. These unpalatable species have contributed adversely to reducing animal production and productivity both in terms of quality and quantity parameters. Research done by (Worku & Lisanework, 2016) revealed that a positive correlation between increasing coverage of bush encroachment and mean daily milk yield of livestock (i.e. cattle, goat, and camel). Pastoral producers also perceived the impact of bush encroachment on livestock population trends and milk production and thus applied different adaptation strategies (like feed supplementation and mobility). The government and other development partners have made vital contributions to control the invasion these species of to the extent possible. However, there is still a gap in addressing the problem to the required level. DRSLP I has attempted its best to control the problem through relevant approach. Its coverage in terms of vertical and horizontal coverage is so insignificant.

- iii. Animal disease and parasites - Areas controlled and utilized by pastoralists are prone to different animal diseases that are responsible for low productivity of animals, and economical loss encountered due to the high rate of animal mortality and morbidity. The contribution of the livestock sector to the national economy is minimal compared to its potential. One of the main reasons of this mismatch between population size and production output from livestock in Ethiopia is the widespread occurrence of many infectious and parasitic diseases. According to (MoA and ILRI, 2013) the annual loss due to mortality ranges from 8–10% for cattle, 12–14% for sheep, 11–13% for goats, and 56.9% for poultry. These figures are much higher for calves, lambs, and kids. The direct and indirect losses from livestock disease have important economic, food security and livelihood impacts on livestock keepers and the national economy. As compared to other parts of the country, the incidence and devastating effects of the animal disease have a pronounced manifestation in pastoralist areas. Disease like anthrax, Lump skin disease, contagious pluro bovine and pasturullosie, trypanosomes, and a wide range of internal and external parasites are common in the area under study.

Cognizant of this assumption, the Government of Ethiopia (GoE) and other stakeholders have done their best at least to reduce the devastating effects of these diseases. Especially critical consideration was given to pillars and strategies as means to achieve the targeted objectives. Among the intervention areas were, Strong livestock disease surveillance system, mitigating climate impacts of animal disease, focus on eradication and controlling of animal diseases with livelihood and trade importance, improved veterinary public health, improved quarantine, and inspection system and strengthen the legal frameworks are among the strategic areas that the GoE planning and implementing. Most specifically, the attempt done to strengthen the veterinary service through the deployment of Community Animal Health Workers (CAHWs) has brought a significant contribution in designated pastoral areas. These paraprofessional animal health workers have contributed a significant role in vaccination, disease control, and prevention.

During DRSLP I, the project managed to intervene by establishing and rehabilitating animal health posts, capacitating animal health workers, training of CAHWs, and upgrading regional laboratories and animal health-related activities. However, due to huge area coverage and other related barriers, it was impossible to cover all geographical areas considered as pastoral areas. Furthermore, lack of Veterinary medication,

the inability of animal health workers to reside around their posts, and allocation of certain facilities for non-commission activities were among the constraints observed during DRSLP I.

- iv. Animal feed - Rangelands in many pastoral areas are known for their biomass in a different season of the year. There is also noticeable seasonal variation in availability and quality of feed resources due to pronounced seasonal variation in rainfall distribution. The availability of feed resources (grasses and browses) is adequate during the rainy season. However, the grasses become emptied during the dry season. The over mature dry grasses also have very low nutritive value. The situation is further aggravated when the dry season is prolonged. Thus, when the dry season is prolonged or during drought years, animals become unproductive, lose condition and market value and eventually die due to inadequate feed and water supply and the very low nutritive value of the available feed. The over-matured dry grasses are characterized by low nutrient content, high fiber content, low digestibility, and low voluntary intake by animals.

The pastoralists have an indigenous mechanism of coping with the problems of feed and water shortage during the dry season and drought years. When grasses become depleted from the grazing land, they lop the leaves and branches of trees and feed their animals. Acacia pods are also used as important sources of dry season feed for goats, camels, and cattle (Tolera and Abebe, 2007). In addition to culturally existing grazing land management mechanisms that have existed for a long period, it is so important to introduce modern rangeland management techniques that fit the values and norms of the community. Besides, government experts and other stakeholders are expected to create awareness to the respective pastoralist about destocking and restocking to be held in times of feed shortage or otherwise. By maintaining the carrying capacity of the rangelands, it would be possible to utilize the feed resource sustainably without interruption,

As discussed by Nigus (2017), rangelands can be upgraded using different strategies. Application of proper pasture management &, proper stocking & seasonal grazing, seasonal distribution of grazing land & pasture rotation among strategies to be considered in rangeland development programs. The same source reveals that, in addition to the rangeland management programs, strategies like under sowing, over sowing, intercropping, back yard forage development & mixed forage and pasture development, and strip planting could complement and supplement the rangeland management plan.

In addition to these interventions, the multiplication and distribution of drought-tolerant and quality grass, legumes, and tree fodders should be one area of intervention. This could be happening by establishing different nurseries and multiplication centers for seeds, cuttings, and seedlings. DRSLP I in its initial intervention areas has supported pastoralist and agro pastoralist to build their own fodder banks. From the field survey it is possible to observe that these banks have provided quality feed to the animal by covering the recurring the problem feed most specifically in dearth periods. However, some pastoralist argue that lack of some materials seen hurdling the effectiveness and efficiency of these banks. Having based on the result of the previous project intervention the upcoming project expected to scale up these practices to the wider areas.

- v. Index-based livestock insurance - In pastoralist, areas of Ethiopia where livestock mortality is common due to feeding shortage and animal disease and parasites, an Index-based livestock insurance system can be a mechanism through which a lost stock of animals can be replaced. The Index-Based Livestock Insurance (IBLI) product controls the strong correlation between a remotely sensed vegetation index and livestock losses associated with forage shortages to offer insurance coverage to pastoralists in regions without access to conventional insurance products (*Jensen et al.,*

2015). The experience that we had from the feed the future innovation has already made groundbreaking contributions to strengthening the resilience and economic viability of pastoralists in East Africa. This project explored index insurance contracts in which payments are based on an easily observable index that is correlated with, but not identical to individual loss (Feed the Future, 2019).

Scaling up the practice of IBLI to the pastoral areas will benefit the community at large by creating stability in their livelihood. It also complements with a culturally existing reciprocal support system as that of *Bussa gonofa* in Borena. GoE and other financial institutions are so keen to implement the system in a wider scale to benefit pastoralists who repeatedly lose their stock due to drought and other related factors. As indicated in DRSLP report, there a start in this regard and the problem further calls the expansion IBLI to the wider areas in the upcoming projects.

- vi. Strengthening Livestock restocking activities - The prevailing shortage/absence of rainfall and the resultant drought are continuing to be causes for the existing high livestock mortality and morbidity in pastoral and dry-land areas. GoE and other development institutions have intervened to reduce the problem and restock animals using different mechanisms. However, most of the interventions were not started having the consent of the people. In some cases, some projects tried to introduce animal species and types that weren't fit to the livelihood arrangements and the agroecology of intervention areas under operation. The upcoming restocking program should start from the felt need of the community and also the basis on the already existing cultural arrangements. Though the program seems keen on restocking, it doesn't mean that it has no effort to aware pastoralists to destock livestock voluntarily to avoid the mismatch between the number of livestock and the carrying capacity of the rangeland. The restocking program will be linked with IBLI to attaining the required objective.
- vii. Poor livestock genetic potential and the need for improvement - Local animal breeds throughout the country have a very low genetic potential expressed in terms of low meat and milk production and other genetic parameters. The need to improve the genetic potential of this animal through different breeding techniques can be confronted by low level of awareness, harsh climatic conditions, poor availability of feed and water, and the inability of crossbreed animals to tolerate poor management conditions. Having these problems in mind, it is difficult in such areas to introduce crossbreeding programs by AI (Artificial Insemination), ET (Embryo transfer) and hormone synchronization. The vigor and physical characteristics improved animals have, paved the way for the less acceptability of exotic animals very specifically at the pastoralist community level.

Whilst the intervention of DRSLP II in this regard rest on supporting a breeding program that basis on a natural selection program managed by the community members themselves. It also tries to create synergy between the bulls-based breeding program with fodder banks and regularly serving water point

## **6.5 Exploitation of fisheries resource and value chains**

Ethiopia has been a non-coastal country since 1993, so its fishery comes fully from inland water bodies counting rivers, lakes, reservoirs, and substantial wetlands streams that are of great socio-economic, ecological, and scientific importance. Fishing has been the main source of protein supply for many Ethiopians particularly for those who are residing near major water bodies like rivers in the Gambella region, SNNRG, and Rift Valley and highland lakes (Tesfaye & Wolff, 2014). As indicated in (FAO, 2012) Ethiopia's water,



bodies support a varied aquatic life including more than 180 fish species of which about 40 are endemic. There are 10 major lakes with a total area of 7400 km<sup>2</sup> and 7185 km of major rivers. Many artificial water bodies stocked with fish. Empirical models suggest that the current total annual fish production potential is around 50, 000 tons. Rivers draining to neighboring countries like Omo, Baro, Tekezi, Wabe Shebele have a huge and untapped fishery potential.

Figure 13: Map showing rivers and lakes of Ethiopia (*Source: Ministry of Water and Energy*)

In spite of this potential, pastoralists residing adjacent to these rivers are not seen using the fishery resource for both nutrition, food, and livelihood security. For fisher folk who are residing around Omo River and Northern Turkana, fishery is an integral source of food and income. Fishery is the traditional and most important livelihood option for the people living around the river valley and the lake. Pastoralists benefit from fish in its natural form and also use it to make wide range of fish products including dried fish and smoked fish. Contrary to this fact, the fishery livelihood is highly constrained by several problems that need the attention of government and other stakeholders. Based on the desk review and field work the following constraints were identified:

- i. Absence of fishing tools: Communities and households in the intervention area lack access to basic fisheries inputs, seriously affecting the productivity of the sector. Under the proposed project, DRSLP II will undertake a twofold approach introducing improved technologies and practices through Fisher folk Field Schools (FFFS) whilst facilitating sustainable access to fishing equipment through the reinforcement and establishment of 'bush shops' to be managed by Community-based Fisheries Cooperatives. Such technologies include nets, cold boxes, floats, hooks etc. to be accompanied by training on issues such as net braiding for increased productivity. The project will promote and introduce fishing gear that is economically efficient and environmentally sound to replace - to the extent possible - gear that has negative impacts on the environment. Fishing gear replacement will be conducted in compliance with the existing national legal and regulatory framework and in line with the FAO Code of Conduct for Responsible Fisheries. The impact of fishing gear will be closely monitored and fisher folk and extension agents will receive appropriate training in their use. The introduction of such new

technologies will be accompanied by the formation of co-management committees at local level to promote the sustainable management of fisheries resources.

- ii. Elevated levels of post-harvest losses - Fish production represents a continuum from the water to the consumer. While in Ethiopia, specifically in riverine and lacustrine, situation which is managed by pastoralist and agro-pastoral postharvest remains a challenge. As most of the fishing grounds are far from the landing sites, inability to use ice and other cold technologies, and limited knowledge on post-harvest technology, there is a high rate of fish post-harvest losses. Besides, most of the fish grounds are prone to high temperatures, the rate and magnitude of fish spoilage and shrinkage remain at a higher. It is estimated that around 20-30 percent of all fish produced at national level is currently lost due to poor post-harvest handling and processing.



(A)



(B)

Figure 14: (A) Unhygienic way of fish processing practices around Omo river (B) Fish transportation out of the cold chain line under harsh temperature in Dasenech district (*Photo credit: Laloto Sodoree & Adefris Kassaye.*)

In Ethiopia full understanding of the post-harvest sector remains a challenge, new opportunities must be taken to ensure the restoration of livelihoods and enhanced resilience of vulnerable populations. Under this intervention, DRSLP II will support fisher folk and fish processors in adopting good conservation practices. These interventions will seek to construct an appropriate and sustainable fisheries value chain and mitigate public health risks posed by fish and fish products. It will introduce quality fish processing methods, as well as introducing good conservation practices using improved smoking ovens, drying nets, salting and other appropriate environment-friendly technologies widely accepted by the target communities. In line with this, cold chain equipment will be introduced and storage and processing facilities will be identified and reinforced. Local capacity in processing and marketing as well as in maintenance and repair of equipment will be built through practical on-the-job training. With other development partners, will take this opportunity to assist fishers and fish processors in adopting good conservation practices. These interventions will thus seek to (i) construct an appropriate and sustainable fisheries value chain; and (ii) prevent public health risks posed by fish and fish products sold to domestic and export markets. Good fish conservation practices such as fish handling, sun drying, salt drying and fish smoking, will be promoted and developed in selected communities, cooperatives and associations. Efforts will also be made to build the capacity of fishers, fish processors, traders, extension services (interested partners) and fisheries administrations.

- iii. Absence of market integration, and weak value chain - The remoteness of the area coupled with the presence of many actors in the fish market value chain has significantly compressed both the market and the price of fish. In addition to this, due to lack of fishery market information system fishing communities will be forced to sell their produce at a lesser price. The existing fish stock chain can be reflected as buyers driven supply chain because producers/fishermen have no commanding position to control the supply and thereby the prices.



Figure 15: (a) Poorly handled, salted and air-dried tilapia around Buba, Northern Turkana (b) Fisherfolk selling his fish to the retailer on a number basis (*Photo credit: Ministry of Agriculture.*

However, there is high need for high value product in big towns, the perishability of the product and other factors have shifted the balance of trade towards the buyer. The buyer driven supply chain is the chain in which the buyers owing to the nature of the product or the availability of fish, the buyers are in the top of the chain and they determine. For instance, study done around Dasenech woreda of South Omo, identified many value chain actors that start from the water body and stretches to other countries like Kenya and Congo. The review identified several actors in the fish value chain fishermen who do not have a boat, fishermen who own both boat and net, commission/collection agents, transporters, wholesaler/exporters, retailers, people working as fish packers at the landing sites and at processing plants, external traders /Kenyan (Hussein, 2015). In addition, absence of hygienic and appropriate landing grounds (jetty's), fish processing and storing plants, fish collecting boats, insulated trucks and deep freezers, filleting and gutting utensils and ice-making machines are among the facilities to be urgently put in place. Connecting “lake to fork” is a critical building block for improved resilience and food and nutrition security. In the context of this project, DRSLP II will reinforce linkages between producers and consumers by improving market infrastructure, services and transportation.

- iv. Lack of awareness and training - Anglers and their partner need to be trained and capacitated in different aspects of the fishing activities. Among others are net braiding, fish processing (gutting, filleting, air drying, smoking, and de heading, entrepreneurship, fishery co-management, boat braiding, fish recipe,

and post-harvest technology. This will further help them to sustainably utilize the resource, diversified livelihood, development skill and finally to becoming efficient and effective.

- v. Absence of credit - Due to several other reasons, be at large or small scale, operators in the fish value chain are seriously constrained by shortage or lack of finance to run their business. This in particular affected their intent to purchase improved fishing gears, cold chain equipment and machines, insulated and refrigerated trucks, and better performing fishing boats. Also, the financial hurdle remained a problem for fishermen and other actors to build and utilize fish processing plants, jetties, fish restaurants and boat and net making centers.
- vi. Conflict over the resource - In pastoralist areas, a major source of conflict arises over the use of natural resources. Conflicts can occur between pastoral fishermen themselves, adjacent fishermen and fishermen men from the neighboring countries. The observed conflicts seen repeatedly occurring and results in the loss of life asset damage. Through integrated development intervention, these types of conflicts can be reduced to the required level.
- vii. Absence of fishery organizations and community-based fisheries management associations - Fish stock is a capital asset, which, if properly managed, can generate a steady flow of economic and social benefits to those engaged in the sector. The intended project intervention area had huge fisheries potential but nascent fishery-related organizations in the area face challenges such as poor record-keeping skills, lack of project management capacity and lack of awareness of principles and regulations governing cooperative bodies. As development initiatives are undertaken, it is of vital importance that, concurrently, efforts be made and awareness raised concerning the potential and the risk of overexploitation. For this reason, it is important to put in place effective management mechanisms. There are conventional management methods, such as gear restriction, mesh size regulation, close area/season, control of efforts through licensing, that must be taken into account and regulated by government. Currently however, the local government lacks the financial, logistical and human resources capacities to effectively monitor and control the implementation of such conventional methods. The project will therefore support the establishment of Fisheries cooperatives to manage fish production, processing, marketing, trading and net bridging and mending and Co-management Associations to promote the sustainable utilization of fishery resources.

## 6.6 Forest Resources

As 60 - 70% of Ethiopia and the Horn of Africa is covered by dry-lands, dry-land forest is not uncommon resources in the study areas. In fact, the large diversity of vegetation depends on the pattern and intensity of rainfall and its distribution. Dry-land forest play a significant role in biodiversity conservation, hosting endemic species of plant and animals adapted to extreme climatic condition. Also, it sources fodder/feed to browser and grazers of both domestic and wild animals. Furthermore, it caters construction material, fuel wood, medicine and marketable products such as resins and gums for the pastoralist or agropastoralist communities. Dry-land forest also serve as a buffer plant to wind and soil erosion as well as shelter the livestock during extreme weather such as very hot days. Forests' role in climate change mitigation and adaptation is important; the sustained provision of ecosystem goods and services can help people adapt to the local consequences of a changing climate, while the carbon stored in these ecosystems, if well managed, can contribute to climate change mitigation (FAO, 2010). In our observation, the forest cover varies by altitude and soil types across the dry-land areas. As referenced earlier, economically important trees/forest are not uncommon, though, highly under used for the intended purposes (Fig. 18).





Figure 16: Acacia forest (left) and gum incense (right) in the dry-land of Somali region (Photo: Gerba Leta)

### 6.7 Biodiversity

Ethiopia is one of the world's biodiversity hotspots and one of the *Vavilov* centers of agro-biodiversity. ASAL of Ethiopia endowed with rich diversity of natural resources such as soils, water, flora and fauna that makes the basis for genetic diversity. Feed, food, fiber, fuel and other essential economic and eco-system services and functions are derived from the existing natural resources. However, overtime, these natural resources are subjected to persistent degradation and depletion being triggered by natural and anthropogenic factors. As a result, loss of habitats and decline in genetic resources, species and ecosystem diversity is looming. Essentially, water scarcity owing to recurring droughts led to negative environmental impacts, such as reduced biodiversity and ecosystem services (UNCCD and FAO, 2020). Erratic and erosive rainfall in the upstream catchments induces floods that trigger dispersal of alien species. Above all, the growing invasion of rangeland by invasive thorny bushes and other noxious weeds such as *Prosopis juliflora*, *Parthenium hysterophorus* and unknown species of herbs (Fig. 13) are the alarming issues as they naturally suppress the undergrowth and easily spread like wildfire by various means such as wind, flood, and vectors: birds, browsing animals and bulldozing machineries. Therefore, the rangeland and other natural forest in dry-land areas must be preserved to support the livestock as well as human population's evolution into the future. Selective clearing of invasive species before it flowers/set seeds and controlled burning are affordable techniques to manage its multiplication. Apparently, the recognition of environmental problems introduces new interest and efforts to integrate various kinds of policies and measures to ensure sustainability of the beneficial system.



Figure 17: Unknown species that covers huge rangeland area in Somali region (Photo: Gerba Leta)

### **6.8 Potential and Constraints of Natural Resource Management in the Country**

In Ethiopia, the rise in population has brought about a corresponding increase in the scale and intensity of natural resource exploitation. Natural resources such as land, water, and forests are increasingly being overused, depleted, and destroyed (Leta *et al.*, 2018a). The growing pressure on land resources has led to land degradation and a decline in crop production (FAO and UNEP, 1999). Thus, government has strived to address the prevailing issues since early 1980's (Lakew *et al.*, 2005). However, the efforts to stop and reverse the degradation and its threat to livelihoods of the people have been associated with potentials and constraints.

Development of Community Based Participatory Watershed Development guidelines- Part I and II (Lakew *et al.*, 2005), adopted policies and strategies such as the ESIF-SLM (MoARD, 2010) are basic to foster natural resource management of the country. Also, the positive responses from donors, international community and development partners to the increasingly growing degradation of natural resources boost government commitment to stop and reverse the prevailing trends. As a result, natural resource management (NRM) has become the pillar of the GTP I and II that annually mobilize millions of free labor and deploy for watershed management. Similarly, increased farmer awareness on NRM through training and mobilization campaign known as *nikinake*, and its outcome, increased government and public commitment toward managing natural resources. Also, the support from flagship programs and development partner is indispensable. International donors and NGOs have substantially contributed to NRM. Essentially, NGOs support in providing technical inputs, information and training. Suitable climate in humid parts of the country is another opportunity to effectively combine physical soil and water conservation with biological and stabilize the bunds/terraces; supply livestock feed and ensure sustainability of NRM structures. Strong political support at different levels has stimulated persistent involvement of the community.

Aside the prevailing opportunity, the current version of NRM is constrained by various issues. These are short, unfocussed and inefficient skills training, top-down introduction of land management technologies, state inability to supply necessary inputs sufficient to all farmers, recurrent drought and climate change are negatively affect the efforts. Particularly, in dry-lands of Ethiopia, drought, overstocking by livestock, flood and alien invasive species are the main issues. Furthermore, lack of stringent monitoring and evaluation and maintenance of previously built physical structures, excessive emphasis on quantitative goals instead of outcome and effectiveness, and free livestock grazing system have an implication on sustainability of soil and water conservation structures (Leta *et al.*, 2018a). Ambitious development/conservation plan and introduction of incompatible technology/ practice to the right agro-ecology and farming system is also not uncommon.

Technical inefficiencies further impede farming operations in oxen-based farming and can lead to destruction of existing structures and aggravate soil erosion. Also, maintenance work from previous year is not integrated into new plans. A lack of essential inputs such as forage grass for stabilizing bunds tends to exacerbate structural failure and soil loss through erosion. The time and labor-intensive nature of watershed management campaign during the dry season also dissuades farmer's participation (Leta *et al.*, 2018a). Natural resource management is virtually relied on central planning and steering than the combination of the top-down and bottom-up in which middle ground can be located and established in a way inclusive to all - including direct beneficiaries and development actors.

Often, the effectiveness, technical efficiency and sustainability of NRM driven by campaign remain unsatisfactory (remain short of meeting the government and peoples ambition). In public mobilization approach, the goal is drawing labor towards NRM. In this approach, speed is basically undisputable results. In contrary to the approach in large part of the country where free labor is drawn through public mobilization, stricter follow-up and/or monitoring is applied mainly in regions or *woredas* where productive safety net program is currently operating and engaging residents in NRM activities.

### **6.9 Gender in Natural Resource Exploitation**

Drought, water scarcity, deforestation, soil erosion, lack of modern farming equipment, lack of water for irrigation, improved seedling problem, frequent occurrence of drought, epidemic disease, trans boundary animal disease, lack of animal health clinic center, lack of feed animal, locust infestation, lack of irrigated land / irrigation infrastructure, traditional agronomic practice, livestock disease, livestock parasite, degraded rangelands, violence against women, male dominance culture, scarcity of financial institution and unavailability of seed money to start business, low business skills, absence of alternative livelihood opportunities, Lack of skill and money to start another livelihood opportunity, rainfall scarcity and climate change, value chain problem, lack of market information, shortage of animal vaccination, logistics problem, Food insecurity, Geographical isolation in terms of infrastructure and communication, Environmental degradation and deterioration of natural resources through overgrazing of land, Long term reliance on coping mechanism which were previously only used in times of acute food insecurity, project sustainability problem, dependency syndrome problem in the community, water pump and tractor, project management problem, staff turnover and lack of educated manpower are listed out social challenges to different thematic components.

Women travel long distances (10 km's and above) in areas where water is scarce to collect water for both household consumption and to their livestock, these make an additional burden to women, make them more

vulnerable for VAW, and are sometimes attacked by wild animals. During the lean season and drought sheep, goats, and babies of large livestock's will remain within the households to be cared for by women, while the men took the camels and cattle to areas far from their home for months in search of pasture and sometimes these involves crossing of regional and international borders. To minimize livestock disease and parasites, pastoral communities at the household level make different coping mechanisms, including giving livestock saline water to remove internal parasites, using water sources used for drinking to livestock in time gaps so that herds from other households could not physically meet to expose for disease and parasites.

Key issues in natural resources and environment management include; men and women have different experience and knowledge of environment, specific resources, and environmental issues and challenges; livelihood strategies that are rooted in particular use of the environment are different for men and women; utilization and management of natural resources emanating from the unequal gender relationship in the family, community, etc. preexisting gender inequalities constrain the influence and control of women and girls over;

- i. Decisions governing their lives; and
- ii. Their access to resources of production such as finances, agricultural inputs, land and property as well as technologies (IDDRSI & RPP, 2016).

Resources at a household level including livestock and farmlands if in case available are managed by men and women heads of the households. But the dominant one deciding who has to use and control these resources is determined by the male head of the household. Because the culture and religion in Ethiopia in general and in this specific area in particular leave to manage and access productive resource to male rather than women's. But as customary practice women are entitled to manage and use the milk from goat, cow, and camel for household consumptions, sell some if they have close access to local markets, besides women also generate incomes for demand to purchase consumer goods or other basic expenditure by selling goat or sheep in the household. And the men head in the household is the one who decides to use, transfer, or sale of large livestock including cattle and camels with some consultation with the women heads and other members of the household.

Communal resources including water and rangeland are managed by customary/traditional laws usually facilitated and lead by local tribal or religious leaders. Since water sources and availability of pastures in rangeland are varied across seasons and years due to weather and climatic conditions pastoral communities temporarily or permanently move from one place to another to pass the lean season or getting a more sustained supply of the two key resources, in case of temporal movement for water and pastures the pastoral communities move far placed with their camel and cattle's, and this involves also crossing international borders to Djibouti, Somali, Kenya. Local tribal or religious leaders across different group lines work together and exchange views for preventing or resolving conflict that could happen in due process.

Pastoral women and men often have different knowledge of rangeland resources management system. Particularly, pastoral women have traditional experience and practices of range land production systems as they are being responsible for home gardening, harvest charcoal as small-scale enterprises, collection of fuel wood for the household and wild plants used as food and medicines. Therefore, in the planning and management of natural resources development activities it is imperative to use tradition knowledge of women and also enhance their rightful benefit from development activities.



## **7. DETAILED DESCRIPTION OF THE PROJECT COMPONENTS**

### **7.1 Activities to Be Carried Out**

DRSLP I and II baselines identify need for water resource development along with proper operation and maintenance and irrigation application needs capacity building training for proper application of water resources for multi purposes. The provision of tailored and regular livestock market information to pastoralists through appropriate communication channels to assist pastoralists to make rational decisions about when and where to sell their animals. Supporting the development of infrastructure with emphasis on feeder road construction and road communication is needed. Moreover, since the available marketplaces were not well kept and lack basic amenities, the situation called for close attention recommended construction of appropriate livestock marketing infrastructures including stock routes, watering points and slaughter houses and facilitating cross border trade need to be considered in order to increase livestock trade in the project areas.

Tables 4 lists key program activities by component and sub-components to be conducted across the program intervention districts in four IGAD clusters.

## 7. Detailed Description of the Project Components and Sub-components

### 7.1 Activities to be Carried Out

Sub-component	Activities	Sub-activities	Approx № of beneficiaries (HH)	Estimated cost (USD)	Target district(s)
<b>Component 1. Strengthening the resilience of drought prone areas and pastoral and agro-sylvo-pastoral production systems to climate change</b>					
1.Support for sustainable management of agro-pastoralland	Ensure year-round livestock access to feed	<ul style="list-style-type: none"> <li>▪ Establishing fodder banks.</li> <li>▪ Establishing fodder stores.</li> <li>▪ Procuring and provisioning of harvesting materials.</li> <li>▪ Establishing Irrigation schemes and procuring and providing solar pumps.</li> <li>▪ Provide forage seeds.</li> <li>▪ Training on fodder production and management.</li> <li>▪ Mobilization, targeting, sensitization of forage seed growers cooperatives.</li> <li>▪ Provision of Seed money.</li> <li>▪ Provision of seed, seedling and cutting off grass and legumes.</li> <li>▪ Training of cooperative members.</li> <li>▪ Establishing nurseries for trees and cuttings.</li> <li>▪ Promote and capacitate agro-pastoralist to implement backyard and over.</li> <li>▪ Sowing forage development strategies.</li> </ul>	300,000	500,000	All districts
	Flood management	Construct physical structures dike, gabion walls, contour stone bunds and cutoff Drain	12,000	80,000	4
	Rangeland management	▪ Identify and report the type of invasive shrubs/weed species	65,000	160,000	all districts
		▪ Organize awareness creation and sensitization work on the proper management practices			
		▪ Engage the pastoralist community in range land management through participatory approach			
		▪ Aware and implement the destocking and restocking to maintain the carrying capacity of the grazing lands			
		▪ Promote existing and reliable traditional rangeland management practices			

		▪ Introduce and implement cut-and-carry feeding system and forage preservation facility			
		▪ Awareness creation for local experts, women and men on natural resource management		8,000	
	Introduce Sustainable Land Management (SLM) Practices	▪ Conduct community consultation & derive new and strengthen the exiting bylaws	1,600	60,000	15
		▪ Map and delineate degraded land for management intervention			
		▪ Integrate biophysical soil and water conservation into area closure			
		▪ Promote controlled/ zero grazing system			
	Conservation Agriculture (CA)/Minimum tillage	▪ Introduce and implement minimum tillage practices	135	90,000	27
		▪ Create general awareness on CA/minimum tillage			
		▪ Introduce and implement mixed/intercropping practices			
		▪ Manage crop residue/retain on farm for moisture conservation and restoration of soil fertility			
	Integrated Soil Fertility Management	▪ Introduce integrated fertility management activities	1,000	85,000	27
		▪ Identify adaptive variety of crops to the agro-ecology			
		▪ Familiarize & supply necessary inputs, then pilot...			
		▪ Combine best practices and inputs			
		▪ Identify evidence base best practice and scale it up to the wider areas			
		▪ Test and manage saline soil in dry-land farming system			
	Improving access for smallholder irrigation	▪ Introduce improved irrigation system	150	8,000	12
		▪ Based on soil moisture test, set irrigation cycle			
		▪ Awareness raising of user groups to target watering of basal areas			
		▪ Timely and periodical cleanup of irrigation canal			
		▪ Establish and support community level water management committee			
	Nursery site establishment	▪ Identify multipurpose tree species tolerant to drought and salinity	300	75,000	27
		▪ Establish on farm and/or central nursery sites			
		▪ Seedling preparation			

		<ul style="list-style-type: none"> <li>▪ Select proper site and farmer for piloting</li> <li>▪ Follow-up and demonstrate to other potential users</li> </ul>			
	Land registration and certification	Land certification	Resident HHs	140,000	27
		-Lobbying the government for pastoralist land registration			
		-Identify, map and define the communal and private lands (mapping exercise)			
		-Test and validate land registration & its effectiveness			
		-Issue certificate to communal as well as private landowners			
	Capacity building	Organize lesson learning training-workshops based on DRSLP experiences	150	55,000	27
		-Familiarize partners/end users to technologies/practices			
		-Stimulate local participatory planning exercise at local level			
		-Organize and undertake experience exchange visit for knowledge and skills sharing			
	Promote sustainable management of agricultural land	-Greater outreach activities for women on drought resistance crops that provide optimal nutritional content and income sources during low agronomy cycles.		23,000	
		-Promote the accessibility of agriculture water to women, youth and other vulnerable groups for greater nutrition of food security			
		-Backyard and irrigated agriculture by increasing accessibility to agricultural water sources to women and the households at large to get nutrition diversity and income from vegetable and other cash crops			
	Establish cross-border joint planning and conflict resolution mechanisms	<ul style="list-style-type: none"> <li>-Establish cross-border development planning and conflict management committee</li> <li>-Conduct joint periodic review of cross-border security conditions and development activities</li> </ul>		10,000	
	Managing noxious bush encroached communal rangelands	Bush thinning on communal rangelands	15000	140,000	All
		Bush clearing on communal rangelands	15000	140,000	All

2.Development of climate resilient infrastructure	Strengthen the animal health service to the extent that provides efficient and effective service to the pastoral community	<ul style="list-style-type: none"> <li>-Capacitate livestock animal health services with Drones and Solar energy augmented disease prevention and surveillance.</li> <li>-Put in place mechanisms and logistics for regular vaccination and treatment and out breaks</li> <li>-Train additional Community Animal Health Workers (CAHWs) in on selected drought prone areas</li> <li>-Provide periodical refresher training for CAHWs</li> <li>-Upgrade previously trained successful CAHWs to the next professional carrier</li> <li>-Put in place mechanism through which CAHWs provide the necessary veterinary services under the umbrella of cooperative services</li> <li>-Distribute and furnish the CAHWs kits on timely basis.</li> <li>-Procure and install cold chain equipment and train cold chain operators</li> <li>-Strengthen an information system concerning cross-border animal disease through cell phone and Drone technology.</li> <li>-Strengthen the diagnostic and analytical capacity of veterinary laboratories</li> <li>-Ensure uninterrupted and timely distribution of vaccines, veterinary drugs and other veterinary supplies.</li> <li>-Put in place organize and capacitate Rapid Disease Assessment Teams who work regularly in disease surveillance and reporting.</li> <li>-Equip livestock disease control points (movable spray pumps for ECF and tick control)</li> <li>-Establishing mobile animal health service (Vehicle or boat based)</li> <li>-Construct animals health clinic and posts</li> <li>-Provide seed money for CAHWs to run private/ cooperative based animals' health service</li> <li>- Identify, map and report, potential animals' disease in prone areas for timely and effective intervention.</li> </ul>	216,000	950,000	All districts
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	Development of new livestock water infrastructure	<ul style="list-style-type: none"> <li>-Boreholes (deep wells)</li> <li>-Hand Dug wells</li> <li>-Shallow wells supported by Rope</li> <li>-Ponds (20,000 m<sup>3</sup> capacity)</li> <li>-Berkads (underground water reservoir) in Somali region</li> <li>-River diversion</li> <li>-Micro écart dams</li> <li>-Consultance services</li> </ul>		5,200,000 450,000 365,000 555,400 105,000 1,300,000 1,350,000 400,000	All
	Rehabilitation of livestock water infrastructures	Maintenance for all infrastructures		1,300,000	
	Livelihood and income diversification for vulnerable groups	-Mobilizing and engaging vulnerable groups in small scale activity		340,909	
		-Train in entrepreneurship, business plan preparation, record keeping and etc			
		-Provision of seed money for cooperative as start capital			
		-Create market linkage and provide market information timely			
	Boosting and capacitating livestock marketing	-Development of comprehensive Animal Health Services (Veterinary clinic (works) with full equipment and drug for one year)		880,000	
		-Mobile veterinary clinic vehicles with full equipment and supported by solar energy		1,200,000	
		-Mobile veterinary clinic and transported by animals and have temporary tent and supported solar energy		290,000	
		-Development of livestock market centers		2,850,000	
		-Milk collection Center not more than (30 M <sup>2</sup> )		80,000	
		-Milk transport truck with milk tanker		380,000	
		-On-time provision of livestock Market Information System	108,000	506,000	All 27 districts
		-Establishing and renovating market infrastructures			
		-Smoothing coordination among stakeholders			
		-Standardizing unit of transaction			

		-Put a mechanism through which contraband trade can be controlled or reduced			
		-Renovating the existing market centers			
		-Awareness creation to the community members to reduce weekly marketing days			
		-Provide market-based veterinary services			
		-Provision of feed and water supply mechanism based on each market			
		-Establish waste disposal mechanisms at each market point			
		-Provide credit to lower and middle-level livestock			
3.Promotion of climate-smart innovations and technologies	Introduction of climate smart agriculture technologies	-Provide FTC/PFS) pastoralist field school-based training on climate smart crop and livestock production ( <i>e.g.</i> drought tolerant crops)	15,000	190,000.00	All
	Introduce renewable energy sources	Solar energy for -Lighting -Pumping water -Powering livestock health centers and posts		100,000	
<b>Component 2. Supporting agribusiness development</b>					
1.Access to advisory services, financing and markets	Create market linkage and integration for women	-Establishment of inclusive credit and financing for Women			
	Facilitating low interest finance or seed money for small and medium enterprises	-Establish saving and credit for SMEs	50,000	1,560,000	All project districts
		-Facilitate seed money for SMEs			
		-Training and awareness creation of SMEs on saving and credit along with potential agribusiness businesses development			
		-Promote and facilitate inclusive revolving fund for SMEs, youth and women			
		-Promote and support the establishment of revolving fund for aggregators and underserved (poor) to be included in financing mechanism			

		-Facilitate funds for value addition by private sectors (abattoirs, honey processing, poultry, feed processing) and supply			
	Establish integrated rural Input Centers and advisory services / incubation agro entrepreneurship Centers	-Establish model input centers	100,000	920,000	All project regions (1 per region as pilot)
		-Establish business incubation centers			
		-Train and establish SMEs of value chain and livelihood technicians advisory group			
	Strengthening of private sector platforms for enhancing value chain actions	-Encourage private sector involvement on livestock marketing and other agricultural inputs,	500,000	98,000	All project districts
		-Establish and promote PPP for better value addition and market integration.			
	Promotion and facilitating market linkage	-Establish well designed livestock market centers and other agricultural inputs	500,000	1,450,000	All project districts
		-Establish one-stop agricultural input shops inputs including livestock drugs are made accessible for local purchase			
		-Digitalization and standardization of livestock commodity for better and sustainable regional integration.			
		-Capacity building on standardization of products and marketing			
		-Strengthening and supporting primary cooperatives for better market linkage			
		-Conduct studies on best business models			
	Promote cross-border trade linkage	-Develop or enhance standards for feed and fodder, livestock products	250,000	138,000	All project districts 5 border posts
		-Provide advisory services to the government for the establishment of custom posts			
		-Promote cross-border legal agricultural trade through managing trans-boundary livestock diseases with health check posts, establishing custom points, etc			
		-Introduce and implement digital market information system	250,000	250,000	



	Strengthening of Livestock & related products Market Information Systems (LMIS) including; electronically facilitated trade, digitalization of commodity and livestock trade	-Introduce weight-based marketing of livestock to reduce negotiating on individual livestock base marketing			All districts
		-Train pastoralists and regional actors on digital marketing and related platforms			
		-Introduce digital payment system for domestic and inter-regional trade			
		-Put in place Community radio interactive system			
	Promoting and supporting of agro-processing sector	-Promote and support value addition and agro-processing of honey	120,000	120,000	All districts
		-Promotion of cross border-based market linkage			
	Provide women empowerment support	-Establishing women-based cooperatives for milk production, poultry productions, etc -Support them enhancing their access to credit and finances		50,000	
2.Supporting development of entrepreneurship	Improvement of fishing, fish handling and fish processing infrastructure to improve the quality and quantity of fish catches	-Identify target communities and carry out community mobilization -Carry out training on fish harvesting, processing, marketing, post-harvest handling, fishnet breeding and boat building, fish by-product processing and utilization -Establish fish market and processing infrastructure -Conduct training on fishery cooperative, business planning, management and record-keeping -Introduce the practice of fishery co-management, and conduct training in fisheries resource management -Select and organize women and youth members of the community in different fishery-related activities. -Construct jetties, cold storage, processing plants, and net bradding and boat building training centers -Establish bush shops/fish input selling centers -Provide season-long technical backstopping	85,000	262,000	Dasenech, Dolo Ado, and other potential areas

	Enhancing and diversifying the livelihoods of youth and women in different income-generating activities	-Organizing and mobilizing user groups in poultry, beekeeping, animal product processing and livestock trading	150,000	200,000	All districts
		-Identifying, training and engaging stakeholders who have a keen interest in engaging off-take, export slaughterhouse and hide and skin trading			
		-Linking the business to other operators in regional countries for economic integration			
		-Easing and sustaining certain export-related hurdles that help for regional integration			
		-Establishing quarantines and quality control and other regulatory institution that are keen for product quality and regional integration			
		-Sustaining national, regional and international standards that have a common currency for international trade			
	Construction and equipping of small processing and marketing units for agricultural and dairy products	-Establishing well equipped model dairy processing facility with cold chains and market linkage	150,000	1,750,000	all project districts
		-Establish well equipped fishing infrastructure and cold chains technologies			
	Support and implement food and feed preservation mechanisms	-Introduce and implement of fish smoking, air drying and fish powder making practices	250,000	190,000	all project districts
		-Promote nutrition sensitive agricultural practices for better food nutrition and livelihood security.			
		-Promote saving of any incomes to enhance resilience			
	Support livelihood diversification	Income and livelihood diversification through value chain development in areas in beekeeping, poultry, incense production, etc through capacity building, seed money support, market linkage, etc		150,000	
	Support livelihood Diversification scheme for women and youth	-Enhancing women to harness diversified income earning potential. -Sensitize and organize vulnerable groups fodder supply chine		55,000	

3.Promoting domestic bio-digesters and solar energy	Promote renewable energy systems such as solar, wind and biogas energy sources	-Train and familiarize the community with implementation and manipulation of sustainable energy technology	400,000	250,000	
<b>Component 3. Strengthening adaptive capacity to climate change</b>					
1.Development of climate services	Provision of climate advisory support through digital agriculture in partnership with ICPAC and other national institutions	-Provide customized advisory and early warning services on climate, livestock disease, conflict, etc using mobile technologies such as farmer hotline and radio programs		235,000	All
		-Development and sharing of hydro-climatic products and information		64,500	All
	Provide livestock insurance services to rural communities	-Pilot index-based livestock insurance services through shared premium with local communities -Facilitate awareness creation events to enhance adoption of the insurance service		450,000	
2.Building capacity of main stakeholders in the agro-pastoral sectors in the drought prone areas for mainstreaming and monitoring climate change	Knowledge management and learning	-Experience sharing visits to best practices area with similar Argo climate and livelihood similarity		98,000	All
		Demonstrations for rural communities		78,000	All
	Pilot index-based livestock insurance program for selected HHs to promote adoption	Capacity building and awareness creation		68,000	All
		Introduction and implementation of livestock insurance through shared premium		504,000	All
	Support livelihood recovery to drought or conflict affected poor households	Restocking of small ruminants to drought and conflict affected vulnerable households to support livelihood recovery through revolving fund		300,000	

3.Strengthening the operational capacity for resilience	Enhance rural communities' operational capacity improving access through feeder roads	-Build gravel roads to and from new construction and maintenances sites of livestock water points (300 KM)		4,300,000	
<b>Component 4. Program coordination and management</b>					
1.Effective and efficient regional management and coordination of the HoA Program by IGAD					
2.Effective and efficient management and coordination of the HoA Program by IGAD member states	<b>Conduct regular activity monitoring and performance reviews</b>	<ul style="list-style-type: none"> <li>-Conduct periodic monitoring of project activities</li> <li>-Conduct periodic performance reviews of the project at cluster, region and district level</li> <li>-Capacity building to DRSLP team at zone and woreda levels, and implementation partners to ensure sustainability of results</li> <li>-Experience sharing visits to program staff</li> </ul>		3,250,000	

## **7.2 Implementation Strategy**

### **7.2.1 Role of the Regional Executing Agency**

IGAD will serve as the regional executing agency of the HoA program. The overall coordination of the programme will be carried out by IGAD as the regional Executing Agency working in close liaison with the national governments in the HoA region. While IGAD will be responsible for implementing the regional activities, IGAD member states' institutions will be responsible for the implementation of activities at the national level. IGAD Executive Secretariat and its specialized institutions including ICPAC (IGAD Climate Prediction and Applications Centre) and ICPALD (IGAD Centre for Pastoral and Livestock Development) will provide the necessary technical backstopping for regional activities.

The IGAD Secretariat, through the IDDRSI Platform Coordinating Unit (PCU), will be responsible for coordinating the implementation of the programme. The Regional Programme Coordination Unit, set up by the IGAD Secretariat, will be dedicated to coordinating the program. Overseen by a Regional Program Steering Committee, Regional PCU, will provide coordination support and overall guidance ensuring that the objectives and goals of the regional program component are achieved. The mandates of the Regional Program Steering Committee include approval of the budgets, activity reports and annual accounts related to the implementation of the regional program. It is chaired by the IGAD Executive Secretary in accordance with the instrument in force, and its secretariat is provided by the Regional IDDRSI Coordinator. While undertaking specific regional activities under the program, ICPAC and ICPALD will each act as implementing agencies, within the framework and terms of a Memorandum of Understanding with the IGAD Secretariat coordinated by the IDDRSI PCU. The Regional Program Steering Committee (RPSC) which will include representatives from RPCU and the National program coordination unit (NPCU) to ensure the synergy and harmonization in the implementation of the program in the countries and at the regional level.

### **7.2.2 Role of the National Executing Agency**

The Ministry of Agriculture, Livestock and Fishery Resources will be the national executing agency of the programme with the overall responsibility for coordination and supervision of the program. The ministry will form a national program coordination team comprising of a core team of a Program Coordinator, an Accountant, a Procurement Specialist and a Monitoring and Evaluation Specialist, and subject matter specialists (in Agribusiness, Livestock, Rural Infrastructure and Sustainable Land Management) and experts on cross cutting issues (gender and environment). The program coordination team at the national level will be in charge of leading the coordination and monitoring of implementation of the project activities. Respective Regional Pastoral Development Commissions will be in charge of implementing regional level activities and providing the necessary institutional support for the smooth, efficient and effective implementation of the program activities. Regional PDCs will be responsible for day-to-day implementation of the program activities at the grass roots level.

The National Steering Committee (SC), chaired by the State Minister for Livestock and Fishery Resources, will be established by the executing agency. The SC, meeting at least twice a year, will provide implementation oversight, policy guidance and ensure inter-ministerial coordination, harmonization and alignment support among donors providing related resilience building programmes. The SC will also be mandated to review progress of the programme on a semi-annual basis and will assess work plans on an annual basis in order to ensure the effective implementation of the program. It is also tasked with approval of the budgets, activity reports and annual accounts. On top of this, SC will work with the National IDDRSI Platform in order to ensure that all resilience building interventions being implemented in the country have the necessary technical guidance, supervision and coordination. The program coordinator will be the Secretary to the SC and the focal person for all coordination with the IGAD national programme coordination team.

### **7.2.3 Procurement**

All procurement of Works, Goods and Consultancy services required by the national program will be procured in accordance with Ethiopian Federal Government Procurement and Property Administration Proclamation no 649/2009, Bank's 'Rules and Procedures for the Procurement of Goods and Works, May 2008' and 'Rules and Procedures for the Use of Consultants, May 2008'. The Ministry of Agriculture, Livestock and Fishery Resources, and Regional Pastoralist Development Commissions will be jointly responsible for procurement activities under the project.

### **7.2.4 Monitoring**

The program monitoring and evaluation function will be carried out using a participatory and results-based management approach which will generate data to monitor progresses with emphasis on outcome and impact levels of the program result. The monitoring and evaluation will be based on set of qualitative and quantitative key performance indicators identified as appropriate to measure all subsequent changes due to activities implemented by the program. Baseline data on key performance indicators will be collected in the first year of the programme in order to determine the before-program condition or status of the project beneficiaries which will be used as a benchmark against the program target. Periodic monitoring data will be collected on biannual basis to assess the program implementation progress and overall project performance which will also be used as input to make necessary adjustments to the strategies, mechanisms and activities in the course of the project implementation. Final evaluation and impact assessment of the program will be conducted at the end of the implementation process in order to determine whether the program met its target against the baseline, assess scalability and identify proper exit strategies to ensure sustainability of the program. The final evaluation and impact assessment will be conducted by an independent consultant to independently assess the performance of the program through methodologically robust evaluation methodology and standard tools.

The monitoring and evaluation function of the project will be pursued under the coordination of a dedicated M&E specialist with support from the national program coordinator. The specialist will also undertake periodic project monitoring activities as required in order to appropriately guide project management and implementation within time and budget. The M&E specialist will be responsible for coordination of all monitoring and evaluation activities and ensure the production of periodic progress reports and knowledge products that would be shared among stakeholders. In this line, the program will make sure that adequate budgetary support will be made to support the monitoring and evaluation aspect of the program. The Executing Agency, Ministry of Agriculture, will put in place a simplified M&E framework and approach and build capacity of its staff at all levels and pastoral communities and promoting community participation and improving the effectiveness of the programme.

### 7.3 Expected Results by Component, Sub-Component and Focal Area

Program		Program to build resilience for food and nutrition security in the Horn of Africa (HoA)				
Purpose		Contribute to improving the living conditions of populations and food and nutritional security in the Horn of Africa				
Results chain		Performance indicators			Means of verification	Risks/mitigation measures and assumptions
		Indicators (including CSI*)	Baseline	Target		
Impacts	<ul style="list-style-type: none"> <li>Improved livelihoods and rural incomes</li> </ul>	<ul style="list-style-type: none"> <li>- N° of people /families with improved incomes</li> <li>- Length: km of farm to market roads constructed</li> </ul>	Baseline in 2020	Target in 2025	<ul style="list-style-type: none"> <li>- Reports from government statistics services in the Ministries of Agriculture, Plan, Economy, Infrastructural Development, Roads etc.</li> <li>- Reports from centers of excellence (relevant research centers/ universities)</li> <li>- Reports from IGAD and related Centers (ICPAC, ICPALD, IFRAH, ICARDA etc.)</li> <li>- Reports from IGAD including the IDDRSI Platform, and IGAD program partners (CEWARN &amp; others)</li> <li>- Reports from other NGOs and International organizations working on community resilience in HoA</li> </ul>	
	<ul style="list-style-type: none"> <li>Improved resilience of communities to CC, droughts, pandemics and shocks</li> </ul>	<ul style="list-style-type: none"> <li>- N° of families /communities affected by the -ve effects of CC, drought, etc.</li> <li>- N° of cattle/herds affected by the -ve effects of CC, droughts etc.</li> </ul>	Baseline in 2020	Target in 2025		
	<ul style="list-style-type: none"> <li>Improved access of communities to food and nutrition</li> </ul>	<ul style="list-style-type: none"> <li>- N° of children/ women/ men /families with improved access to food &amp; nutrition</li> <li>- N° of children who are underweight</li> </ul>	Baseline in 2020	Target in 2025		
	<ul style="list-style-type: none"> <li>Improved access of communities to water for irrigation, sanitation etc.</li> </ul>	<ul style="list-style-type: none"> <li>- N° of people/ families/ communities benefiting from irrigation and H2O sanitation systems</li> <li>- Area/ha of restored agro-silvo-pastoral systems</li> </ul>	Baseline in 2020	Target in 2025		
	<ul style="list-style-type: none"> <li>Improved resilience of agro-silvo-pastoral production systems</li> </ul>	<ul style="list-style-type: none"> <li>- N° of internally displaced persons (IDPs) in the HOA.</li> </ul>	Baseline in 2020	Target in 2025		
	<ul style="list-style-type: none"> <li>Strengthened regional economic, legislative and institutional integration</li> </ul>					

Outcomes	1. Increased agro-silvo-pastoral and piscicultural entrepreneurial capacity and ability in the HoA countries	<ul style="list-style-type: none"> <li>- N° of agricultural entrepreneurs</li> <li>- N° of livestock entrepreneurs</li> <li>- N° of diversified entrepreneurs i.e. fish farmers, honey, NTFPs, camel/goat value chains</li> <li>- N° of intra/inter entrepreneurial networks</li> </ul>	Situation in 2020 in project sites -	Target in 2025	- Government statistical services in the Ministries of Agriculture, Livestock, Fisheries & Forestry	<p><b>Risk 1:</b> Highly infectious variant of COVID – 19 <b>Mitigation:</b> With the demonstrated political will manifested by the highly mediatized national and regional dialogues on COVID – 19, all IGAD Governments are likely to order the now available and appropriate vaccines in the short term as solution to the crisis.</p> <p><b>Risk 2:</b> Regional Conflict. <b>Mitigation:</b> Most regional programs including DRSLP, IDDRSI Platform and others advocate regional integration. Belonging to these regional forums is an indication of the good political will of governments in the region to promote peace and stability in the region.</p> <p><b>Risk 3:</b> Low human and institutional capacity in IGAD and National Implementing Agencies <b>Mitigation:</b> The capacity of national implementing agencies will be enhanced as they work alongside regional and international consultants recruited by the HoA Program. Moreover, Component 3 of the HoA Program has regional capacity building activities for IGAD &amp; IGAD Centers</p>
	2. Increased legislation supporting new / innovative entrepreneurial initiatives	<ul style="list-style-type: none"> <li>- N° of legislations supporting local biogas development &amp; sales</li> <li>- N° of legislations supporting non-food plant-based biofuel development and sale</li> <li>- N° of legislations supporting exploitation of local solar energy for sale</li> </ul>	Situation in 2020 at district level -	Target in 2025	- Ministries of Economy, Finance, Commerce,	
			Situation in 2020 at departmental level	Target in 2025	- Ministries of Trade,	
			Situation in 2020 at provincial / sub-national level	Target in 2025	- Ministries of Customs and Cross-border Trade	
			Situation in 2020 at national level	Target in 2025	- Government Gazettes compounding Laws, Policies & Legislations	
	3. Increased availability and accessibility of water in HoA countries and communities	<ul style="list-style-type: none"> <li>- N° of people/ families accessing water all-year round</li> <li>- N° of cattle/herds of cattle assessing water &gt; 6 months/ yr</li> <li>- N° of hydraulic infrastructures /H2O harvesting systems constructed &amp; used</li> </ul>	Situation in 2020 in project sites -	Target in 2025	- Government statistical services in the Ministries of Water/ Hydrology, Agriculture/Lands, Livestock and Fisheries	
			Situation in 2020 at district level	Target in 2025		
			Situation in 2020 at departmental level	Target in 2025	- Ministry of Plan & Infrastructural Development	
			Situation in 2020 at national level	Target in 2025		
	4. Increased use of knowledge systems to inform the management of assets / agro-silvo-pastoral and piscicultural production systems	<ul style="list-style-type: none"> <li>- N° of people/ families using ICT-based systems to protect assets against damage</li> </ul>	Situation in 2020 in project sites	Target in 2025	- ICPAC, ICPALD,	
			Situation in 2020 at departmental level	Target in 2025	- Research Centers - Statistical services in the Ministries of Agriculture Livestock & Fisheries	



		- N° of people/ families using crop/livestock insurance services	Situation in 2020 at national level	Target in 2025		<b>Risk 4:</b> Engagement of women is difficult due to cultural barriers.
	5. Increased human and institutional capacity developed in the HoA region	- N° of people trained in efficient handling of pastoral/ livestock production systems in each country - N° of people trained in efficient handling of land / agricultural production systems in each country - N° of people vaccinated against COVID 19 in each country - N° of personnel trained by IGAD as training of trainers in climate related /agric/ pastoral & livestock services	Situation in 2020 in project sites  Situation in 2020 at national level  Situation in 2020 at IGAD field staff level	Target in 2025  Target in 2025  Target in 2025  Target in 2025  Target in 2025	- Ministries of Agriculture, Lands, Livestock & Fisheries  - Ministry of Health  - IGAD and IDDRSI-PCU, AED, DRISD, PSD, PCPD.....  - ICPAC, ICPALD, ICARDA	<b>Mitigation:</b> The support of men will be solicited to ensure that women and girls are involved from the design phase of this HoA Program  <b>Risk 5:</b> Capacity of pastoral communities to adopt and adapt is low. <b>Mitigation:</b> Communities will be mobilized, trained and sensitized. An effort will be made to ensure that women assume leadership roles where appropriate.
Outputs	<b>Component 1:</b> Strengthening the resilience of drought prone areas and Pastoral and Agro-Sylvo- Pastoral Production systems to Climate Change.	- Ha of land reclaimed - Km of transhumance corridors developed - N° of studies /Ha on resources in pastoral areas - N° of adapted storage facilities & N° of livestock development clusters	Situation in 2020 in project sites  -	Target in 2025  Target in 2025	- Quarterly and annual DRSLP progress reports  - Procurement and audit reports	
	<b>Sub-component 1.1</b> Support Sustainable Management of Agro-pastoral land	- Km of feeder roads - N° of hydraulic infrastructure - N° of studies for livestock markets / vaccination parks	Situation in 2020 at district level  -	Target in 2025  Target in 2025	- MTRs, Steering committees and PCR meeting reports	
	<b>Sub-component 1.2</b> Develop Climate Resilient Infrastructure	- N° of fish processing infrastructure - N° of ICT-based trainings	Situation in 2020 at departmental level  -	Target in 2025  Target in 2025	- Statistical Services of the Ministries of Agriculture, Livestock, Fisheries, Hydraulics & Water Resources, Plan, Economy, Lands, Infrastructure and Development	
	<b>Sub-component 1.3</b> Promote Climate-Smart Innovations and Technologies	- N° of trainees in index based crop and livestock insurance - N° of members of range platform /health networks - N° of people trained in risk-management tools	Situation in 2020 at national level	Target in 2025		

		- N° of people sensitized in good nutrition practices				
	<b>Component 2: Supporting Agribusiness Development</b>  <b>Sub-component 2.1</b> Facilitating access to advisory services, financing and markets  <b>Sub-component 2.2</b> Supporting Development of Entrepreneurship  <b>Sub-component 2.3</b> Promoting Domestic Bio-digesters and Solar Energy	- N° of integrated agricultural service centers - N° of youth / women trained in advisory services / incubation agropreneurs - N° of inclusive financing mechanisms - N° trained in trade-improving market access - N° of private sector platforms for enhancing value chain actions - N° trained in Market Information Systems (LMIS) - N° of trainings in value addition of crop and livestock products - N° trained in digitalization of commodity and livestock trading - N° trained in assembly of industrial processing units - N° trained in food reserve systems - % of support for development of regulatory, institutional, and policy arrangements - N° trained in IEC on bio-digesters and solar energy	Situation in 2020 in project sites  -  Situation in 2020 at district level  -  Situation in 2020 at departmental level  -  Situation in 2020 at national level	Target in 2025  Target in 2025  Target in 2025  Target in 2025  Target in 2025	- Government statistical services in the Ministries of Economy, Commerce, Trade, Energy, Agriculture, Livestock and Fisheries  - IGAD and IDDRSI-PCU, AED, DRISD, PSD, PCPD.....  - ICPAC, ICPALD, ICARDA.	
	<b>Component 3: Promoting adaptive capacity to climate change</b>  <b>Sub-component 3.1</b> Development of climate services	- N° trained in rainfall monitoring & use of MODIS vegetation index products - N° of packages of user-friendly hydro-climatic products - N° of PS in business models for production of hydro climatic services - N° trained in climate smart village ventures	Situation in 2020 at national level  Situation in 2020 at the regional level	Target in 2025  Target in 2025  Target in 2025	- IGAD and IDDRSI-PCU, AED, DRISD, PSD, PCPD.....  - ICPAC, ICPALD, ICARDA.  - IGAD and IDDRSI-PCU, AED, DRISD, PSD, PCPD.....	

	<p><b>Sub-component 3.2</b> Build capacities of main stakeholders of the agro-pastoral sectors in drought prone areas for mainstreaming and monitoring Climate Change</p> <p><b>Sub-component 3.3</b> Strengthen the Operational Capacity for resilience</p>	<ul style="list-style-type: none"> <li>- N° trained in climate smart mapping</li> <li>- N° of reports disseminated on state of resilience in HoA</li> <li>- % support to coordination and monitoring of IDDRSI</li> <li>- N° trained in local &amp; regional climate insurance products</li> <li>- N° of regional livestock and crop insurance policies</li> <li>- N° trained in risk-management tools</li> <li>- N° trained in water accounting &amp; resource maps</li> <li>- N° of BOs trained in negotiations</li> <li>- N° of maps on resilience actions in HoA</li> <li>- % support to regional observatory on climate, transhumance and mobility</li> <li>- N° trained in pro-poor, gender and sex-oriented resilience actions</li> </ul>	<p>Situation in 2020 at national level</p> <p>Situation in 2020 at the regional level</p>	<p>Target in 2025</p> <p>Target in 2025</p> <p>Target in 2025</p> <p>Target in 2025</p> <p>Target in 2025</p>	<p>- ICPAC, ICPALD, ICARDA.</p> <p>- IGAD and IDDRSI-PCU, AED, DRISD, PSD, PCPD.....</p> <p>- ICPAC, ICPALD, ICARDA.</p> <p>- IGAD and IDDRSI-PCU, AED, DRISD, PSD, PCPD.....</p> <p>- ICPAC, ICPALD, ICARDA.</p>	
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<b>Major Activities</b>	<p><u>Component 1</u></p> <p>Promote Soil and water conservation</p> <p>Promote landscape management in cross-border areas</p> <p>Strengthen gender dimension across agro-sylvo-pastoral production investments</p> <p>Develop transhumance pathways for movement of animals through transhumance corridors</p> <p>Undertake support studies that inform on resources in pastoral</p> <p>Identify livestock development clusters that link output markets to infrastructure</p> <p>Rehabilitate / construct hydraulic infrastructure</p> <p>Rehabilitate / Construct rural feeder roads</p> <p>Promote efficient post-harvest handling to reduce post-harvest losses</p> <p>construct livestock markets and vaccination parks</p> <p>Improve fishing, fish handling and fish processing infrastructure</p> <p>Integrate ecotourism in arid clusters</p> <p>Promote ICT-based agricultural management</p> <p>Promote Index based crop and livestock insurance</p> <p>Promote agricultural mechanization</p> <p>Integrate ICT with climate forecasting, early warning and mitigation</p> <p>Strengthen vaccination against major Epizootics</p> <p>Promote forage production</p> <p>Support improved dietary diversity</p> <p><u>Component 2</u></p> <p>Establish integrated agricultural service centers</p> <p>Equip youth advisory service centers to invest in value-chain addition</p> <p>Establish inclusive financing mechanisms for farmers and SMEs</p> <p>Strengthen private sector platforms to enhance value chain actions</p> <p>Encourage PPP investments in feedlots, export slaughterhouses and tanneries</p> <p>Promote market Information Systems including electronically facilitated trade</p> <p>Support the harmonization of Grades and Standards of livestock products</p> <p>Promote digitalization of commodity and livestock trading</p> <p>Promote professionalization of agro-pastoral value chains actors and of partnerships</p> <p>Support sub-projects on agro-sylvo-pastoral and fisheries value chains</p> <p>Promote establishment of youth and women SMEs as business incubation centers</p> <p>Promote industrial processing units : animal products, cereals, fruits, and marketing</p> <p>Support IEC on bio-digesters and solar energy and the use of by-products</p> <p>Promote development of financing mechanisms for renewable energy sub-projects</p> <p>Train youth and women in manufacture of bio-digesters and solar energy systems</p>	
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	<p><u>Component 3</u></p> <p>Promote network for collection of hydro climatic data building on IGAD HYCOS</p> <p>Strengthen use of rainfall monitoring and MODIS Vegetation Index Products</p> <p>Develop user-friendly hydro- climatic products and information</p> <p>Support communication on hydro climatic information for IGAD Climate Strategy</p> <p>Develop agro-climatic forecast services linking agencies and climate smart villages</p> <p>Develop Climate risk mapping capability</p> <p>Develop digitalized platforms for good practices and technologies</p> <p>Develop Knowledge products on resilience: climate atlas, CC Newsletters etc.</p> <p>Support capacity strengthening against COVID – 19</p> <p>Develop and disseminate reports on the state of resilience in the HoA</p> <p>Support for coordination and monitoring of IDDRSI</p> <p>Support national and regional services in CC based knowledge management</p> <p>Support development of relevant regional livestock and crop insurance policies</p> <p>Promote access to risk-management tools</p> <p>Develop reports on water accounting / water resource maps and link to IWRM tools</p> <p>Improve institutional capacities of BOs in negotiations</p> <p>Develop mapping of resilience actions in the HoA</p> <p>Support operation of a regional observatory on climate, transhumance and mobility</p> <p>Develop regional pro-poor, gender/sex-oriented CC framework on resilience actions</p> <p>Organize annual climate investment forums in the Horn of Africa</p>	
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**Key:** C-Components SC-Sub-components, FA - Focal Area

## **C1: Strengthening the resilience of drought prone areas and Pastoral and Agro-Sylvo- Pastoral Production systems to Climate Change.**

### **SC 1.1: Support Sustainable Management of Agro-pastoral land**

- **FA 1.1.1:** Agro Pastoralist Community capacity to adopt modern land management practice enhanced, additional income and nutritional sources from agro-forestry improved and participation and mainstreaming different groups (women, boys, girls and men's) are properly mainstreamed in community development endeavor.
- **FA 1.1.2:** Pastoralist capacity enhanced and equipped themselves with modern early warning systems to enhance resource usage and sharing of pastoral and water resources to minimize cross border conflicts, increasing income diversification of Pastoralist households.
- Agro pastoral communities will adopt drought resistance crops that provide optimal nutritional content and income sources during low agrarian cycles.

### **SC 1.2: Develop Climate Resilient Infrastructure**

- **FA 1.2.1:** Income and food security status of participants will increase as a result of rise in productivity and additional Livestock feeds produced. Pastoralist access to health facilities, market and livelihood diversification increased.
- **FA 1.2.2:** Increasing productivity and management of cross-border pastoral resources will decrease incidence of conflicts and promote cross border collaboration among Pastoralist.
- **FA 1.2.3:** Livelihood will be more diversified by participating on improved fishing, honey, non-wood forest produces and ecotourism as well as from well-functioning camel and goat markets will improve income of households, diversified livelihood and income cumulatively builds the capacity of pastoralist households for resilience to climate related risk.

### **SC 1.3: Promote Climate- Smart Innovations and Technologies**

- **FA 1.3.1:** Pastoralist and agro-pastoralist will create capability to minimize climate related risk by accessing the availability of climate related information in a form pastoralist community easily understand, Livestock feeds and food production yield increased by adopting droughts tolerant varieties and water harvesting technologies enhanced food and livelihood security of the pastoralist
- **FA 1.3.2:** Pastoralist Community access to information and services vital to minimize climate related risks and adaptation to climate changes will be increased. Capacity of the community to use and integrate CSA information and services enhanced
- **FA 1.3.3:** The nutritional status of the Pastoralist Community improved by awareness campaigns on nutritional sensitive food preparation, accessing more nutritious food from nutritional diversification activities through backyard vegetable gardening and proper use of health centers and advisory service.

## **C2: Supporting Agribusiness Development**

### **SC 2.1: Facilitating access to advisory services, financing and markets**

- Livestock Based Business development and improvement of the value chain along the market flourished the Pastoralist economy and livelihood by improved advisory systems, financial accessibility and cross border Livestock markets.

## **SC 2.2: Supporting Development of Entrepreneurship**

- Value Addition of Livestock Products increased both in diversity and quality that helps to attract more youth employment and income generation.
- Enhancing women to harness their diversified income earning potential and engaging men and boys to support this process.
- Organized Youth, Women, Men, and Mixed groups with training on entrepreneurship and business development to tackle unemployment, poverty, and livelihood diversification for resilience.

## **SC 2.3: Promoting Domestic Bio-digesters and Solar Energy**

- Applications of bio-digester and solar energy at household level would improve living condition of Pastoralist, soil fertility of backyard farms increased from application of composts and institutional capacity to adopt regulatory and facilitation on expansion of alternative energy sources improved.

## **C3: Strengthening adaptive capacity to climate change**

### **SC 3.1: Development of Climate Services**

- **FA 3.1.1:** Farmers could access quality climate data for adoption of CSA and index-based insurance.
- **FA 3.1.2:** institutions at regions and local levels in Pastoralist area would build capacity in generating, using and dissemination to climate information and services.

### **SC 3.2: Build capacities of main stakeholders of the agro-pastoral sectors in drought prone areas for mainstreaming and monitoring Climate Change**

- **FA 3.2.1:** over all adoption of the state-of-the-art information and knowledge management and sharing platform among academics and policy makers at regional level will be enhanced.
- **FA 3.2.2:** Capacity of local focal persons will be enhanced in using and dissemination of climate information.
- **FA 3.2.3:** Best Practices in crop and Livestock climate insurance programs will be assessed and shared with stakeholders to scale up among wider Pastoralist and agropastoralist for Minimizing climate risks among households.
- The pastoral communities especially women will identify and pursue adaptation strategies that positively respond to climate change and weather events.

### **SC 3.3: Strengthen the Operational Capacity for resilience**

- **FA 3.3.1:** National and Regional Institutional Capacity on IWRM Will be improved for Establishing Common and A Shared Management Platform for Cross – Border Water resources.
- **FA 3.3.2:** Regional Collaboration among national institutions for development and dissemination of climate information and climate Resilience practice will be enhanced.

## **C 4: Support Coordination**

- Coordination, technical and financial management, monitoring and supervision and preparation of audits at National and region level will be enhanced.

## 8 INTERVENTION APPROACH AND MAJOR STAKEHOLDERS

### 8.1 Intervention Approach

The proposed DRSLP II program in Ethiopia will maintain an intervention approach that is guided by the following 5 key principles - participatory, partnership, institution-oriented, iterative and inclusive of women and youth. The program will put the major beneficiaries (pastoral and agro-pastoral communities) and stakeholders at the core of its intervention strategy which promotes the active participation of local communities through a community-driven and government facilitated approach. Primarily it supports local communities and their institutions so that they become the architects and builders of their social, economic and political future in sustainable ways. The project promotes the active participation of local communities so that they become main actors in the design, implementation and evaluation of the project which is an essential condition for the success of the project. The project will build partnerships and promote solidarity with various governmental and non-governmental partners that potentially add value to the project efforts and expected results. Further, to that the envisaged partnership will help to mobilize additional resources including knowledge that local efforts cannot provide.

The proposed program will also follow an institution-oriented approach to roll out its activities through utilizing existing institutional structure at the lower level including woreda and kebele units. The institution-oriented approach complemented with active participation of beneficiaries and stakeholders will help ensure the sustainability and scale up of the project results. It will also help mainstream resilience building into development planning and programs with potential for synergy. In addition, the program will build on past and present similar resilience building and development initiatives to present relevant, high priority and adapted interventions that address the needs and priorities of communities and ensure development effectiveness. In particular, it will be informed by successes and failures of the preceding DRSLP I program and does not try to re-invent the wheel rather build on it. Moreover, it will have gender sensitiveness and youth participation inclusive agenda at the center of its interventions to address gender differential vulnerability issues and gender equity gaps in making fair benefit of rural women, and enhance rural youth participation.

### 8.2 Major Stakeholders

The following table presents summary of stakeholder analysis for the national component of the program.

Table 7: Stakeholder analysis for the national component of the program

Stakeholders	Role in the program	Management or institutional arrangement	Areas of engagement (technical, material and organizational)
Civil Society Organizations (CSOs)	Building capacity of local communities, sectoral office experts, etc.		Watershed Management, Sustainable Land Management, Water resources management, GIS,
Private Sector	Actively engaging in and supporting the value chain development		Agro-processing, packaging, and agricultural marketing for



			outputs such as milk and milk products, live animals, etc.
Pastoralist Development Coordination Offices	Program implementation		All aspects of the program intervention areas
Sectoral Offices at Woreda Level	Support implementation of thematic activities		Bureaus of Water Resources, Education, Trade and Industry, Health, etc.
Ministry of Agriculture	Program Coordination and Implementation at national Level		Institutional and coordination support to regional governments and PDC Offices
Intergovernmental Authority for Development	Lead program management and coordination at regional level		Baseline studies, midterm/final evaluations, etc.

## 9 DETAILED COST OF THE PROGRAM

The following table summarizes the program cost by component and sub-components. For detailed cost of activities, visit the activities table in Section 7 of this report.

Table 8. Summary of program cost by component and sub-components

Component	Sub-component	Cost (USD)	Subcomponent cost (%)	Component Total USD (%)
1.Strengthening the resilience of drought prone areas and pastoral and agro-sylvo-pastoral production systems to climate change	1.1 Support sustainable management of agro-pastoralland	1,574,000	4	<b>20,366,309 (55%)</b>
	1.2 Development of climate resilient infrastructure	18,502,309	50	
	1.3 Promotion of climate-smart innovations and technologies and Technologies	290,000	1	
2.Supporting agribusiness development	2.1 Access to advisory services, financing and markets	4,536,000	12	<b>7,443,000 (20%)</b>
	2.2 Supporting development of entrepreneurship	2,657,000	7	
	2.3 Promoting domestic bio-digesters and solar energy	250,000	1	
3.Strengthening adaptive capacity to climate change Sub-component	3.1 Development of climate services	749,500	2	<b>6,097,500 (16%)</b>
	3.2 Building capacity of main stakeholders in the agro-pastoralsectors in the drought prone areas for mainstreaming and monitoring climate change	1,048,000	3	
	3.3 Strengthening the operational capacity for resilience	4,300,000	12	
4.Program coordination and management	4.1 Effective and efficient regional management and coordination of the HoA Program by IGAD	0	0	<b>3,250,000 (9%)</b>
	4.2 Effective and efficient management and coordination of the HoA Program by IGAD member states	3,250,000	9	
<b>Total</b>				<b>37,156,809 (100%)</b>

## **10 ECONOMIC AND FINANCIAL ANALYSIS**

### **10.1 Benefits of the Project**

The main project intervention includes borehole/pond/dam construction and maintenance of existing schemes, introduce improved range land management and establish fodder banks, expand access to veterinary care, establish market center with market information system, capacity building for pastoralists and agropastoralists on improved animal husbandry and drought resilience and marketing among others. Furthermore, cooperatives, SMEs will be established and strengthened, business incubation centers will be supported to enhance entrepreneurship to promote on farm and off farm livelihood activities and value addition.

Resilience can be built in the long run by ensuring access to functioning livestock markets, veterinary care, and adequate feed and water in the project area under the assumption that proposed interventions are implemented well and ensured market linkage in the value chain. The benefit include water access to livestock and irrigation, improved farm incomes from livestock and crop production, mitigation of economic losses due to drought, decreased incidence of water borne illness, reduced time collecting water etc. Rural households typically travel over an hour to water sources, and international standards for water access to be within half an hour walking distance. The time spent collecting water is high in drought periods, when pastoralists often have to travel for a full day to get water on a regular basis. For instance, according to key informant in SNNPRS in Ethiopia, previous DRSLP project intervention has reversed estimated loss of 100 thousands of livestock in the past three years compared with 2016 losses due to drought disaster. The same key informant involved in the project stated that more than one million animals were traded in the central market as the result of resilience project interventions. There will also be numerous other benefits, reduced aid dependency, increased sense of security and confidence by pastoralists due to provision of fodder and water access.

### **10.2 Financial Analysis**

It is difficult to conduct financial analysis for all project investments of such complex project. However, some on farm and off farm business activities have been selected for financial analysis. Mostly, households, cooperatives and SME enterprises were selected to analyse the financial performance of the economic activities that were supported by the project (Table 9).

#### **Goat fattening (supplementary feed lot).**

Seed money/revolving fund provided for each cooperative member for the purchase of 4 male goats, supplementary feed, and drug and market center access. The goats will gain weight and sold after 4 months. Another round of 4 goats will be purchased fattened and sold by the cooperative member within 1 year. Starting from Y3 each cooperative member is assumed to increase number of fattening goat by 2 and it will become 10 goats per round in Y5. Due to improved animal husbandry with full project intervention, goats with increased weight will be sold higher price. Also middle men would be avoided by selling in the market center to small scale or large scale traders. Goat purchase cost, Supplementary feed, drug and vaccine, labour cost and market fees are considered. This business will specifically benefit cooperatives of women and youth and underserved communities in all project districts.

#### **Fodder Producer SMES.**

The project will support irrigation schemes, improved forage seed, and other inputs and training on fodder agronomy for cultivating forage to improve animal feed and facilitate market linkage. The project assumed fodder producing SMEs own 5 ha for the production of fodder under irrigation. The average yield will be 20 tons per hectare for Y1 and Y2, and due to all the project interventions, the yield increases

to 25 ton per hectare in Year 3, remaining stable for the rest of the project life. Inputs such as seed, fertilizer, labour and harvesting and handling cost were considered.

#### **Fodder seed Producer SMEs**

The project will support irrigation schemes, improved fodder seed, and other inputs and training on fodder agronomy for fodder seed production and facilitated market linkage. It is assumed fodder seed producing SMEs own 5 ha for seed production under irrigation. The average yield will be 2 ton per hectare for Y1 and Y2, and due to all the project interventions, the yield increases to 2.5 ton per hectare in Year 3, remaining stable for the rest of the project life. Inputs such as seed, fertilizer, labour and harvesting and handling cost were considered.

#### **Fruits and vegetable production SMEs**

The project will support irrigation schemes, improved seedling and seed, and other inputs and training on agronomy for banana and tomato production and facilitated market linkage. It is assumed SMEs own 5 ha (4 ha for banana and 1 ha for vegetable production) under irrigation. The average yield will be 20 ton and 25 ton per hectare for Y1 and Y2 for banana and tomato respectively, and due to all the project interventions, the yield increases to 25 ton and 30 ton per ha in Year 3 for banana and tomato respectively and remaining stable for the rest of the project life. Inputs such as seed, fertilizer, labour and harvesting and handling cost were considered.

#### **Apiculture Households**

The project will support youth, women and underserved communities to involve in honey value chains. Assumed modern hives, bee colonies, shed construction, trainings and market linkage will be facilitated by the project. Currently, honey production in the proposed project districts is limited and yield is very low, 5-6 kg per year per hive. Assumed agro-pastoralhouseholds will own 4 modern beehives for improved yield. Apiculture is environmentally friendly activity with additional pollination benefit. In Y1 and Y2 yield with modern beehives will be 20 kg per year. In Y3 yield be increased to 25 kg with all project interventions and accumulated experience and remain stable for the next project period. Cost for shed maintenance, bee colony, sugar and labour for beehive care, harvesting and marketing is considered.

#### **Poultry Fattening SMEs**

SMEs of youth, women and underserved communities will invest on poultry fattening. SMEs will buy 45 day old 400 male broilers assumed to ready for sale after 3 months. Feed, drug and vaccination, trainings on poultry business and market linkage is expected to be facilitated by the project. For Y1 and Y2, 10 % death of broilers are assumed but it will be decreased to 5 % starting Y3 with full implementation of the project and stable for the remaining project period.

#### **Poultry Egg SMEs**

SMEs of youth, women and underserved communities will invest on poultry egg production. SMEs will buy 45 days old 400 female broilers assumed to lay eggs after 3 months. Feed, drug and vaccination, trainings on poultry business and market linkage is expected to be facilitated by the project. For Y1 and Y2, 10 % death of broilers are assumed but it will be decreased to 5 % starting Y3 with full implementation of the project and stable for the remaining project period. Feed, drug and vaccine, shed rent, shed maintenance and labour cost are considered

Table 9. Financial analysis with possible other value chain benefits

<b>Agribusiness type</b>	<b>Unit</b>	<b>XIRR (%)</b>	<b>XNPV(\$ US)</b>	<b>Benefit/Cost Ratio</b>
Goat fattening	Household	55.3	574.9	1.2
Fodder Production	SMEs	27.4	14,557.8	1.8
Fodder Seed Production	SMES	24.3	12,175.1	1.7
Banana and vegetable	Coops	22.9	10,948.9	1.2
Apiculture	Household	33.0	314.6	1.3
Poultry fattening	SMEs	22.1	4,337.6	1.3
Poultry egg	SMEs	28.8	6,064.8	1.2

\*Financial analysis for 5 years at 10% discount rate consistent with most models

### **10.3 Economic Analysis**

Aggregation of beneficiaries an estimated 188,800 households are estimated to be benefited in the agribusiness and off-farm businesses value chains in the project lifetime (Table 11).

Table 10: Agribusiness activity beneficiaries in the project lifetime

<b>Agribusiness type</b>	<b>Unit</b>	<b>Y1</b>	<b>Y2</b>	<b>Y3</b>	<b>Y4</b>	<b>Y5</b>	<b>Total HH</b>
Goat fattening	HH	32,400	32,400	32,400	32,400	32,400	162,000
Fodder Production	HH	675	675	675	675	675	3,375
Fodder Seed Production	HH	135	135	135	135	135	675
Banana and vegetable	HH	500	500	500	500	500	2,500
Apiculture	HH	2,700	2,700	2,700	2,700	2,700	13,500
Poultry fattening	HH	675	675	675	675	675	3,375
Poultry egg	HH	675	675	675	675	675	3,375
<b>Total HH</b>		<b>37,760</b>	<b>37,760</b>	<b>37,760</b>	<b>37,760</b>	<b>37,760</b>	<b>188,800</b>

NB - HH=Household



Table 11. Regions of proposed agribusiness and beneficiaries

Agri Business type	Unit	Location, beneficiary and budget		
		Location	No. of Beneficiary	Budget required
Goat fattening	Household	Afar	36,000	
		Somali	36,000	
		Oromia	48,000	
		SNNPRS	42,000	
Sub total			<b>162,000</b>	<b>10,456,363.64</b>
Fodder Production	SMEs	Afar	750	
		Somali	750	
		Oromia	1,000	
		SNNPRS	875	
Sub total			<b>3,375</b>	<b>3,829,090.91</b>
Fodder Seed Production	SMES	Afar	150	
		Somali	150	
		Oromia	200	
		SNNPRS	175	
Sub total			<b>675</b>	<b>785,454.55</b>
Banana and vegetable	Coops	Afar	1,000	
		Somali	500	
		SNNPRS	1,000	
Sub total			<b>2,500</b>	<b>684,090.91</b>
Apiculture	Household	Afar	1,750	
		Somali	1,750	
		Oromia	5,000	
		SNNPRS	5,000	
Sub total			<b>13,500</b>	<b>1,104,545.45</b>
Poultry fattening	SMEs	Afar	750	
		Somali	750	
		Oromia	1,000	
		SNNPRS	875	
Sub total			<b>3,375</b>	<b>1,687,500.0</b>
Poultry egg	SMEs	Afar	750	
		Somali	750	
		Oromia	1,000	
		SNNPRS	875	
Subtotal			<b>3,375</b>	<b>1,417,500.0</b>
Agribusiness total cost			<b>188,800</b>	<b>19,964,545.45</b>
Value chain development and capacity building costs				
Input and incubation centres establishment				920,0
Revolving fund/seed money				1,660,0
Other capacity building				5460
Sub-total				3,126,0
<b>Total cost</b>				<b>23,090,545.</b>





## Economic analysis

The costs and benefits of economic analysis are the costs and benefits of financial analysis, to which conversion factors have been applied to take into account the following distortions: elimination of direct financial transfers (taxes, duties, subsidies). The prices used for the goods and services produced and consumed by the project as well as investment costs are constant quantities for the year 2021. Labor costs were based on the wage rates averaged at ETB 150 per day for most farm operations but a wage rate of 0.77 opportunity cost used to determine the economic value of labor based on rural unemployment rate in Ethiopia (IDRI and IFPRI, 2016).

The economic analysis was undertaken in 2021 constant prices and discount rate of 10% was assumed. The ETB was used as the unit of account and an exchange rate of ETB 44 to US\$1 (August 2021) was applied when converting to US\$ and the project is assumed to be implemented for 5 year period. Economic analysis was based on the reference price method and the comparison of the “without project” and “with project” situations. The economic benefits of the project arise from the improved infrastructure, range land management, capacity building that would result from the rehabilitation of water infrastructure and the improvement of water management, greater.

On this basis, the economic rate of return (ERR) calculated through 7 economic and financial models over a 5-year investment lifetime at 10 %, are presented below:

ERR (baseline scenario): 43.2 % - NPV amount: 23,450,118 Million of \$US

The proposed agribusiness profitability might differ due to project cost variation and sales price fluctuations. For to account such scenario, project sensitivity is tested for (i) project costs increase by 10%; (ii) benefit drop by 10% for proposed agribusinesses; (iii) The project cost increases by 10% and benefit drop by 10%. Economic rates of return the 3 assumptions are 38.3 %, 37.8 % and 33.2 %, respectively validating the project remains economically viable with all or one of the assumptions occur.

Table 12: Project costs per component and beneficiary Cost/benefit ratio

Project component	Cost (\$)	No. of Beneficiaries	Cost/Benefit ratio (US \$)
Strengthening the resilience of drought prone areas and pastoral and agro-sylvo- pastoral production systems to climate change	20,366,309		
Supporting agribusiness development	7,443,000		
Strengthening adaptive capacity to climate change Sub-component	6,097,500		
Programme coordination and management	3,250,000.0		
<b>Total</b>	<b>37,156,809</b>		

## 11 PROGRAM SUSTAINABILITY

Program results sustainability is an important aspect of the program management process. However, the institutional, human and physical capacity deficits at regional and woreda levels poses a big challenge on continuity of the program results and sustainability of the program. Institutional sustainability of the programme will depend primarily on the degree of involvement of stakeholders, ownership and capacity-building of the executing agency, participating public institutions (at regional, zonal and woreda levels), and the beneficiary pastoral communities themselves. In alignment with needs and priorities of rural communities, the GoE is committed to stimulate the growth of the agriculture sector in general and

livestock sub-sector in particular as an important engine of growth for the country and enhance food security and improve the livelihoods of the pastoral communities. The programme, through the capacity building component, will provide support to strengthen the human and institutional capacity of the executing agency at all levels and also beneficiary pastoral communities.

There is no doubt that many projects fail because of the lack of an appropriate sustainability plan. The program's rural infrastructure investments on water, livestock health and market centers will be implemented with external contractors and technical assistance but the ownership and longterm management of the facilities will rest ultimately with pastoral communities and respective woreda level government lines. Towards this, the programme will ensure that the pastoral communities organize themselves into groups and acquire the knowledge and necessary skills to operate and maintain the facilities in a sustainable manner. Eventually, institutionalization of proven technologies or practices implemented by the program into the mainstream government respective line offices ensure the take up and scaling up/out of the activities that can serve as a decent exit strategy.

## 12 RISKS AND MITIGATION MEASURES

Table 13: Program potential risks and mitigation strategy

Nº	Potential risk	Risk category	Likelihood of risk	Mitigation Strategy
1	Security challenges some of the intervention sites	Security	Medium	Insecurity in some of the intervention sites because of resource-based or ethnically motivated conflicts may hinder smooth implementation of the project. In collaboration with partners, utmost efforts will be made to prevent and/or manage such conflicts so that the project implementation and its sustainability is not negatively affected.
2	Lack of coordination between implementation partners	Organizational	Low	Though building strong partnership among different stakeholders remain at the heart of this project, some partners may not effectively participate in the implementation for reasons including other competing priorities and limited manpower. Every effort will be made by the coordinating ministry MoA to make sure that active participation and coordination is being achieved.
3	Limited human capacity at the local government level	Capacity	Medium	Due to various reasons including already limited manpower and associated staff turnover, implementation capacity at Woreda and Kebele levels inherently remains at a relatively low level. Efforts will be made by the project management team to enhance the capacity of the implementation partners at the lowest level of governments.
4	Slow and lengthy administrative processes	Administrative	Medium	There is a risk of slow and lengthy administrative processes that hinder the purchase of equipment and procurement of services including construction which may delay the project implementation process. The project team will consult with responsible authorities to facilitate the speedy purchase and procurement of goods and services from relevant service providers.

5	Severe climate induced drought risk	Natural	Medium	Severe drought conditions may undermine the project implementation efforts through mobilizing human and infrastructure resources towards drought emergency responses particularly at the woreda level. This can be mitigated through various means including well equipping the project with necessary human, financial and equipment that help reduce disruptions
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### **13 LIST OF PROGRAM GOODS AND SERVICES**

The DRSLP II activities involve the procurement of goods and services from external suppliers and AfDB procurement policy requires to ensure that the proceeds in the projects and programs financed by it are used only for the purposes for which they were granted. The charter also requires that proper attention be paid to economy and efficiency in the procurement processes in Bank funded projects.

Adding experience in staff and system from DRSLP II, PCU will follow Bank procedure for open competitive for procurement of goods, works and services. The procurement process will not be affected by political and other non-economic influences or considerations must not influence procurement in Bank financed projects. The procurement procedures should give fair and equal opportunity to contractors, suppliers and consultants from member countries of the Bank. Transparency is also essential in the procurement process

The DRSLP II procurement of goods and services are vehicles for PCU at national and regional offices, mobile veterinary vehicles, office equipment, contracts for construction of small-scale infrastructures for market, feed store, PTC, livestock clinic, dairy and fishery small scale processing, consultancy services for implementation.

Partial lists of program goods and services include -

- Supply of Different types of Furniture, Laboratory and Office Equipment's
- Procurement of equipment's for Laboratory Reagents and Diagnostic Kits
- Procurement of vehicles for Mobile veterinary clinics
- Procurement of goods for mobile veterinary clinics that mounted on the vehicles.
- Supply of Fodder Seed
- Feasibility studies and detail design preparation for construction of Various Multipurpose Water Infrastructures
- Construction supervision and contract administrations for various Infrastructures
- Spare parts for rehabilitation of existing water schemes
- Solar pumps
- Procurement of hand tools for invasive weeds control
- Procurement of equipment for community based alternate livelihoods
- Construction Water ponds, boreholes, microlams
- Equipment and furniture for new and upgrading market center
- Contract for carrying out the baseline study, mid-term and final evaluation
- Contract for consultancy to study activities identified in the thematic areas
- Feasibility studies and ESIA for rural feeders' road

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## 15 ANNEXES

Annex i. Portfolio of major ongoing resilience building projects and programs in Ethiopia

Project/Program title	Geographic focus	Source of funding	Implementing agency	Effective date	Initial closing date	Revised closing date	Total project cost (US\$)
Responding to the Increasing Risk of Drought: Building Resilience under Responsive Resilience for the Most Vulnerable Communities		GCF, GoE	MoA, and MoWIE	2019	2014		49.5
Lowlands Livelihood Resilience Project (LLRP)		IDA/World Bank	Ministry of Peace	2019			45.5
Climate Smart Integrated Rural Development Project		Adaptation Fund	MoALR MoWIE MoEFCC	2017			9.5
Regional Pastoral Livelihoods Resilience Project (RPLRP)		IDA/World Bank	Ministry of Agriculture	2014			7.5
Drought Resilience and Sustainable Livelihoods Programme in The Horn of Africa (RSLP) - Project II	Oromia and SNNP States		Ministry of Agriculture	2014			
Drought Resilience and Sustainable Livelihoods Programme in Ethiopia (RSLP) - Project I	Afar and Somali Regional States		Ministry of Agriculture	2013			

Annex ii. Results-based logical framework matrix for the proposed national program

<b>Program: Program to Build Resilience for Food and Nutrition Security in the Horn of Africa (HoA) - Ethiopia</b>				
<b>Purpose: Contribute to improving the living conditions of populations and food and nutritional security in the</b>				
<b>Results level</b>		<b>Performance indicators</b>		
		<b>Indicators</b>	<b>Baseline</b>	<b>Target</b>
<b>Impact</b>	Improved livelihoods and rural incomes	-№ of people/households with improved incomes -Length (km) of farm to market roads constructed	Baseline in 2021  Baseline in 2021	Target in 2026  Target in 2026
	Improved resilience of communities to CC, droughts, flood, conflict and other shocks	-№ of households affected by the -ve effects of CC, drought, etc. - N° of cattle/herds affected by the –ve impacts of CC, droughts etc.	Baseline in 2021  Baseline in 2021	Target in 2026  Target in 2026
	Improved access of communities to food and nutrition	-№ of children/households with improved access to food & nutrition -№ of children who are underweight	Baseline in 2021  Baseline in 2021	Target in 2026  Target in 2026
	Improved access of communities to water for irrigation, sanitation etc.	-№ of households benefiting from irrigation and H <sub>2</sub> O sanitation systems	Baseline in 2021	Target in 2026
	Improved resilience of agro silvo-pastoral production systems	-Area/ha of restored agro-silvo-pastoral systems	Baseline in 2021	Target in 2026
<b>Outcome</b>	1. Increased agro-silvo-pastoral and piscicultural entrepreneurial capacity and ability in the HoA countries	-№ of agricultural entrepreneurs -№ of livestock entrepreneurs -№ of diversified entrepreneurs <i>i.e.</i> fish farmers, honey, NTFPs, camel/goat value chains -№ of intra/inter entrepreneurial networks	Situation in 2021 in project sites	Target in 2026
	2. Increased availability and accessibility of livestock water in pastoral and agro-pastoral communities	-№ of households accessing water all-year round -№ of cattle/herds of cattle assessing water > 6 months/year -№ of hydraulic infrastructures /H <sub>2</sub> O harvesting systems constructed & used	Situation in 2021 in project sites	Target in 2026
	3. Increased use of knowledge systems to inform the management of assets/agro-silvo-pastoral	-№ of households using ICT-based systems to protect assets against damage	Situation in 2021 in project sites	Target in 2026

	and piscicultural production systems	-№ of households using crop/livestock insurance services		
	4. Increased human and institutional capacity developed at national level	-№ of people trained in efficient handling of pastoral/livestock production systems in project sites -№ of people trained in efficient handling of land/agricultural production systems in project sites -№ of personnel trained by DRSLP II as training of trainers in climate related /agric/ pastoral & livestock services	Situation in 2021 in project sites	Target in 2026
Output	<b>Sub-component 1.1</b> Support Sustainable Management of Dry-land land	-Ha of land reclaimed -Km of transhumance corridors developed -№ of studies /Ha on resources in pastoral areas	Situation in 2021 in project sites	Target in 2026
	<b>Sub-component 1.2</b> Develop Climate Resilient Infrastructure	-№ of adapted storage facilities & N° of livestock development clusters -Km of feeder roads -№ of hydraulic infrastructure -№ of studies for livestock markets -№ of fish processing infrastructure	Situation in 2021 in project sites	Target in 2026
	<b>Sub-component 1.3</b> Promote Climate-Smart Innovations and Technologies	-№ of ICT-based trainings -№ of trainees in index-based livestock insurance -№ of people trained in risk-management tools -№ of people sensitized in good nutrition practices	Situation in 2021 in project sites	Target in 2026
	<b>Sub-component 2.1</b> Facilitating access to advisory services, financing and markets	-№ of integrated agricultural service centers -№ of youth and women trained in advisory services / incubation agropreneurs -№ of inclusive financing mechanisms -№ trained in trade-improving market access -№ trained in Livestock Market Information Systems (LMIS)	Situation in 2021 in project sites	Target in 2026
	<b>Sub-component 2.2</b> Supporting Development of Entrepreneurship	-№ of private sector platforms for enhancing value chain actions -№ of trainings in value addition of crop and livestock products -№ trained in digitalization of commodity and livestock trading	Situation in 2021 in project sites	Target in 2026

	<p><b>Sub-component 2.3</b> Promoting Domestic Bio-digesters and Solar Energy</p>	<p>-№ trained in assembly of industrial processing units -№ trained in food reserve systems - % of support for development of regulatory, institutional, and policy arrangements</p> <p>-№ trained in IEC on bio-digesters and solar energy utilization</p>	Situation in 2021 in project sites	Target in 2026
	<p><b>Sub-component 3.1</b> Development of climate services</p>	<p>-№ trained in rainfall monitoring &amp; use of MODIS vegetation index products -№ of packages of user-friendly hydro-climatic products -№ of PS in business models for production of hydro climatic services</p>	Situation in 2021 in project sites	Target in 2026
	<p><b>Sub-component 3.2</b> Build capacities of main stakeholders of the dry-land sectors in drought prone areas for mainstreaming and monitoring Climate Change</p>	<p>-№ trained in climate smart village ventures -№ trained in climate smart mapping -№ of reports disseminated on state of resilience in HoA -% support to coordination and monitoring of IDDRSI -№ trained in local &amp; regional climate insurance products -№ of regional livestock and crop insurance policies -№ trained in risk-management tools -№ trained in water accounting &amp; resource maps</p>	Situation in 2021 in project sites	Target in 2026
	<p><b>Sub-component 3.3</b> Strengthen the operational capacity for resilience</p>	<p>-№ of maps on resilience actions in HoA -№ trained in pro-poor, gender and sex-oriented resilience actions</p>	Situation in 2021 in project sites	Target in 2026
<b>Major activities</b>	<p><b>Component 1</b></p> <ul style="list-style-type: none"> <li>▪ Ensure year-round livestock access to feed</li> <li>▪ Flood management</li> <li>▪ Rangeland management</li> <li>▪ Introduce Sustainable Land Management (SLM) Practices</li> <li>▪ Conservation Agriculture (CA)/Minimum tillage</li> <li>▪ Integrated Soil Fertility Management</li> <li>▪ Improving access for smallholder irrigation</li> <li>▪ Nursery site establishment</li> <li>▪ Land registration and certification</li> <li>▪ Capacity building</li> <li>▪ Promote sustainable management of agricultural land</li> <li>▪ Establish cross-border joint planning and conflict resolution mechanisms</li> <li>▪ Managing noxious bush encroached communal rangelands</li> <li>▪ Strengthen the animal health service to the extent that provides efficient and effective service to the pastoral community</li> </ul>			

	<ul style="list-style-type: none"> <li>▪ Development of new livestock water infrastructure</li> <li>▪ Rehabilitation of livestock water infrastructures</li> <li>▪ Livelihood and income diversification for vulnerable groups</li> <li>▪ Boosting and capacitating livestock marketing</li> <li>▪ Introduction of climate smart agriculture technologies</li> <li>▪ Introduce renewable energy sources</li> </ul>	
	<b>Component 2</b> <ul style="list-style-type: none"> <li>▪ Create market linkage and integration for women</li> <li>▪ Facilitating low interest finance or seed money for small and medium enterprises</li> <li>▪ Establish integrated rural Input Centers and advisory services / incubation agro entrepreneurship centers</li> <li>▪ Strengthening of private sector platforms for enhancing value chain actions</li> <li>▪ Promotion and facilitating market linkage</li> <li>▪ Promote cross-border trade linkage</li> <li>▪ Strengthening of Livestock &amp; related products Market Information Systems (LMIS) including - electronically facilitated trade, digitalization of commodity and livestock trade</li> <li>▪ Promoting and supporting of agro-processing sector</li> <li>▪ Provide women empowerment support</li> <li>▪ Improvement of fishing, fish handling and fish processing infrastructure to improve the quality and quantity of fish catches</li> <li>▪ Enhancing and diversifying the livelihoods of youth and women in different income-generating activities</li> <li>▪ Construction and equipping of small processing and marketing units for agricultural and dairy products</li> <li>▪ Support and implement food and feed preservation mechanisms</li> <li>▪ Support livelihood diversification</li> <li>▪ Support livelihood Diversification scheme for women and youth</li> <li>▪ Promote renewable energy systems such as solar, wind and biogas energy sources</li> </ul>	
	<b>Component 3</b> <ul style="list-style-type: none"> <li>▪ Provision of climate advisory support through digital agriculture in partnership with ICPAC and other national institutions</li> <li>▪ Provide livestock insurance services to rural communities</li> <li>▪ Knowledge management and learning</li> <li>▪ Pilot index-based livestock insurance program for selected HHs to promote adoption</li> <li>▪ Support livelihood recovery to drought or conflict affected poor households</li> <li>▪ Enhance rural communities' operational capacity improving access through feeder roads</li> </ul>	
	<b>Component 4</b> <ul style="list-style-type: none"> <li>▪ Conduct regular program activity monitoring and performance reviews</li> </ul>	

Annex iii. Country team or national experts working on the feasibility study

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Annex iv. List of contacted persons during the field visit  
(In addition to sectoral bureau experts interviewed)

№	Name	Region	Zone	District	Affiliation	Position
1	Mr. Mitiku Tamiru	SNNP	-	-	Pastoral Development and Special Support Affairs Bureau	Head, Bureau
2	Mr. Azene Adasho	SNNP	-	-	Pastoral Development and Special Support Affairs Bureau	Deputy Head, B
3	Mr. Seyoum Metaferia	SNNP	-	-	Regional DRSLP Coordination Office	Coordinator
4	Mr. Zenebe Zerihun	SNNP	-	-	Regional DRSLP Coordination Office	DRSLP Livestock Expert
5	Mr. Simret Teklil	SNNP	-	-	Regional DRSLP Coordination Office	DRSLP Livelihood Expert
6	Mr. Wosenu Mekonen	SNNP	South Omo	-	DRSLP Zonal Mobile Support Team Coordinator	Coordinator, ZM
7	Mr. Getachew Gelmo	SNNP	South Omo	Male	Pastoral Development and Special Support Affairs Bureau	Head, Bureau
8	Mr. Abraham Worku	SNNP	South Omo	Male	DRSLP Coordination Office	Head of Office
9	Mr. Arkerich Weyisol	SNNP	South Omo	Dasenech	Pastoral Development and Special Support Affairs Bureau	Head, Bureau
10	Mr. Issa Mohamed	SNNP	South Omo	Dasenech	Pastoral Development and Special Support Affairs Bureau	Bureau's Awareness Raising Expert
11	Mr. Roba Turcha	Oromia	-	-	Regional Pastoral Development Commission	Commissioner
12	Mr. Mohamed Jilo	Oromia	-	-	Regional Pastoral Development Commission	Deputy Commissioner
13	Mr. Ibsa yusuf	Oromia	-	-	Regional Pastoral Development Commission	Advisor to the Commissioner
14	Mr. Ayele Kene'a	Oromia	-	-	DRSLP Coordination Office	Head of Office
15	Mr. Jaldesa Huka	Oromia	Borena	-	Pastoral Development Commission	Head of Office
16	Mr. Bule Boru	Oromia	Borena	-	DRSLP Zonal Mobile Support Team	Coordinator
17	Mr. Boneya Wario	Oromia	West Guji	Dugda Dawa	District Administration Office	Deputy Head
18	Mr. Bali Wata	Oromia	West Guji	Dugda Dawa	Pastoral Development Commission	Deputy Head
19	Mrs. Shubichu Kebu	Oromia	West Guji	Dugda Dawa	Women Affairs Bureau	Head of Bureau
20	Mr. Galma Liben	Oromia	West Guji	Dugda Dawa	DRSLP Coordination Office	Coordinator
21	Mr. Tukale Wario	Oromia	West Guji	Dillo	District Administration Office	Deputy Head

22	Mr. Sora Guyo	Oromia	West guji	Dillo	Pastoral Development Commission	Head of Bureau
23	Dr. Befkadu Mamo	Afar	-	-	DRSLP I	Coordinator, and Livestock Exper
24	Mr. Tamiru Likachwe	Afar	-	-	DRSLP I	Rangeland Mana Expert
25	Mr. Amir Abdu	Afar	-	-	DRSLP I	Livelihood Expe
26	Mr. Mohammed Ali	Afar	Zone 1	Elidar	Livestock, Agri & NR Office	NRM expert
27	Mr. Ibrahim Ali		Region	Elidar	Livestock, Agri & NR Bureau	Senior NRM exp
28	Mr. Melaku Kassa	Afar	Awsu Risu	Elidar	Woreda Agricultural Development Office	Planning & Coo
29	Mr. Amin Abdu	Afar	Awsu Risu	Elidar	Value Chain	Cooperative
30	Mr. Habibe Mhamed	Afar	Awsu Risu	Elidar	DRSLP I	Project Coordin
31	Mr. Endires Hussene	Afar	Awsu Risu	Elidar	Agricultural Development Office	Livestock exper
32	Mr. Jemale Ali	Afar	Awsu Risu	Elidar	Water Development Office	Water office exp
33	Mr. Kalid Yemam	Afar	Awsu Risu	Elidar	Women and Youth Office	Monitoring and Evaluation Expe
34	Mr. Melaku Kassa	Afar	Awsu Risu	Elidar	Agriculture Office	Cooperative Exp
35	Mr. Easea Hare	Afar	Awsu Risu	Gerene	District Administration Office	Administrator
36	Mr. Ahemed Ysin	Afar	Awsu Risu	Gerene	Agricultural Development Office	Head of Office
37	Mr. Yosuf Esmaeal	Afar	Awsu Risu	Gerene		
38	Mr. Ardo Aboko	Afar	Awsu Risu	Gerene	District Administration	Deputy Speaker
39	Mr. Mohamed Suna	Afar	Awsu Risu	Gerene	Water Development Office	Head
40	Mr. Haya	Afar	Awsu Risu	Gerene	District Security Bureau	Head
41	Mr. Hibil Hussien	Somali	-	-	DRSLP I	Regional Project Coordinator
42	Mr. Mahamed Farah	Somali	-	-	Labor and Social Affair Bureau	Former DRSLP Coordinator
43	Mr. Abduleqeder	Somali	-	-	Pastoralist Development office	Regional Pastoral Development Ex
44	Mr. Taher Abdula	Somali	-	-	Bureau of EPA	Director
45	Mr. Abdulkadir Omar	Somali	-	-	Bureau of EPA	Department Hea
46	Mr. Ebrahim Aden	Somali	-	-	Bureau of EPA	Expert
47	Mr. Abduleqider Jama	Somali	-	-	Livestock Resource and Pastoral Development Bureau	Regional Pastoral Development Ex
48	Mr. Ibrashim Rashid	Somali	-	-	Women and Youth Office/RPLRP	Gender Expert
49	Hassen Abdulahi Takel	Somali	-	-	Livestock Resource & Pastoral Development Bureau	Directorate Dire
50	Mr. Ahamed Mohamed		Afder	Barey	Water Development Bureau	Head, Bureau
51	Mr. Osman Amro	Somali	Afder	Barey	Agricultural Development Office	Natural Resource Management

52	Mr. Abdi Mohamed	Somali	Afder	Barey	Livestock office	Livestock
53	Mrs. Nure Wele	Somali	Afder	Barey	Women and youth Office	Gender expert
54	Mr. Usman Aman	Somali	Liben	Dollo Ado	WoA	NRM expert
55	Mr. Abdi-Mohamed Ibrahim	Somali	Liben	Dollo Ado	Livestock, Agri & NR office	Senior Livestock
56	Mr. Mohamed Kelif	Somali	Liben	Dolo Ado	District Administration Office	Chief Administrator
57	Mr. Sanbul Ahamed	Somali	Liben	Dolo Ado	District Agricultural Office	Agronomy expert
58	Mr. Abdrhaman	Somali	Liben	Dolo Ado	District Agricultural Office	Livestock expert
59	Mr. Abdrhaman Dhire	Somali	Liben	Dolo Ado	Water Development Office	Head, Office
60	Mrs. Saida Nasir	Somali	Liben	Dolo Ado	Cooperative Development Office	Head, Office
61	Mr. Nur Mohamed	Somali		Arareso	District Administration	Deputy Administrator
62	Mrs. Nemo Adem	Somali	Liben	Dolo Ado	Women and Youth Office	Office Head
63	Mrs. Fertuna Dahira	Somali	Liben	Dolo Ado	Women and Youth Office	Expert
64	Mr. Ousman Aman	Somali	Liben	Dolo Ado	Agricultural development Office	NRM expert