CLIMATE CHANGE ADAPTATION PROGRAMME IN WATER AND AGRICULTURE IN ANSEBA REGION, ERITREA

Mid-Term Review Report

National Commission for Higher Education, Bureau of Standards and Evaluation

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Acronyms

HAC	Hamelmalo Agricultural College
MoA	Ministry of Agriculture
MoLWE	Ministry of Land Water and Environment
NSC	National Steering Committee
MND	Ministry of National Development
NARI	National Agricultural Research Institute

NUEY	National Union of Eritrean Youth and Students
NUEW	National Union of Eritrean Women
FGD	Focal group discussion
NAPA	National Adaptation Programme of Action
SWC	Soil and Water Conservation
GoSE	Government of State of Eritrea
PPR	Project Performance Reports

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Executive Summary

Zoba Anseba is implementing UND-GEF/AF supported project in the subzobas of Hamelmalo and Habero. The purpose of this MTR is to enable the UN System to work together and in close cooperation with the Government of the State of Eritrea (GoSE) and development partners for enhanced efficiency and impact in response to the development challenges confronting the GoSE.

The UN guidance on UNDAF processes recommends annual and mid-term reviews of joint projects for relevance and progress towards its set of outcomes. In 2011, the GOSE and UNDP signed and agreed to jointly implement **Climate Change Adaptation Programme in Water and Agriculture in Anseba Region, Eritrea**. Annual reviews and monitoring and evaluation were undertaken in the last three years of implementing the project. This MTR aims to assess the projects' outcomes, relevance, efficiency and sustainability and to come up with recommendations and any modifications. The project is a five-year climate adaptation programme that integrates water and agriculture implemented at the Anseaba regional level. The project is organized across four outcomes and 12 outputs with a budget of $6.52 million, benefitting 6,141 households, 1,350 of whom are female-headed households directly and has a potential to benefit a total of 75,400 inhabitants of the two sub zobas of Hamelmalo and Habero directly or indirectly.

Findings of the MTR

Outcome 1. The focus of Outcome 1 was on making water available. This was carried out through the construction of diversion structures and micro-dams in the subzobas of Habero and Hamelmalo, respectively. Construction of diversion structures has been completed at two sites in Habero, namely, Fiza and Lemayt. A solar set-up using two solar pumps has been installed to pump water to a reservoir of 314 m3 capacity that has been constructed in Fiza. As a result of the construction of micro-dams, diversion structures and SWC activities that have been taking in the two subzobas, water has become available to enable to carry-out sedentary agricultural and livestock production. This change of behavior from pastoralism to agro-pastoralism is particularly evident in Habero sub-zoba. The project has helped to cultivate about 30 ha of land intensively for the production of animal feeds, vegetables and fruits and about 120 ha of land to be cultivated under supplementary irrigation at Fisa and Lemayt diversions.

Two micro-dams have been constructed at Wazentet and Gebsi with a total capacity of 320,000 m3. These dams have secured water for humans and livestock. About 20 ha of land in Gebsi is awaiting cultivation. Farmers in Musha-Shebah have benefitted from the project through the use of a dam constructed by another project. Water recharge from the dam has enriched the wells of farmers in Musha-Shebah and made water available throughout the year for forage production for dairy cows, vegetable and fruit production and supplementary irrigation for crop production.

SWC activities which include construction of hillside terraces, check dams, establishment of enclosures, planting of tree seedlings have been carried out in the two sub-zobas. These activities helped reduce erosion and conserve soil and water. These activities were also a source of income for the many farmers, about 10% of whom were females.

Two nurseries in Hamelmalo sub-zoba have been successfully rehabilitated and they are supplying seeds and seedlings of sisal, Acacia spp. and different fruits and vegetables being used by farmers in the project area. A site has been selected for nursery in Habero at Fiza which will start propagating seedlings in 2017.

Over-sowing with grasses was not carried out because of drought in 2015 and seeds could not be collected to be used for over-sowing in 2016.

Outcome 2. This outcome focused mainly on enhancing climate-resilient agricultural and livestock production. This was undertaken through trainings, distribution of early-maturing, drought-tolerant seed varieties, installment of improved mogogos and distribution of chicks to farmers in the project area. A total of 50 farmers from the two sub-zobas were also provided with a package of technologies

that included the distribution of ½ ha of land, a cross-bred dairy cow, seeds and seedlings of forages (alfalfa, sudan grass and pigeon pea) and five fruit trees, namely, mangos, oranges, guavas, bananas and sour oranges. The project also constructed six Class A meteorological stations in order to enable to provide farmers with seasonal forecasts to enhance adaptive capacity and climate-proof production systems.

To enhance and update the knowledge of the extension agents, different in-service trainings were given through the project. Most of the trainings dealt with crop and animal production in relation to climate change.

A range of improved varieties that are early-maturing and drought and striga-resistant were distributed to farmers in the project area. These include Hariray and Se'are from sorghum and Kona and Hagaz from pearl millet. Distribution of these varieties increased yield of sorghum from 3 to 7 q/ha and pearl millet from 2 to 6 q/ha.

In Habero from the farmers who received 25 dairy cows six have already transferred six-month old female calves to other farmers and 4 are awaiting to transfer the calves when they reach six months of age. In Musha-Berdeg, nine female calves are awaiting to be transferred. Milk production in Habero ranges from 5-8 litres per cow per day while in Musha-Berdeg it is about 8 litres. This has made milk available for sale after satisfying house-hold requirements. This has created a milk market in Habero at 15 nakfa per litre while in Musha Berdeg milk is sold at 28 nakfa per litre in Keren. In Habero, prior to this project the beneficiaries had no experience of raising dairy cows. This undertaking has been a ground-breaking action for modern livestock production in Habero mainly due to availability of water from the diversions.

The dairy cows depend on the cultivation of animal feeds, namely alfalfa, elephant grass and pigeon pea introduced by the project. A market for animal feeds has been created in Habero from the surplus of animal feeds being produced by the farmers in the project.

The major vegetables produced by the farmers in the project include tomatoes, onions, okras and leafy vegetables. This has resulted in providing diversity of foods for the households and created a market for the community at a reasonable price especially in the sub-zoba of Habero. Fruit trees such as mangos, guavas and bananas introduced by the project have started to bear fruit in 2016 and will a reliable source of income for the future.

Three hundred sixty-five needy female-headed household and fifteen males were provided with 25 one-month old chicks each. The poultry served as a source of nutrition and income through the consumption and sale of cocks and eggs.

About 400 improved energy efficient stoves ("mogogos") were installed in four hundred homesteads by the project. The mogogos helped save wood and protected women from harmful smoke.

Six meteorological stations have been constructed by the project. The data from these stations is important to make seasonal forecasts to guide production activities of farmers. However, while the meteorological stations in HAC and Hagaz Agro-Technical School have been fully functioning, the remaining four stations are not adequately utilized due to shortage of meteorological experts and in adequate management arrangement of the stations.

Outcome 3. The focus of this outcome was on improvement of climate risk information and climate monitoring used to raise awareness of and enhance community preparedness to climate change hazards.

Awareness raising events on climate change have been carried out in Geleb, Hamelmalo and Habero. In each sub zoba 45 farmers were present out of which 20% were females. The topics included sanitation of water and consequences of water pollution, effects of environmental degradation, the advantages of terrace construction, tree seedling transplanting, check dam construction and farm field terracing for sustainable land management practices. A movie showing the efforts of the community

in afforestation and the changes they were able to achieve through a community effort was shown in the different villages of the two sub-zobas.

Outcome 4. This outcome focused on lessons learned and shared and policy influenced through knowledge management system.

Most of the outputs and activities planned under this outcome have not been accomplished. The accomplished activities which should be included into a knowledge management system in the future include the germination and purity tests and seed priming and seedling transplanting of sorghum and pearl millet conducted by HAC and the incubation of eggs from improved hens by local hens carried-out by enlightened farmers in the sub-zobas of Habero and Hamelmalo. Another activity that has been accomplished from outcome 4 is the incorporation of climate resilient crop varieties in the research of NARI and HAC. Such crop varieties developed in NARI and HAC such as Kona for pearl millet and Se'are for sorghum, respectively, were distributed to farmers in the two sub-zobas by this project.

However, study tours to a country in the region with similar climate risks and environmental constraints have not taken place. No regional forum has been established to review and integrate climate risk reduction strategies and measures in the regional development plan. Development of appropriate knowledge products, and policy advocacy have not progressed adequately. However, media coverage regarding the project was adequate and extensive. These are all activities that are awaiting accomplishment in the remaining years of the project.

Monitoring and Evaluation, Risks, Emerging Opportunities and Lessons Learned

The actual details of the M&E reports were prepared by the project coordinator, program analyst (UNDP) and monitoring and follow-up team based on field visits and reports of extension agents. Part of the M&E activities were conducted by providing Annual Work Plans (AWPs) for the years 2013-2016. Back to Office reports were also prepared by UNDP as part of the M&E. Only one Annual report for the years 2013-2014 was prepared with main emphasis on activities done in the project area. AF Project Performance Reports (PPRs) were provided which provided details of achievements by outcome, output and activity.

Risks

The risks, current status of the risks and the steps taken to mitigate the risks by the project have been reports in detail in the PPR reports. The risks identified by the project were drought, groundwater level dropping and salinisation, low human and institutional capacity, price escalation and unavailability of commodities and materials, failure of zoba administration to institutionalize early warning system and meteorological/climate observation components and migration of humans and livestock. There were also critical risks that were not identified in the project design. These included: delays in programme implementation and shortage of feed, water and concern on the health of the dairy cows.

Emerging Opportunities and Lessons Learned

The project has brought about a change in mentality from depending only on livestock (pastoralism) to making use of both crop and livestock (agro-pastoralism). This is particularly true for sub-zoba Habero. With the project, they have started to raise dairy cows and grow animal feeds, crops, vegetables and fruits due to the diversions that made water available throughout the year. This is serving as a lesson to other farmers who were not included in the integrated minimum package to follow their example. A previously weak or non-existent market for animal feeds, milk and vegetables has been created in sub-zoba Habero. The minimum package implemented in Aretay and Musha-Shebah has been so successful that the zoba administration is implementing a similar program in Elabered and Gelebsubzobas and similar programs are under study in the subzobas of Halhal and Hagaz.

Challenges

The most important challenges facing this project are:

- Maintenance of the well-being of the diversions at Fiza and Lemayt and
- Prevention of the siltation of the micro-dams in Hamelmalo
- Lack of experts in climate change with special emphasis on making use of the meteorological data in the preparation of community-based early warning systems and knowledge management.

Only if these challenges are overcome can the sustainable production of the crop and livestock production options introduced by the project and the community preparedness to face challenges in climate change be ensured.

Conclusions and Recommendations

Conclusions

- People from Habero were predominantly pastoralists; but with this project they have started to raise dairy cows in confinement and grow vegetables, crops, animal feeds and fruits for market and home consumption because the project has made water available.
- Over 80% of the activities of Outcome 1 and 2 have been accomplished. However, a lot remains to be done in Outcomes 3 and 4. ***Hence, in order for the project to complete the remaining project activities, as per terms and conditions of the Adaptation Fund (AF), we strongly recommend that the project be granted a one year no-cost extension beyond the original completion date***. There should not be change in the project's originally approved scope of work.

Recommendations

- SWC activities in the catchment areas need to be enhanced to reduce siltation. Construction of check dams on the upstream side of the micro dam will help reduce siltation.
- All the areas where SWC and afforestation activities have been carried-out should be properly enclosed and protected by hiring guards from the community.
- There is a severe shortage of grasses in the two sub-zobas due to recurrent droughts and high soil erosion. There is a need to identify places, other zobas if necessary, from where to collect suitable grasses to over-sow in the enclosures.
- Nursery establishment in Habero should be expedited to produce for seedlings for afforestation and for farmers who want to start fruit cultivation.
- Females in both sub-zobas traditionally have experience in raising goats. The two sub-zobas are also suitable for goat production because of the availability of plentiful browse trees and shrubs. Taking the high mortality that the distributed chicks suffered into consideration, goat distribution to needy women could be a viable alternative.
- There are plenty of ingredients for compost making available in the integrated minimum package areas. These include manure, weeds, horticultural crop residues from mango leaves, banana stems, etc. The farmers need to be trained on changing these byproducts of their farms into compost as there is a high demand for fertilizer for the various crop production activities.
- All the planned meteorological stations have been constructed in six sites. However, the stations are not functioning at full capacity. This is due to the lack of climate expert(s) and a designated entity with full authority to operate and manage the stations. This problem needs to be urgently solved in order to fully provide the local farmers with robust and timely seasonal forecasts.
- Undertaking of regional study tours as proposed in the plan would contribute to the achievement of Outcomes 3 and 4.
- The Ministry of National Development, Ministry of Land, Water & Environment, UNDP, Bank of Eritrea and the Commercial Bank of Eritrea should enhance and better harmonize their

planning process and programme implementation to mitigate budgetary delays and make funds available to the project so that season-dependent activities can be carried out on time.

- For the sustainability of the diversions and other structures, farmers should initiate contribution of money to raise funds.
- ***Over 80% of the activities of Outcome 1 and 2 have been accomplished. However, a lot remains to be done in Outcomes 3 and 4. Hence, in order for the project to complete the remaining project activities, as per terms and conditions of the Adaptation Fund (AF), we strongly recommend that the project be granted a one year no-cost extension beyond the original completion date***. There should not be change in the project's originally approved scope of work.

1 Introduction

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The UN guidance on UNDAF processes recommends annual and mid-term reviews of joint projects for relevance and progress towards its set of outcomes. In 2011, the GOSE and UNDP signed and agreed to jointly implement Climate Change Adaptation Programme in Water and Agriculture in Anseba Region, Eritrea. Annual reviews and monitoring and evaluation were undertaken in the last three years of implementing the project. This MTR aims to assess the projects' outcomes, relevance, efficiency and sustainability and to come up with recommendations and any modifications. The project is a five-year climate adaptation programme that integrates water and agriculture implemented at the Anseba regional level. The project is organized across four outcomes and 12 outputs with a budget of $6.52 million, benefitting 6141 households, 1350 of whom are female-headed directly and has a potential to benefit a total of 75,400 inhabitants of the two sub zobas of Hamelmalo and Habero directly or indirectly.

1.1 Project Development Context

Eritrea is extremely vulnerable to adverse effects of climate change mainly because of its geographical location in the arid and semi-arid region of the Sahelian Africa. Environmental issues, in the country, are among the top priorities since the war and recurrent droughts have caused immense damage to the environment. The rainfall intensity is very high with a lot of rainfall falling within a limited period resulting in soil erosion and run-off. The rainfall also shows great variation in space and time. Under normal conditions, the rainfall in the sub humid agro-ecological zone in the eastern escarpment may reach as high as 1000 mm while in the Southern Red Sea and the North-Western parts of the country; it is less than 200 mm.

The causes of climate change in Eritrea could be due to anthropogenic factors, both occurring at the global and local levels. At the local level, the gas emissions from agricultural activities, manure management; emissions from forest activities, burning of savannah and methane emissions from domestic livestock enteric fermentation could contribute to climate change.

The impacts of climate change are manifested on desertification/land degradation. Climate change also causes temperature increase above the mean global value, increasing variability in rainfall, more frequent dry spells and more severe droughts. The effects of these impacts on water resources and agriculture exacerbated food insecurity, diminishing biological diversity. They also increased the incidence of weeds, insect pests and diseases and reduced grain yield and livestock production and worsened health conditions.

The mitigation mechanisms should mainly focus on food security and the effects of climate change on crop production, livestock, and forestry and water resources. Climate models suggest that Eritrea's climate will generally become more variable, with high levels of uncertainty regarding climate projections in the Sahel zone. The main climate risks or hazards identified in the assessments carried out to develop the Eritrean National Adaptation Programme of Action (NAPA) are as follows:

- *Increased climatic variability:* Relative to baseline conditions, there have been observed changes in average, range, and variability of temperature and precipitation throughout the country;
- *Recurring drought:* The occurrences of dry spells, seasonal droughts and multi-year droughts are more frequent than in the past;
- *Flash flooding:* there has been a perceived increase in episodes of torrential rainfall with heavy

runoff and flooding; and

- *Sea level rise:* Coastal areas and the hundreds of Eritrean islands in the Red Sea are susceptible to rising sea levels associated with climate change.

Current projections do not provide much information on increased frequency of extreme events, such as flooding, although this was identified by the NAPA as a key threat. However, in a country like Eritrea in which drought has long been a significant and severe natural phenomenon, the high likelihood that climate change will increase incidence and severity of drought is a cause for considerable concern.

1.2 Project location

Anseba is one of the six zobas of Eritrea located in the north-west of Eritrea, with a total area of approximately 22,834.28 square kilometres, covering about one fifth of the country. Keren is the capital of Zoba Anseba, with a population of approximately 100,000 people, is located 91 km north-west of Asmara, Eritrea's capital city. Administratively, Zoba Anseba is divided into 11 sub-regions (sub-zobas). The sub-regions or sub-zobas are sub-divided into 109 administrative kebabis (collection of villages) comprising approximately 441 villages.

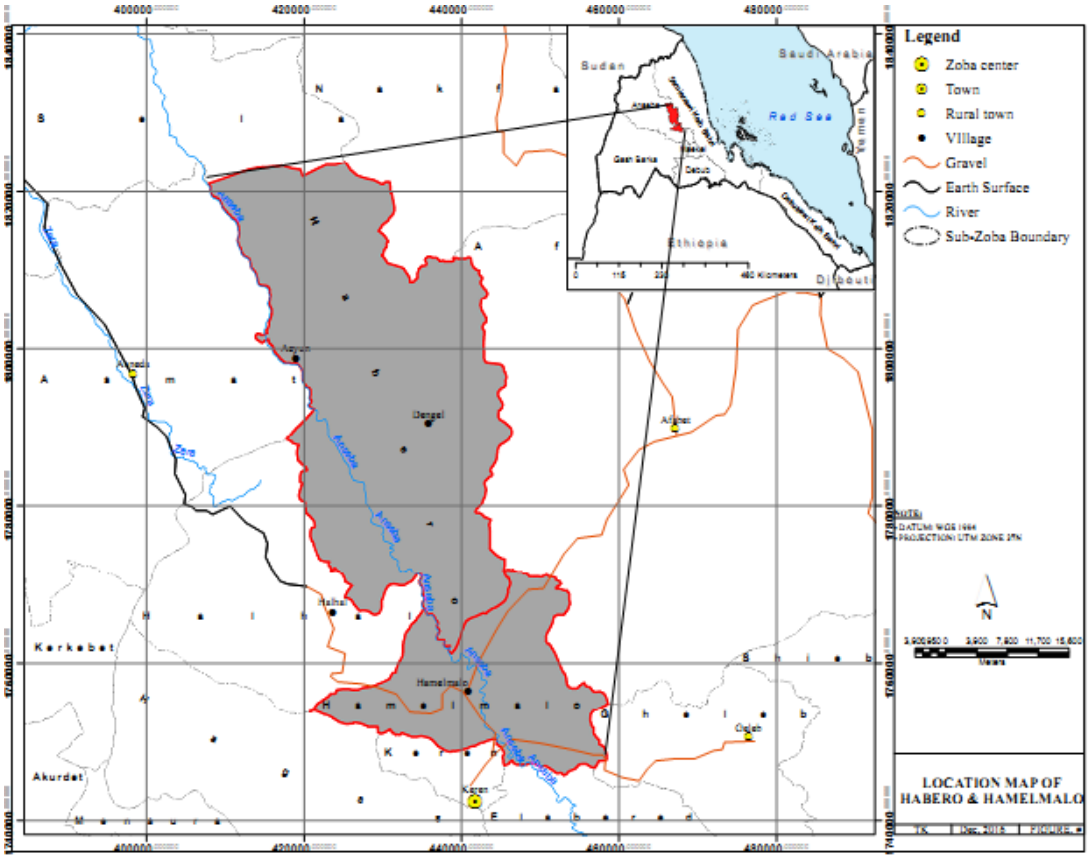

Figure 1: Location of the Sub-zobas Hamelmalo and Habero

Agriculture including livestock is the main economic activity for the people of the zoba Anseba. About 80% of the population mainly relies on this sector for food, income and employment. Agriculture is mainly rain-fed and subject to climatic variability. Out of the total land area only 368,088 ha (16%) is currently classified as potentially arable land and only about 17 percent (62,393 ha) of this potential arable land is cultivated annually for crop production. The average land holding ranges between 1 and 2 hectares. As for the primary income sources of the population in Anseba 49.8% of the population are agriculturalists, 19.2% are agro-pastoralists, 12.2% are pastoralists and 18.8% are engaged in trade and small-scale industries (including both wage labor and self-employment).

Although there is no specific study on the historical and recent forest coverage for Anseba, it is

believed that large parts of the region have been deforested, for house construction, firewood, and in certain areas for making charcoal. The conversion of forests and woodlands into croplands has also been a major factor for the depletion of biological resources, and overgrazing has contributed considerably to the loss of bio-diversity. As forest cover has declined, the rugged topography of the area is exposed to severe soil erosion, reducing topsoil and making the grasses, forest and woodland regeneration difficult. Many of the valleys in between hills and mountains are too narrow to be used for large scale farming.

The most common crops grown in the zoba in order of importance are sorghum, pearl millet, barley, maize, ground nut, wheat, and finger millet. Vegetable and fruit production is carried out in limited areas along the banks of the major ephemeral rivers, namely the Barka, Anseba, Gadmay, Begu and Daerotay. Major livestock are cattle, sheep, goats, and pack animals (donkeys, horses, and camels). A recent estimate of livestock numbers is 540,000 goats, 165,000 cattle, 90,000 pack animals, 300,000 poultry and 3,000 bee colonies. At the household level, livestock are used for food, income generation, as draught animals in farming, transport and for manure.

The food security situation in the zoba is extremely precarious. According to the Zoba Administration, over the past five years per capita food production has showed no growth. The average yield for sorghum and pearl millet ranged from 0.27 to 0.31 t/ha according to the BLS. In most parts of the region crop production has stagnated and in others it is showing a decreasing trend. In 2002, a drought year, the estimated annual crop production was 454.75 tons which accounted for only one percent of the total annual food requirement of the region. The food production deficit contributes to a picture of overall food insecurity that renders the population of the zoba highly vulnerable to any external shock that may affect their food production and livestock.

Based on vulnerability criteria, including drought-proneness and levels of malnutrition, the Ministry of Agriculture, together with government departments of the Region or Zoba identified sub-zobas of Hamelmalo and Habero for the site of the project interventions. Criteria for selection of the two sub-zobas include levels of vulnerability related to climate variability and change. Low agricultural productivity and land degradation have become major features of these sub-zobas. The main constraint is recurrent drought. Over the last three decades, these sub zobas have experienced several droughts as well as erratically distributed rains. The effective rainy period is short, starting in mid-June and extending to August. Sometimes rain starts too early and ends too early, with adverse effects on crop and livestock production. Other problems include cultivation of marginal land without fallowing and inappropriate land management, lack of investment in land improvement, inadequate animal feed, depletion of underground water and the natural limitations of the rugged topography. These problems are major setbacks to improvement of the agricultural resource base in the sub-zobas.

More specifically:

- The two sub-zobas have been identified as vulnerable livelihood systems semi-sedentary livestock-based agro-pastoralism, and pastoralism. The 2008-2012 Anseba Regional Development Plan ranked Habero and Hamelmalo as in the top five (out of 11) sub-zobas most affected by food insecurity, due largely to drought. The Zoba Administration selected Habero and Hamelmalo for this project as other vulnerable areas are being better addressed by government through regular rangeland/livestock development programmes.
- A further selection criterion was that Habero and Hamelmalo are bisected by the Anseba, a major seasonal river with base flows that can be strategically harnessed to enhance the availability of water for increased productivity and thus adaptive capacity for vulnerable communities, by expanding small-scale irrigation for vegetable production and rangeland development.

Both targeted sub-zobas are characterized by the hot and arid lowlands climate. The average annual rainfall for Habero is about 190 mm while for Hamelmalo it is about 367 mm. Since 1990, the two sub-

regions have been seriously affected by drought. During 2002-2004 and 2014-2015 rainfall was erratic and below average, especially in parts of Habero, resulting in loss of household assets such as livestock that greatly affected the livelihoods of communities.

Sub-zoba Hamelmalo begins 15 km north of Keren and extends for about 20- 25 km up to its northern neighbouring sub zobas of Halhal and Habero. The total area of the sub zoba is 454.3 square km. Hamelmalo has a total population estimated at 31,163 people of which 48 percent are women and 52 percent men. Population density is estimated at 62 persons per square km.

Sub zoba Habero is located in the eastern part of zoba Anseba and starts at 25 km from Keren and extends for about 80 kilometres in a north-north westerly direction. The total area of the sub zoba is 1034.4 square km, with a total population of about 44,237 people, of which 47 percent are women and 53% men. The population density is estimated at 38 persons per square km. The total population of the two sub-zobas according to the BLS is 75,400.

1.3 Purpose and objectives of the mid-term review

The overall purpose of the MTR is to examine the progress of the Climate Change Adaptation Programme in Water and Agriculture in Anseba Region, Eritrea funded by GEF/AF. The project is in its fourth years of implementation, 2013-2016, and this MTR will examine its continued relevance, effectiveness, efficiency, and sustainability. Besides, the MTR is intended to identify strengths and weaknesses of the project design and execution and come up with recommendations for any necessary changes in the overall design and orientation of the project and on the work plan for the remaining project period. The MTR also reviewed the M&E system and framework and assessed the project's success, the project's strategy and risks to sustainability. Findings of this review have been incorporated as recommendations for enhanced implementation during the remaining project life. More specifically, the objectives of the MTR are:

- to monitor and, particularly, evaluate results, short-term impacts and review all indicators;
- to document and provide feedback on and disseminate lessons learned;
- to identify lessons learned in terms of what has worked and what hasn't;
- to provide important information for strengthening programming and results (sustainability); and
- to provide actionable recommendations for improving.

2 Scope and Methodology

2.1 Scope

The scope of the MTR focuses on the implementation of the project during the period 2013-2016 addressing the following:

- Assess relevance and effectiveness of the project's strategy and approaches for the achievement of the project objectives;
- Assess performance of the project in terms of effectiveness, efficiency, and sustainability and timeliness of producing the expected outputs;
- Assess the quality and timeliness of inputs, the reporting and monitoring system and extent to which these have been effective;
- Assess relevance of project management arrangements; identify advantages, bottlenecks and lessons learned with regard to the management arrangements; and
- Provide recommendations to key project stakeholders for follow-up activities

2.2 Methodology

The midterm review was developed in such a way as to gather information which is credible, reliable and useful based on evidence and consultative approach. The team consulted all relevant documents

that were prepared during the preparation phase. These documents included UNDP Initiation Plan, UNDP Environmental & Social Safeguard Policy, the Project Document Report, Project Progress Reports (PPRs), project budget revisions, lesson learned reports, National Strategic Environmental Impact Assessment and Socio-Economic Base Line Study (BLS) and Environment Impact Assessment (EIA) for sub zobas of Hamelmalo and Habero in Anseba and any other relevant documents and reports such as M&E.

The MTR followed a collaborative and participatory approach to ensure close engagement with the project team. The stakeholders with whom interviews and discussion were carried out were: members of the National Steering Committee, Technical Advisory Committee, Ministry of Land, Water and Environment, Anseba Regional administration staff, National Project Coordinator, Ministry of National Development, sub-zoba administration members (Hamelmalo and Habero), Hamelmalo Agricultural College (HAC) staff, National Agricultural Research Institute (NARI) staff, organization leaders of NUEY and NUEW at zoba and sub zoba levels and concerned staff of UNDP. Focal group discussions (FGDs) were held with farmers involved in the project in both sub-zobas with females being adequately represented in all FGDs.

Field visits were carried out in project sites of sub zobas Hamelmalo and Habero. In sub-zoba Hamelmalo the villages and project sites visited included Hamelmalo, Libena, Wazntet, Basheri, Gebsi, Genfelom, Musha Shebah (Berdeg), and Ferhien. In sub zoba Habero the villages visited were: Aretay, Qarobel and Filfile to carry out discussion on the achievements, constraints and lessons learned from the project with sub-zoba and village administrators, farmers, pastoralists and women's group. Besides field visits were carried out to observe field activists such as irrigation development scheme in Fiza and Lemayt (Simit Heday), Meteorological stations in Hamelmalo and Habero were visited. In the villages visited diversion structures, micro-dams, SWC activities in enclosures and farmers' fields, the distributed chicks, the installed energy efficient improved stoves (*mogogo*s) and the conditions of the farms where dairy, animal feed, crop, vegetable and fruit production were observed.

The questions and discussions for the MTR were based on the criteria of relevance, effectiveness, efficiency and sustainability as defined and explained in the UN Guidance for conducting reviews/evaluations of UN supported projects. Some of the questions covering each of these criteria are contained in the TOR and explained below.

Relevance: The relevance of each outcome was assessed with respect to the needs of targeted rural population, and it was related to the extent to which the project activities have been implemented on the basis of the needs of rural population following a participatory approach.

Effectiveness: The effectiveness of each outcome of the project was assessed on the capacity of the project in achieving the different activities of the outcome. The achievement for each outcome has been calculated or estimated in % by comparing the planned activity and the accomplished activity during the MTR period.

Efficiency: This was measured in terms of delivering the expected outputs within the planned time frame and implementing the budget on time and with least cost. Efficiency assesses whether resources have been utilized efficiently or whether the economic benefits have been achieved with a least cost. Each of the outcomes of the project has been assessed in terms of terms of cost, time and effort.

Sustainability: In establishing sustainability, the overall focus was on whether the benefits achieved due to project could be continued after the end of the project. Specific questions asked included what kind of training farmers received, what administrative measures have been put in place (e.g. establishment of committees), management capacity, economic and financial aspects of the beneficiaries, etc. to ensure sustainability.

Monitoring Systems: The monitoring tools currently used to generate adequate information for project evaluation were assessed. The adequacy and relevance of baseline data were assessed. The monitoring system, including performance indicators were to the standard of GEF/AF.

***Risk Management*:** The project's risk identification and management systems were assessed based on UNDP-GEF/AF Risk Management System in order to strengthen project management.

2.3 Structure of the MTR

The MTR is structured according to the following eight sections:

- Executive Summary is presented at the beginning summarizing the findings of the MTR.
- Chapter One deals with the introduction, purpose and objectives of the evaluation.
- Chapter Two deals with the scope and methodology of the MTR
- Chapter Three deals with the findings and discusses Outcomes and Outputs.
- Chapter Four presents M&E system, risks, emerging opportunities and lessons learned
- Chapter Five focuses on conclusions and recommendations.
- References
- Annexes

2.4 Development objectives of the project

The main objective of the project is to increase community resilience and adaptive capacity to climate change through an integrated water management and agricultural development approach in the sub-zobas of Hamelmalo and Habero, Anseba Region, Eritrea. The programme is working with vulnerable groups including small-scale farmers, agro-pastoralists, pastoralists and rural women in relation to climate change induced problems.

The project is expected to deliver on its objectives by achieving the following outcomes;

OUTCOME 1: Increased water availability and erosion control through floodwater harvesting and irrigation technologies;

OUTCOME 2: Enhanced climate-resilient agricultural and livestock production;

OUTCOME 3: Improved climate risk information and climate monitoring used to raise awareness of and enhance community preparedness to climate change hazards;

OUTCOME 4: Lessons learned and shared and policy influenced through knowledge management system.

3 Findings of the MTR

The findings of the MTR are based on the progress of the four outcomes and their outputs. Each outcome has been assessed in terms of its relevance, effectiveness, efficiency and sustainability. Generally significant progress has been achieved in Outcomes 1 and 2 while a lot remains to be done in Outcome 3 and 4.

3.1 OUTCOME 1:

Increased water availability and erosion control through groundwater recharge, rainwater harvesting, irrigation and soil and water conservation measures

The activities in this output include subsurface dam construction, provision of irrigation training to farmers, preparation of manual of irrigation and maintenance of the diversions in Habero so that farmers in the area can produce forages and vegetables that will diversify their income, increase their purchasing power and availability of nutritious food.

Output 1.1: *Groundwater recharged and irrigation technologies implemented for crop and forage production by developing a sub-surface dam within the Anseba River*

A sub-surface dam was planned to be constructed in the Anseba River in sub zoba Hamelmalo. There was a change in this output after the project document was prepared. Consultations with the Director General, Agriculture and Land Department, Zoba Anseba, the project coordinator, administrator of Hamelmalo sub-zoba and FGD revealed that the beneficiaries from a sub- surface dam would serve only a limited number of farmers who already have wells and pumps and are engaged in horticultural production. However, construction of a micro-dam would serve a greater number of farmers downstream of the dam who had no opportunity of obtaining water for irrigation of vegetables, forages and as a supplement to cereal crop production.

A site for the construction of a micro-dam was selected at Shlilak (Basheri) based on an agreement among the project coordinator, experts of the MoA and local administration in consultation with the community.

Site investigation and hydrological analysis and technical design have all been completed according to NAPA regulations and all necessary precautions and have been completed. The micro-dam will have a capacity of over 0.5 million $m^{3.}$ It will have three to four check dams on the upper side of the micro-dam to control silt deposition and a small micro-dam below the dam to collect the water from seepage of the micro-dam. Recharge water from the micro-dam will provide an opportunity to cultivate over 50 ha of land from wells dug on the downstream of the micro-dam.

All other activities in relation to water management, training of farmers and manual preparation have not been completed. They have to be done after the construction of the micro-dam and before the end of the project.

Output 1.2.: Floodwater harvested to enable irrigation of rain-fed cereal production and rangelands. Selection of the sites in Habero sub-zoba, at Fiza GoSEs back to the war for liberation. Later the MoA in 1998 attempted to build a diversion from a previous Fiza project. Now with this project, experts from the MoA, local administration with the participation of the community have selected two sites at Fiza and Lemayt. The Habero sub-zoba has been identified as having a vulnerable livelihood system, low agricultural productivity and ranked among the most top five zobas affected by food insecurity due to increased impact of climate change and rainfall variability. There is about 130 ha in Habero sub-zoba (Aretay and Qar'obel) that can be potentially cultivated by the diversion and associated irrigation technologies.

Preparation of topographic map of the selected sites has been completed. Site investigation and hydrological analysis and design have all been completed according to NAPA and all necessary precautions have been considered during the construction.

Construction of diversion structures has been completed at two sites in Habero, namely, Fiza and Lemayt/Simit Heday. Each of the diversion structures consists of a weir, canals and gates. The dimension of the weir in Fiza is 132 m length, 5.7 m total height (3.2 m depth of foundation and 2.5 m of wall height from the ground), and average width of 3.15 m. A hundred and seventy m of canals in Fiza and 136 m of canals in Lemayt have been constructed. Eight diversion gates with a dimension of 2 m by 1.5 m have been constructed in both diversions. These diversion structures have been built with the aim of supplying water for irrigating 120 ha. Three hundred and sixty-eight people participated during the construction out of which 8% were women.

Figure 2: Diversion structures at Fiza, Habero Sub-zoba

Figure 3: Diversion structures at Lemayt (Simit Heday), Sub-zoba Habero

At Fiza there are two wells that have been built by the MoA in 1998. With the current project, it was decided to make use of them to supplement water for irrigation in addition to the diversion. These

wells are connected by pipes to a reservoir. A 314 m^3 reservoir has been constructed by the project at an elevated place at the base of a hill to store water pumped by the solar set-up to be released by gravity through the pipes mentioned above to the fields downstream of the diversion weirs.

Water will be pumped from the wells to the reservoir using a solar set-up. Two solar pumps with a capacity of 7.5 kw each and 48 modules of 180-watt capacity with all accessories (switch board, inverter) have been fixed to generate power to pump water to a reservoir. Ten rolls of HDPE pipes having 90mm diameter and 100 m length have been buried underground. In addition, a total of 1000m pipes, 50 pieces of 3-inch diameter having a total length of 300 m, 10 rolls of 32 mm diameter having a total length of 100 m to be used as conduits for 700 m cables (with 35 m^3) and 1000 m cables of 3.5 mm diameter have been placed underground. In order to protect the solar arrays from any damage and human interference a 144 m^2 of area has been fenced with mesh wire. When operational this irrigation system was providing a significant contribution in providing supplementary power to irrigate farms farther away from the diversion weirs and saving farmers the cost of fuel. The solar set-up can work for a maximum of 6 and ½ hours daily pumping about 50 m^3 of water. Main irrigation is from the diversion.

Figure 4: A well in Fiza

There is another well drilled by this project and was equipped with a water pump purchased by this project in Lemayt with a full set of underground pipes installed. Land has been distributed to 8 farmers who used to produce forages and vegetables and supplement their cereal crops during the rainy season. At this moment, the farmers are not able to make any use of the land because of the absence of the pump. This problem needs urgent solution in order to enable the farmers to make use of their farms. Another concern raised was due to the heavy rains of 2016, the area found in between the well and the solar set-up is highly vulnerable to erosion and it needs to be immediately protected using structures such as *gabions* before they are damaged.

A striking benefit (advantage) of the diversions for the farmers is that it makes water available to farmers continuously at no cost. All the farmers where water from the canals is reaching their field have to do is to direct it to the right place using hoes and when their land has had enough water to let the water pass through the canals to the other fields downstream. This gives this system a tremendous advantage over where water is pumped from wells dug downstream of micro-dams. Another advantage is that the water is full of nutrients from the silt that help fertilize the fields. Construction of the diversion and associated irrigation technologies has caused a change in the livelihood of the community in Habero from pastoralism to agro-pastrolasim. A more sedentary way of life has been created with the project because of the raising of dairy cows, cultivation of fruits, vegetables and cereal crops production. The project has helped to bring about 120 ha of land to be cultivated under

supplementary irrigation at Fisa and Lemayt diversions. The diversion has helped increase the yield of sorghum from 3 to 7 qt/ha and pearl millet from 2 to 6 qt/ha using supplementary irrigation of the cereal crops. MoA employees in Fiza reported that some farmers who prepared their fields properly using oxen to hold water harvested about 12 q of sorghum from the half ha of land. Moreover, the diversion has helped farmers to have forage production throughout the year for their dairy cows and sell the surplus in Aretay market.

Output 1.3: *Two micro dams constructed to retain and store rainfall run-off and to enable higher cereal and forage production levels as well as supply of water for livestock*

Two micro-dams have been constructed at Wazentet and Gebsi with a total capacity of 320,000 $m^{3.}$ Another micro-dam is being constructed at Shlilak (Basheri) as mentioned at 1.1. The construction of a micro dam at Wazentet was completed in 2013 and for the subsequent two years the dam contained water that lasted throughout the year. It provided the inhabitants of Wazentet and their livestock with security of water.

Figure 5: Micro-dams aat Wazntet (left) and Gebsi (right)

The earthen dam built at Gebsi is used for water supply of livestock and humans. About 20 ha of land has been developed downstream of the dam. Similarly, a dam built by a Luthral World Federation (LWF) project in Musa Shebah has been made use of in the current project in the cultivation of forages such as alfalfa and elephant grass, crops and various fruits. The downstream recharge from the dams have increased the water level of the dams that the farmers have access to water throughout the year at shallow depths. This has helped farmers to earn higher incomes and achieve food security. Yield of cereal production in the area increased from 4 to 7q/ha due to supplementary irrigation. The forage production has resulted in increased milk production of the cross-bred cows. The farmers of Musha Shebah reported during the FGD that they have increased forage production significantly that they sell alfalfa and elephant grass in Keren after meeting the requirement of the cow and calf. There is about a daily average of 8 litres of milk being produced by farmers in Musha Shebah who have been provided with cross-bred cow. They keep about 2 litres for home consumption and sell the remaining six litres at 28 nakfa per litre daily.

The downstream recharge from the dam has increased the water level of the dams that the farmers have access to water throughout the year at shallow depths. This has considerably decreased the amount of time spent to water livestock in Anseba River which is about 3-4 km from the village.

For these achievements to sustain in the long-term, trainings and preparations of manuals have to be carried out. It is obvious that there is a need for some time to gain more experience by the farmers and extension agents before a practical, helpful manual can be prepared. However, such a manual on operation and maintenance of the irrigation structures and pumps should be in place before the end of the project.

Output 1.4: *Soil and water conservation measures implemented to improve runoff management and infiltration* for improved rangeland management and enhanced cereal production.

Hillside terraces and check dams were constructed along contours using stone and soil in Habero and Hamelmalo sub-zobas (Table 1). In 2016, the hillside terraces constructed in Habero and Hamelmalo were 96,326 m and 175,020 m, respectively. About 25 ha of enclosure has been established in Aretay with hill side terraces constructed in it. However, due to the severe drought of 2015 the enclosure was not protected from grazing by all livestock. In 2016, with better rains, the enclosure is being revived. It would be a good idea to reserve 5-10 ha of this enclosure for the establishment and regeneration of indigenous grasses to be used as a source of seeds. Similarly, in Hamelmalo 25 ha of hillside terracing and check dam have been constructed and planted with 60,000 seedlings of sisal and 26,204 seedlings of *Acacia senegal* in June 2016. The condition of the enclosure during the visit for the MTR was excellent with more than 90% of transplanted seedling established (Fig.6). The enclosure is guarded by the community.

Figure 6: Enclosure in Hamelmalo planted with Sisal and Acacia Senegal

In 2013 and 2014 a total of 228 ha of land was terraced and transplanted with 130,000 seedlings of *Sisal* and 13,000 *Acacia senegal* in Ferhien for soil stabilization. A total of 233.84 km terraces were constructed. The site was declared as a protected area (enclosure) by the regional administration with six full time guards recruited to protect the enclosure. There were 850 households who benefitted from the SWC activities and transplanting of seedlings. The enclosures in Ferhien and Genfelom have produced grasses that can be available to the community through the cut-and-carry system. In Ferhien, a site that contains *Boswella* trees was selected for enclosure in order to help with the regeneration of this tree that is dwindling in number. Bowella is a good source of incense. In Genfelom, there are sites where SWC activities have taken place. In one of the sites during a visit for the MTR, the team observed extensive and excellent terraces and check dams that were constructed in steep slopes of a mountainous area. However, this area was not enclosed. It is strongly recommended to enclose the area as a first step and enhance the SWC works that have been carried out with the planting of seedlings of sisal and/or suitable acacia trees. The other site which is located at the entrance of Kush has been fenced with walls and planted with sisal seedlings most of which were established and the whole enclosure is in excellent condition. The rangelands had deteriorated in 2015 but have been recovering since the good rainy season of 2016. This would make more feed available for livestock which is being manifested in the much better body condition of livestock at the moment as confirmed during the visit for the MTR.

A total of 558 km terraces were constructed in farm lands of Filfle, Gelet, Qar'obel, Habero Tsa'eda and Aretay villages to stabilize the soil, conserve water and thus increase the agricultural productivity. The farm land terracing has benefitted 2,370 households. According to FGD in Filfle, Qar'obel and Aretay the farm land terraces helped conserve water and soil which resulted in about 15-20% increase in crop production.

In all the sites, the soil and water conservation activities were carried out by farmers through cash for work progamme funded by the project. During the construction, over 35% of the participants were females.

To enhance the SWC experience that the farmers had, on-spot/hands-on trainings were given to farmers. The training contents included the benefits of hillside terracing, farmland terracing, types of terraces (earth bunds or stone bunds), enclosures, afforestation and the contribution of each of this to mitigate climate change.

Table 1: Soil and water conservation activities in sub-zoba Habero and Hamelmalo, 2016

Activity	Habero	Hamelmalo
Hillside terracing	96,326 m	175.02 km
Catchment	25,000 m^2	25,000 m^2
Check dams	1229.4 m^3	3061.9 m^3
Seedling hole digging	60,000	19,740
Sisal seedling transplanted	60,000	26,204
***Acacia senegal* transplanted**	220	433
Enclosure areas	25 ha	25 ha

Source: Anseba MoA, 2016

Woodlots have been established with the 50 farmers that were chosen for the minimum package in Habero and Hamelmalo. The aim was to provide some wood for the improved *mogogo*s and obtain some other benefits from the trees such as fodder for animals and food for humans. The two trees distributed were *Moringa* and *Acacia senegal*. From the team's field visits and FGD with the farmers included in the minimum integrated agricultural package, no farmer has made use of the woodlot trees for the improved *mogogo*. This could because in both sub-zobas shortage of fuel wood is not a major problem. The people of the two sub-zobas are not yet accustomed to the use of moringa leaves as human food. However, suitable and more adaptable multi-purpose trees should be identified and planted along the canals to serve as windbreaks, live fences (hedges) and fodder for animals.

The tree seedlings and forage legumes nursery in Zuron was successfully rehabilitated and has started to propagate seedlings of sisal, *Acacia senegal, Moringa, Leucaenia, Acacia saligna,* neem seedlings, etc. The nursery site has a potential to propagate half a million seedlings annually. Through the project all necessary materials such as water pump, pipes and different field working tools have been purchased. In 2016 the nursery site produced over 400,000 seedlings of sisal and *Acacia Senegal*. The horticulture seedling nursery site at Hamelmalo has also been renovated in 2016 and has provided all the fruit seedlings such as orange, mango, papaya, guava and grape fruit to farmers included in the minimum package.

In Habero a new nursery site with an area of one hectare has been selected at Fiza and it will start to propagate seedlings in 2017. During the FGD with farmers, they complained of unavailability of various fruit seedlings. The early establishment and functioning of this nursery is required to respond to this demand.

Over-sowing of grasses was not carried out because of drought in 2015 and seeds could not be collected to be used for over-sowing in 2016. Even this year where there has been good rainfall, there is shortage of grasses everywhere in the zoba. Efforts should be made to collect grass seeds from other zobas, for example, Mensura in Gash Barkha and consultation with MoA experts from other zobas is recommended because shortage of grasses to oversow is becoming a national problem.

As a result of the construction of micro-dams, diversion structures and SWC activities that have been taking in the two subzobas, water has become available to enable to carry-out sedentary agricultural and livestock production. As mentioned earlier this change of behavior from pastoralism to agro-pastoralism is particularly evident in Habero subzoba. This has reduced the migration of households to She'eb area or Gash Barka (Himbol) because the raising of dairy cows and horticultural production requires full-time attention.

The achievements of the outputs of Outcome 3 are given in Table 2. The outputs 1.2, 1.3 and 1.4 were satisfactory. Output 1.2 is highly satisfactory because the two diversions, wells and the solar set-up

have enabled farmers to be engaged in crop and livestock production. The recharge from the dam in Musha Shebah has enabled successful crop and livestock production and Wazntet micro-dam has secured water for human and livestock and thus Output 1.3 is deemed to be satisfactory. During the visits for the MTR, the team has observed the recharge of underground water which was highly successful particularly in Musha Berdeg. However, there is a need to have a benchmark to measure the recharge more scientifically and a ground-water monitoring system needs to be introduced. The boreholes that already exist in Fiza could be used to this effect in Habero.

Table 2: Summary of MTR Consultants' assessment of progress made in achieving outputs related to Outcome1

Output	Progress of outputs
Output 1.1: **Groundwater recharged and irrigation technologies implemented for crop and forage production by developing a sub-surface dam (SSD) within the Anseba River.**	SSD changed to micro-dam construction
Output 1.2.: **Floodwater harvested to enable irrigation of rain-fed cereal production and rangelands**	Highly Satisfactory
Output 1.3*:* **Two micro dams constructed to retain and store rainfall run-off and to enable higher cereal and forage production levels as well as supply of water for livestock**	Satisfactory
Output 1.4: ***Soil and water conservation measures implemented to improve runoff management and infiltration*** **for improved rangeland management and enhanced cereal production.**	Satisfactory

Relevance

Outcome 1 is highly relevant because it was planned and implemented with the participation of the farmers. All the outputs of outcome 1 are appropriate to solve farmers' needs. Farmers reported that the main problem of the sub zobas is availability of water. Construction of micro dams, wells and flood water harvest has increased water availability. This has increased crop and livestock production. In addition, the physical terracing, check dam construction and field catchment management, afforestation and enclosures have reduced soil and water erosion and increased soil moisture and fertility. The increase in ground water recharge has replenished the wells and this has resulted in higher production of animal feeds, vegetables, and fruit production in the project area and hence has significantly contributed to food security.

Effectiveness

Most of the activities that were planned for outcome 1 have been achieved. These include the construction of diversion structures and associated irrigation technologies, micro-dams and SWC activities. However, some components of this outcome have not been achieved. Construction of sub-surface dam has not taken place for reasons explained earlier. Over-sowing of grasses was not carried-out. Overall, the effectiveness of Outcome 1 is estimated to be about 80%.

Efficiency

Most of the activities in Outcome 1 were carried out with the full participation of the community at less expense and in a timely manner. According to the FGD and key informants all the inputs and supplies required for different activities were made available on time due to flexibility on both the administration and the community. The administration made funds temporarily available from other sources in case of delays and the community were willing to to contribute their labour. As a result, the diversions, micro dams and the SWC activities were completed in most areas on time. The activities in Outcome 1 were undertaken with high efficiency.

Sustainability

Trainings were given to farmers on management and maintenance of the diversion structures, micro-dam management and SWC activities. These would help in the sustainability of Outcome 1. As a good indication for the sustainability of Outcome 1 the farmers in Fiza have been diverting water into their fields for about a year even though the diversion was temporarily damaged. They put sacks of sand to

raise the elevation and in this manner, they have kept running it for a year. In 2016 strong floods damaged their temporary embankments five times but every time they repaired it to enable water to enter the canals from the weir. In Lemayt farmers have dug a canal upstream of the damaged weir to lead water to their fields.

3.2 OUTCOME 2:

Climate-resilient agricultural and livestock production enhanced

Output 2.1: **A range of climate-resilient agricultural technologies and methods developed and transferred to farmers**

To enhance and update the knowledge of the extension agents, different in-service trainings were given through the project. Most of the trainings dealt with crop and animal production in relation to climate change. The trainees came mostly from the sub-zobas of Habero and Hamelmalo. Females were well represented in the trainings (Table 3). In addition, trainings were given on crop protection and GIS and mapping. The trainings were accompanied by visits to different farms and production areas.

Table 3: Trainings given to extension agents

Topic	Date	No. of Participants	
		Male	**Female**
Animal Production	06 – 08/01/2016	15	10
Crop Production	09 - 11/01/2016	15	10
Horticulture	12 – 16/01/2016	15	10
Plant Protection	17 – 25/01/2016	17	8
Animal Production	06 – 08/06/2016	30	10
Crop Production	09 - 11/06/2016	30	10
Horticulture	12 – 16/06/2016	30	10
GIS and Mapping	22-30/10/2016	10	2

Source: Anseba MoA, 2016

According to FGD and the BLS the traditional local varieties have almost disappeared due to these varieties being late-maturing that with the decrease in the rainfall over the decades they went out of production. Such varieties that have disappeared due to climate change include: Hele and Senadir from sorghum and Zbeidi and Shagra from pearl millet. A range of improved varieties that are early-maturing, drought and striga-resistant were distributed to farmers in the project area. These include Hariray and Se'are from sorghum and Kona and Hagaz from pearl millet Table 4.

Table 4: Seed distribution to farmers of Habero and Hamelmalo, 2015 and 2016

Location	Year	Crop Variety	Amount (q)	Beneficiaries		Total
				Male	**Female**	
Habero	2015	Hariray	104.18	950	92	1042
Hamelmalo	2015	Hariray	100.17	812	189	1001
Habero	2015	Kona	83.27	883	157	1040
Hamelmalo	2015	Kona	51.70	557	89	646
Habero	2016	Se'are	110.00	370	240	610
Hamelmalo	2016	Se'are	50.00	383	43	416
Habero	2016	Kona	3.00	178	23	201
Hamelmalo	2016	Kona	25.00	400	162	562

Source: Anseba MoA, 2016

During the FGD, the following were the observations forwarded by farmers regarding the different varieties of sorghum and pearl millet.

Kona – good yielder and good as human food; resistant to downy mildew (a major disease of pearl millet in the project area); early-maturing or drought-resistant; crop residue – thin and small in amount but palatable; crop residue not suitable for thatching roofs.

Hagaz – well accepted by farmers; high yielder; resistant to downy mildew; crop residue low in biomass.

Figure 7: Kona/Hagaz pearl millet improved variety

Hariray – resistant to *Striga*; tall and thin variety; low crop residue biomass; both sorghum varieties (Se'are and Hariray) are not preferred by farmers.

Each farmer in the minimum package program was provided with seedlings of orange, mango, banana, guava and sour orange in 2013. Some of these seedlings have matured and started to bear fruits. A review of the documents and FGD showed that about 40 kg of mango fruits/tree and 50-60 kg of banana fruit/tree were produced in 2016. The mango trees are in good condition and they will be a reliable source of income for the farmers (Fig. 8). However, the stand of the banana trees is short with less fruit bearing per plant and high leaf burning. This could be due to water-logging, alkaline soil, the effect of high altitude or low organic matter content of the soil. It is advisable to consult NARI on the stand of the banana. In 2016, five seedlings each of mango, lemon, guava and seeds of okra, tomato and leafy vegetables were distributed to the farmers included in the minimum integrated agricultural package (Table 5). During the distribution, training on production and management of these crops were given to the farmers.

Table 5: horticulture seedling and vegetable seed distribution in sub-zobas Hamelmalo and Habero, 2016

Subzoba	Seedling/seed	Number	Beneficiaries	
			Male	**Female**
Habero	Mango	75	15	10
	Guava	75	15	10
	Lemon	75	15	10
	Okra	5 kg	15	10
	Tomato	10 kg	15	10
	Leafy vegetables	2.5 kg	15	10
Hamelmalo	Mango	75	17	8
	Guava	75	17	8
	Lemon	75	17	8

Source: Zoba Anseba, MoA

Figure 8: Mango (left and middle) trees and banana tree (right) in Fiza, Habero

A major part of the project consisted of selecting a total of 50 farmers, 25 each from Fiza in Habero and Musha Berdeg in Hamelmalo to be beneficiaries of a minimum integrated agricultural package of options that included the distribution of an in-calf-heifer, 25 chicks and a total of 100 bee hives.

Table 6: Cross-bred in-calf heifer/cow and poultry distribution

Location	Year	Animal	Beneficiaries	
			Male	**Female**
Habero	2015	Heifer (Cow)	15	10
Hamelmalo	2015	Heifer (Cow)	17	8
Habero	2016	Chicks	15	175
Hamelmalo	2016	Chicks	-	190

In Habero, prior to this project the beneficiaries had no experience of raising dairy cows, improved poultry and beekeeping. This undertaking is a ground-breaking action for modern livestock development in Habero.

At Fiza water was first made available through the diversion system. Twenty-five model (progressive) farmers were selected. They were provided with ½ ha of land next to the diversion weir. Training was provided on dairy production, management and health care. Each farmer received an in-calf heifer or cow on condition that the farmer would give back a six-month old female calf to another farmer who had not received a cow through the project. The farmers were provided with seeds of alfalfa and pigeon pea and root cuttings of elephant grass to cultivate for animal feed. Each farmer had to construct a basic shelter (house) for the cow. The number of calves that have been transferred, mortalities, births, etc. is shown in Table 6. The feeds of the cows mainly consist of alfalfa and elephant grass and crop residues. The farmers also purchase sorghum grain to feed the cows at the rate of 2-4 kg per day. Average milk production per day is 5-8 litres.

Figure 9: Dairy cows and forage development in the project area (minimum integrated agricultural package)

At Musha Berdeg the average milk production is higher than Fiza's. They produce on average about 8 litres of milk per day out of which 2 litres are for home consumption and the six are for sale in Keren at 28 nakfa per litre. During the FGD, farmers even mentioned problems with finding market for their milk because they found it difficult to transport their milk on time daily to Keren. To help solve this problem, the Project provided farmers with churners so that during periods of excess they could make butter.

In Musha Berdeg two out of the nine calves are about 9 months old (Table 7). The administration was of the opinion that it would be an advantage to the receiver if calves are older and stronger. However, the farmers were complaining that they wanted them transferred. The remaining 7 calves had not yet reached six months of age.

Table 7: Current status of the 50 in-calf heifers or cows (25 each for Fiza and Musha Berdeg) allotted to farmers

Location	Mortality	No of Births		Not Conceived Cows	No of calves transferred	No of calves waiting to be transferred
		Male	Female			
Fiza	1	12	10	2	6	4
Musha Berdeg	1	13	9	2	0	9

Best Practice
This is the story of a young man, Ismail Mohammed Ali that we visited for the MTR. He has already paid his debt (transferred a six-month old heifer) and his cow gave birth again to a male. He obtains 8 litres of milk a day which he sells at 15 nakfa a litre in Aretay. He said he had other local cattle and goats for family milk needs. He feeds his cow alfalfa, elephant grass that he cultivates in his farm, stover that he obtains from rain-fed sorghum or millet that he grows, and provides about 2 kgs of sorghum grain per day which he purchases at 20 nakfa a kilo. He obtains 120 nakfa from milk sales daily and spends 40 nakfa daily for the purchase of the sorghum grain which leaves him with a balance of 80 nakfa per day. The rest of the feeds he either obtains from his field or as by-product of rain-fed agriculture. He has also a male calf. He has no expenses for fuel as the diversion system provides him with free water. He obtains manure from his animals that he uses as fertilizer for the animal feeds, vegetables and fruits on his farm. There are many farmers like him who will soon find the ½ ha of land provided to them too small or would want to expand.

Twenty-five one month old improved chicks were distributed mostly to female-headed households with the aim of improving nutrition and food security at household level. Symptoms of the diseases observed and reported include: coughing, salivation (drooling), blindness, lack of sleep in the night, difficulty in breathing, and sores in the face, mouth and eyes. Predatory birds also snatched many chicks during the first weeks after distribution. One possible reason for the significant mortality could be the chicks were distributed last year following a severe drought and there was no grain to feed the poultry because there was not enough for human consumption.

Many households reported that they benefitted from the sale of surplus cocks. In Libena, a farmer reported that he sold 10 cocks at 180 each and he knew of a friend who sold 11 cocks at 230 nakfa each. Another benefit of the poultry is production of eggs. Egg production for the improved hens was about 50% most of which is sold with some being used for home consumption. The women who gained the most out of the poultry were from Hamelmalo (Fig. 9). During a visit for the MTR, in one household from 50 chicks 42 survived to adulthood. Despite the problems with significant mortality, a lot of the distributed chicks grew to maturity and they are now commonly observed free-ranging in all the villages visited.

Figure 10: Result of successful chick distribution in Hamelmalo and Habero

The aim of distributing the chicks was to help needy women (female-headed households). As explained, there was significant mortality of the distributed chicks. Adequate training on poultry feeding, management, and health care and regular follow-up by extension agents would have minimized the mortality on time. Provision of older than one-month old chicks would have reduced the mortality because most of the mortalities took place the first few days after they were distributed. Older chicks would have better resistance and ability to run away from predators.

A total of 60 beehives have been distributed. Fifty of these were distributed to the 25 farmers of Musha Berdeg. In Habero sub-zoba, as this is the first-time beekeeping, is being attempted to start with only 10 beehives. The idea of introducing or including bees in the package is commendable for a number of reasons:

- Beekeeping fits with the concept of climate change adaptation in water and agriculture. Bees can benefit the fruit trees and animal feeds through cross pollination and in turn the bees themselves can have a source of nectar from the fruit trees and forages such as alfalfa. Water from the canals will also be made available easily to the bees.
- There are also plenty of local flora that are rich sources of nectar for the bees such as *Ziziphus spp.* and different species of acacia.
- Beekeeping can serve as an additional source of income.
- Beekeeping would also promote organic farming and the conservation of the trees of the area as cutting them down will deprive the bees of their food.

A total of 400 energy efficient improved stoves (*mogogo*s) have been installed in Habero and Hamelmalo subzobas. Prior to the installment, training was given to seven women who in turn trained 67 trainees. Each trainee trained five women in the respective village. To serve as models, 79 stoves were installed in these sub-zobas by the project. All the necessary materials for the construction of 400 stoves were provided to both sub-zobas. Most of the women agree of the benefits that the improved *mogogo* saves wood and has no smoke. However, these two benefits were not apparent during our visits. The women were not making appropriate use of the improved *mogogo*s. This is mainly due to easy availability of wood in the two sub-zobas. The women are interested in obtaining charcoal after burning the logs of wood and are not keen in using twigs and small branches of wood that leave no charcoal. Most of the *mogogo*s operated with the gates opened which results in heat being lost. The women used long logs of woods most of the time and when they placed the log along its length into the oven, a big chunk of the log protruded out of the gate (Fig. 10). Another reason was that the iron covers are inserted into a groove that is engraved in the wall surrounding the gate and through wear and tear, the groove gets eroded for many *mogogo*s and even if they cover there are gaps through which heat is lost. The heavy rains of 2016 destroyed many kitchens and along with them the improved *mogogo*s. During the visits, the team also observed the chimney was either absent or the tube leading to the chimney was broken and smoke filled the kitchen. These *mogogos* also require a relatively large and good kitchen to be installed in. Many women opted out of these *mogogos* simply

because they couldn't provide this.

Figure 11: Energy efficient improved stoves (Mogogos)

Note: Appropriate use of the improved *mogogo*s can be assured through continuous monitoring and checkup of the condition of the improved *mogogo*s by the trained women and extension agents of MoA. Improved *mogogo*s have been introduced more successfully in many villages in other zobas with a more critical shortage of firewood (such as in Mae'kel) than in the sub-zobas of Habero and Hamelmalo. More effort is required by extension agents of the Project to raise awareness of the benefits of the improved *mogogo*s so that they are used more efficiently.

Output 2.2: *Seasonal forecasts used in a farmer-led collaborative action learning process to enhance adaptive capacity and climate-proof production systems*

Two farmers' field days were held in Hamelmalo Agricultural College and Elabered, respectively. Farmers were shown practices such as seed priming in which seeds are soaked in water for eight hours and then dried and planted within 24 hours. They were also shown transplanting of seedling crops. In the farmers' field day held in Elabered the sorghum improved variety Se'are was demonstrated to farmers and its advantages explained to farmers.

Thirty-two farmers received training in HAC on vegetable cultivation, agronomic (cultural) practices, and how to control pests and diseases of vegetables. The training lasted for two days.

When asked about their traditional knowledge of climate change and indicators of seasonal forecasts, they forwarded the following: 1) there were wells in the old times that have dried now; 2) there is higher temperatures nowadays compared to olden days; 3) if there is rainfall in March – May, the rainy season will be good; 4) if wind blows from the west, the rainy season will be bad (drier) and if a northern and south-westerly winds blow there will be a good rainy season.

Six meteorological stations have been constructed by the project. The data from these stations is important to make seasonal forecasts to guide production activities of farmers. However, while the meteorological stations in HAC and Hagaz Agro-Technical School have been fully functioning, the remaining four stations are not adequately utilized due to shortage of meteorological experts and in adequate management arrangement of the stations.

A summary of outcome 2 is given in Table 8. The progress of output 2.1 was highly satisfactory because most of the climate-resilient agricultural technologies have been delivered as planned. The output of 2.2 was marginally satisfactory because trainings to farmers on seasonal forecasts to guide production activities have not been adequate.

Table 8: Summary of MTR Consultants' assessment of progress made in achieving outputs related to Outcome2

Output	Progress of outputs
Output 2.1: **A range of climate-resilient agricultural technologies and methods developed and transferred to farmers**	Highly satisfactory
Output 2.2: **Seasonal forecasts used in a farmer-led collaborative action learning process to enhance adaptive capacity and climate-proof production systems**	Marginally satisfactory

Relevance

All of the activities in Outcome 2 are highly relevant and they were carried out with a high degree of participation of the community. After making water available (Outcome 1), the next steps that were taken of developing climate-resilient agricultural technologies and transferring them to farmers addressed the farmers' needs appropriately. The trainings that were given on animal production and health, fodder cultivation, horticulture and irrigation helped farmers in the establishment of the dairy farms, cultivation of fruits, animal feeds and vegetables. The distribution of cross-bred cows, seeds and seedlings of animal fodder, fruits and vegetables helped farmers improve the nutrition security at household level and supply markets in the villages and towns with milk, animal feed and vegetables at reasonable prices.

Effectiveness

Most of the activities that were planned to carry out in Outcome 2 have been completed and most of the inputs have been delivered. These include cross-bred dairy cows, the one-month old chicks, seeds and seedlings of animal fodders, seeds and seedlings of fruits and vegetables, improved *mogogo*s and the trainings that were offered to farmers and extension agents. The 100-bee hives have been distributed for 50 households. However, there are activities in Outcome 2 that have not been carried-out. These include trainings to farmers on seasonal forecasts to guide production activities and the consequent use of these forecasts to enhance adaptive capacity and climate-proof production systems. Overall effectiveness of Outcome 2 is estimated to be more than 80%.

Efficiency

Most of the activities planned in Outcome 2 were carried out with a high efficiency and at the appropriate time. The trainings were given with the distribution of dairy cows and chicks, planting of seeds and seedlings. The inputs were delivered at the right time and at no cost to the farmers but at a reasonable cost to the project.

Sustainability

Farmers have gained through training and experience on dairy production, production of animal feeds, fruits, crops and vegetables considerable skills and knowledge. In addition to this the transfer of six-months old calves, the houses built for animals, the fruit trees of mangos, guavas, etc. that have started bearing fruit are indications of the sustainability of Outcome 2. Farmers distributed with land but not included in the package are keen to receive six-months old calves and in the FGD were demanding to have access to seeds of alfalfa, sprayers, etc. Some of the already established farmers bought sprayers from the MoA and were requesting for more seeds and seedlings of fruits which all strengthen the sustainability of Outcome 2.

3.3 OUTCOME 3:

Improved climate risk information and climate monitoring used to raise awareness of and enhance community preparedness to climate change hazards

Output 3.1: *Improved climate risk information generated and capacity developed for climate monitoring and analysis*

A review of all the relevant documents, FGD and discussion with key informants revealed that implementation of this activity was less satisfactory because of lack of climate expert in the project to downscale climate change projections, GCMs and satellite observations. However, training on GIS was offered to extension agents from the MoA, staff from HAC and zoba and sub-zoba administration.

According to the project coordinator and discussion with key informants the development of user-friendly products and dissemination was not carried-out because of lack of expert in this field both in the project as well as in the zoba.

Six meteorological stations have been constructed two of which found in institutions of learning (HAC and Agro-Technical School) are manual while the meteorological stations in Keren, Aretay, Adi Tekelezan and Geleb are automatic (Fig. 11). All the equipment and instruments required by the stations have been installed. All the stations have been fenced properly and houses for offices built nearby the stations. The reason for making the equipment and instruments manual for two of the stations is for students and staff to learn to handle the instruments, collect the data and make use of it in their research and teaching activities. The data in the two learning institutions is being collected regularly and a copy presented to the MoA. A memorandum of understanding needs to be signed between HAC and the zoba administration regarding the running of the meteorological station. The data from the stations in Keren, Aretay and Adi Tekelezan is being collected and sent to MoLWE, Deparment of Water. However, no data is being collected from Geleb. The main problem of the meteorological stations is that no one institution has taken up the responsibility of collecting and processing the data. There is a need to come up with a working agreement between the MoA, MoLWE, Department of Environment and the Civil Aviation Authority. Training on how to collect and process the data in a standard form needs to be given to site experts in a more comprehensive manner. In order to provide better support to the local farmers to make effective seasonal forecasts that would help them in their production activities data from the met stations should be timely collected, analyzed and disseminated to the local users. In addition to training, there is a need to supply the MoA with computers where to store and process the data.

Figure 12: Class1 Manual weather station at Hamlmalo Agricultural College/Hamelmalo (left) and Class1 Automatic weather station at Habero (right)

Figure 13: Class1 Weather station at Aretay

In the project, it is indicated that staff for data collection would be trained on the management of the meteorological stations, standardized data collection, reporting and sending the data to a central location for processing to be used for seasonal forecast. Accordingly, robust and systematic training on meteorology should be given to the local extension workers and other subject matter specialists. Without robust and adequate data collection and analysis, the meteorological station facilities will be fully utilized.

Note: For proper and efficient use of the stations, it is very crucial and urgent to organize training and start data collection and analysis and disseminate or release the information for use.

Output 3.2: *Awareness raised at different levels on climate change risks facing Zoba Anseba*

Awareness raising events on climate change have been carried out in Geleb, Hamelmalo and Habero. In each sub zoba 45 farmers were present out of which 20% were females. The topics included sanitation of water and consequences of water pollution, effects of environmental degradation, the advantages of terrace construction, tree seedling transplanting, check dam construction and farm field terracing for sustainable land management practices. A movie showing the efforts of the community in afforestation and the changes they were able to achieve through a community effort was shown in the different villages of the two sub-zobas.

Output 3.3: *Community preparedness enhanced through development of a community-based early warning system in sub-zobas Hamelmalo and Habero*

According to information obtained from key informants and review of the documents no stock taking assessment of former and existing initiatives and structures for community preparedness to climate risks and early warning systems was carried out. However, farmers during the group discussion reported that they traditionally carry out their own preparedness to climate change to overcome a bad season. Usually farmers practice climate forecast though weather conditions based on the temperature (high or low), wind direction, rainfall situation, water table situation (ponds and streams), human health condition, livestock body condition, feed availability, etc. Examples of preparedness for bad season include dry land preparation this will help them to plant/seed their crops with the first rain. They also practice dry planting before the rains start to start germination with the first shower. Other practices include planting early maturing varieties that can mature within 40-60 days, early planting with the first rain and preparing and developing all water harvesting practices within and around the farm to retain moisture in the farm.

A review of all the relevant documents, FGD and discussion with key informants revealed that the activities of Output 3.3 were not carried-out.

Table 9 is a summary of the team's assessment on the progress of Outcome 3. The only activity that has been accomplished in Output 3 is the construction of meteorological stations.

Table 9: Summary of MTR Consultants' assessment of progress made in achieving outputs related to Outcome3

Output	Progress of outputs
Output 3.1: **Improved climate risk information generated and capacity developed for climate monitoring and analysis**	Marginally satisfactory
Output 3.2: **Awareness raised at different levels on climate change risks facing Zoba Anseba**	Marginally Satisfactory
Output 3.3**: Community preparedness enhanced through development of a community-based early warning system in sub-zobas Hamelmalo and Habero**	Not carried-out

Relevance

Knowledge about climate risk information and monitoring is useful and relevant to farmers to forecast the climate situation of the sub zoba so that farmers can prepare or predict the future of their farm activities either positively or negatively both of which are essential to make the necessary preparedness.

Effectiveness
Training on GIS was given. Six class 1 meteorological stations were built. Training on meteorological readings to extension agents and community members was not adequate; user-friendly knowledge products not developed and disseminated (not achieved); awareness raising events and publicity showing of a movie has been achieved; development of a community-based early warning system has not been achieved. Overall Outcome 3 had about 40% achievement.

Efficiency
The construction of six Class 1 meteorological stations and the fencing and equipping the stations has been carried-out on time and at a reasonable cost. The same is true for the awareness raising events and publicity launching event for CC awareness but the activities that have not been carried out need to be done before the end of the project.

Sustainability
The meteorological stations will play a big role in the sustainability of the program if training is offered on how to collect and process the data. The sustainability of Outcome 3 will be in a big doubt if the planned activities on training on how to process the data of meteorological stations, and the purchase of computers, and the processing of the data do not take place in a more comprehensive manner.

3.4 OUTCOME 4:

Lessons learned and shared and policy influenced through knowledge management system

Output 4.1: *Knowledge management system established and knowledge management activities implemented*

A review of all the relevant documents, FGD and discussion with key informants revealed that the existing knowledge management system for the programme is not adeuate. The Zoba Anseba administration, MoA, MoLWE experts and the other stakeholders such as HAC, NARI and representatives of farmers need to discuss on how to strength collection of the experiences of the project and then propose on a leading agency for a robust knowledge management system for the programme.

Germination and purity tests were conducted by Hamelmalo Aagricultural College laboratory and from the analysis a good result was obtained (96% purity and 95% germination for sorghum and 90% purity and 92% germination for pearl millet). This is expected to reduce future crop failures in the sub-zobas of the project area. A seed committee comprising HAC, MoA/NARI, agronomists, and representatives of regional administration has been established to undertake assessment of seed quality.

With the distributed poultry, the surpluses are sold and at the end of the laying cycle the hens will also be sold or consumed in the household. The improved hens are not capable of incubating their eggs. There have been some enlightened farmers who use their local hens to incubate eggs from both types of poultry. During the visit in Musha Berged, an exemplary farmer, Hamed Jabera, hatched eggs laid by the improved poultry after incubating them with local hens. We were also informed during the FGD in Flfle that there was one woman who similarly ensured sustainability of the distributed poultry by incubating their eggs using local hens.

A review of all the relevant documents and discussion with key informants revealed that study tour to a country in the region with similar climate risks and environmental constraints, to enable sharing between programmes, stakeholders and the regional community did not take place. Likewise, no regional forum has been established to review and integrate climate risk reduction strategies and measures in the regional development plan.

The establishment of climate resilient crop varieties is already incorporated in the research of NARI and HAC. Such crop varieties developed in NARI and HAC such as Kona for pearl millet and Se'are for sorghum, respectively were distributed to farmers in the two sub-zobas by this project. However, the

performance of these varieties in the project area must be reviewed and lessons learned should be documented.

Output 4.2: Policy advocacy activities implemented

The activities planned in Output 4.2, development of appropriate knowledge products, and policy advocacy activities have not yet been carried out.

A summary of the progress of outputs for Outcome 4 is given in Table 10. Output 4.1 was moderately satisfactory while output 4.2 remains to be carried-out before the end of the project.

Table 10: Summary of MTR Consultants' assessment of progress made in achieving outputs related to Outcome4

Output	Progress of outputs
Output 4.1: **Knowledge management system established and knowledge management activities implemented**	Moderately satisfactory
***Output 4.2: development of appropriate knowledge products, p*olicy advocacy and media coverage activities implemented**	Moderately satisfactory (local media coverage was adequate and extensive)

Relevance

Outcome 4 is highly relevant because the positive and negative sides of the experience of the project need to be known and lessons learned from them and organized in a knowledge management system. Policy advocacy activities through presentations, media coverage, etc., are also highly relevant for knowledge products' dissemination. However, the project has not yet reached this stage.

Effectiveness

Most of the activities of Outcome 4 have not been achieved. A knowledge management system from the lessons learned has not yet adequately established. Study tours and establishment of a regional forum have not yet been implemented. However, there has been adequate and extensive local media coverage on the4 project undertaking. Early-maturing and drought resistant varieties developed in NARI and HAC have been used in the project area. Overall only about 35% of Outcome 4 has been achieved. However, in the remaining period of the project there is still time to accomplish the activities planned for Outcome 4.

Efficiency

It is not possible to adequately determine the efficiency of Outcome 4 for the MTR as significant part Outcome 4 have yet to be achieved. The establishment of a knowledge management system can only be implemented towards the end of the project. It is too early for the MTR. The budget allocated for Outcome has not yet been fully utilized. Efforts should be exerted to enable the study tours and establishment of regional forum to take place.

Sustainability

It would help the sustainability of Outcome 4 if the study tours and the establishment of a regional forum could take place. Lessons learned must be compiled and a knowledge management system established with the cooperation of HAC and NARI and activities on policy advocacy implemented.

4 Monitoring and Evaluation, Risks, Emerging Opportunities and Lessons Learned

4.1 Coordination

The stakeholders include the National Steering Committee headed by the Zoba Governor and includes MoA, MoLWE, MoF, MoND and UNDP. The executive entity is the MoLWE. The Department of Agriculture and Land, Zoba Anseba is the implementing body. The project coordinator works in close

cooperation with the Zoba Administration. There is a Project Technical Committee that supports the project coordinator that includes Infrastructure Department of Anseba Region, HAC and Forestry and Wildlife Authority. At sub-zoba level the project is implemented by sub zoba administration, head of Economic Affairs, Village Council representatives, and representatives from NUEW and NUEYS. At village level, the project is implemented by Kebabi Administration, Village Development Committee and farmers.

The details of the stakeholders and their role in the coordination of the project activities is given in *Annex 1*.

4.2 Monitoring and Evaluation (M&E)

The actual details of the M&E reports were prepared by the project coordinator and program analyst (UNDP) based on field visits and report of extension agents. Before the onset of the project, Programme Inception Workshop was carried-out with the participation of zoba administration staff, UNDP country office, representatives of line ministries, regional technical policy and programme advisors as well as other stakeholders.

Part of the M&E activities were conducted by providing Annual Work Plans (AWPs) for the years 2013-2016. These reported the planned activities for each output, the time frame by quarter, the responsible stakeholder and the budget for each activity. In the AWPs for each output the target and indicators are clearly specified.

Field reports prepared prepared by UNDP staff describe achievements, challenges and activities carried out by the project such as afforestation, construction of check dams, hill terracing, farmland terracing, procurement of materials, irrigation development and solar home lighting assessment. The reports also provided plans of action for the forthcoming year or quarters. All the field reports indicated that the contribution of the community (government) was significant. The reports also quantified in percent the achievement of the planned activities and the utilization of the allotted budget.

All the reports of the project coordinator and UNDP mentioned the construction and site selection for a sub-surface dam (SSD). In meetings with the Director General, Agriculture and Land Department, Zoba Anseba, project coordinator and sub-zoba administrator of Hamelmalo it was confirmed that this plan was changed to construction of micro-dams.

The Annual report for the years 2013-2014 described in detail the activities done in the project area. These activities focused on irrigation development in Habero and the diversion structures in Fiza and Lemayt, nursery development in Hamelmalo, dam construction in Gebsi and Wazntet, introduction of drought-resistant, heat-tolerant and early maturing varieties, the completion of BLS and EIA studies, training and installation of *mogogo*s and establishment of meteorological stations. This report also has provided quarterly financial reports of the above-mentioned activities.

Three AF Project Performance Reports (PPRs) are provided. The reports showed achievements by outcome, output and activity. One of the project indicators for Outcome 1 suggests that there was an increase of 4.3 million m^3 in renewable water resources due to the construction of micro-dams of Musha Shebah, Wazentet and Gebsi. The water holding capacity of Musha Shebah, Wazntet and Gebsi is 700,000 m^3, 200,000 m^3 and 120,000 m^3, respectively. In the project indicator for improved climate risk information, the percent of beneficiaries is estimated at 70% of the farmers in the project area. The indicator of Outcome 4 of the PPR, suggests that at least five lessons learned were codified and disseminated.

There is a budget allocated for Monitoring and Evaluation by the project. Staff involved in the Project claim that shortage of expertise prevented them from carrying out this activity properly. This activity should not be just limited to individual reports on field visits or back to office reports. There should be a system where reports are submitted at the end of every implementation period. All the stakeholders

should be informed through the monitoring and evaluation process whether the project is progressing according to plan or not.

4.3 Fund release and mobilization

There was a problem with the timely release and mobilization of funds due to a long process of transfering the funds to the project. The highest budget allotted and utilized was for Outcome 1 followed by Outcome 2 (Table 11).

Table 11: Budget utilization by Outcome

Outcome	Budget Allotted (US$)	Budget Utilization (US$)	Budget Utilization (%)
Outcome 1	3,056,400	2,370,435.91	77.56
Outcome 2	1,250,000	741,112.46	59.29
Outcome 3	750,000	280,035.66	37.34
Outcome 4	366,600	76,774.40	20.94
Project Management		79,956.37	

Contribution of stakeholders

In addition to the fund allocated by GEF/AF, the GoSE, Zoba Anseba and communities of the two sub-zobas also made significant contribution in the project (Table 12). The GoSE and the communities of the two sub-zobas contributed as much as the entire budget allocated by GEF/AF through contribution in terms of provision of free unskilled and skilled labour, resources, fuel for transport and food for work programs (Table 12). The zoba administration was highly instrumental in solving the frequent delay of budgets faced in the project through mobilizing funds readily from other sources which enabled activities of the project to be carried-out on time. It also helped by providing fuel to solve the severe transportation problem that affected mainly the sub-zoba of Habero in addition to some project sites in Hamelmalo such as the village of Wazntet. The active involvement of the zoba governor secured the purchase of cement and the zoba governor and director general of the Department of Land and Agriculture also paid frequent visits to the project sites supervising the works on progress and exchanging views with farmers.

Table 12: Contribution of the GoSE and Communities of the two sub-zobas for the project

Activity	Co-financing		Total cost (Nakfa)		
	Government	Community		Total cost (USD)	Remark
Soil and water conservation works	20,000,000.00	35,000,000.00	55,000,000.00	3,666,667	All the works carried-out through food for work programs
Dam construction	14,000,000.00	3,000,000.00	17,000,000.00	1,133,333	The dam constructed by the government and development partners in Musha Shebah
Diversion construction	6,000,000.00	1,600,000.00	7,600,000.00	506,667	
Irrigation development	10,000,000.00	3,500,000.00	13,500,000.00	900,000	Mainly on the Fiza project.
Installation of meteorological stations	250,000.00	800,000.00	1,050,000.00	70,000	Cost of fencing and guarding of the meteorological station covered by Hagaz Agro Technical School
Additional contribution to the project	3,675,000.00		3,675,000.00	245,000	Transportation and cost of labour of the management team covered by the government.
Total				**6,521,667**	

Source: Anseba MoA, 2016

The UNDP office was engaged in mobilizing funds for the project and prepared detailed PPR reports as part of the M&E. Staff members of UNDP also closely supervised progress of the project activities and carried out frequent visits to the project sites which were reported in detail. The Water Resources Department of the MoLWE was involved in collecting meteorological data from the stations in Keren, Adi Tekelezan and Habero. The sub-zoba administrations of Habero and Hamelmalo mobilized resources and the community to be actively involved in the SWC activities and contributed funds for the payment of guards for the enclosures. They also were responsible for the selection of farmers to be included in the minimum integrated agricultural package and distribution of the different inputs of the package to beneficiary farmers. HAC and NARI were involved in the development of new technologies, seed supply and transplanting and in training and demonstration of seed varieties in farmers' field days. HAC staff members were also involved in selection for meteorological stations and preparation of EIA for the project. HAC also provided site for meteorological station and is collecting data from this station for use by students and staff of the College and is regularly making the data available to the MoA for broader use. Similarly, the Hagaz Agro Technical School has provided land and funds for fencing of the meteorological station and is involved in data collection.

4.4 Risks

Groundwater level dropping and salinisation of wells leading to potential scarcity and competition. This is also a potential risk and the construction of diversions and micro-dams has helped to mitigate the risk through recharge of groundwater level downstream of the dams. This has also helped reduce the salinization of wells.

Low human and institutional capacity for the implementation of CC-related interventions was a real risk in the project. The planned mitigation step of recruiting skilled manpower in the design of climate risk information systems was not implemented.

Price escalation and unavailability of commodities and materials. This is a real risk in the project area and purchasing and storing cement could not completely avert the risk because there is an expiry period of six months for cement. The project faced delays in implementation of various activities (construction of micro-dams in Shililak) due to shortage of cement and delay in releasing the budget.

Failure of zoba administration to institutionalize early warning system and meteorological/climate observation components. Putting the responsibility for this risk on the zoba administration was misplaced. The failure to institutionalize the early warning system was partly because of no comprehensive use of the meteorological stations is in place for reasons explained earlier and shortage of expertise in early warning system.

Migration of human and livestock population under conditions of extreme severity to localities with a better natural resource base. As a risk, it is in the project area however the risk was averted by the steps taken through building of diversion structures and micro-dams and the associated activities undertaken with regard to livestock, forage, crop, vegetable and fruit production.

4.5 Risks Affecting Progress (Not identified at project design)

Delays in programme implementation, particularly for infrastructure. This risk took place and there is no way it could have been predicted. As rightly attempted by UNDP and the project stakeholders the only way to mitigate this risk is to work for more through consultations between the ministry of National Development, Ministry of Land, Water & Environment, UNDP, Bank of Eritrea and the Commercial Bank of Eritrea.

Shortage of feed, water and health of the dairy cows. This is a risk that could have taken place particularly in Habero because this is the first time that cross-bred cows (having more than 75% exotic blood) are being introduced. As correctly indicated in the PPR and confirmed by the field visits, this risk was averted through making water available by the diversions and micro-dams and the associated activities undertaken with regard to livestock, forage, crop, vegetable and fruit production.

4.6 Emerging Opportunities and Lessons Learned

The project has created many emerging opportunities. First and foremost, it has brought about a change in mentality (behavior, habit) from depending only on livestock (pastoralism) to making use of both crop and livestock (agro-pastoralism). This is particularly true for subzoba Habero whose inhabitants mainly subsisted by selling goats and other livestock to buy grains. With the project, they have started to lead a more sedentary life raising dairy cows, cultivating animal feeds, crops, vegetables and fruits. This is serving as a lesson to other farmers who were not included in the integrated minimum package to follow their example. The number of farmers who are requesting to be given the six-month old female calves is increasing. These farmers are also requesting for seeds and seedlings of forages, vegetables and fruits to be made available to them at reasonable prices. The farmers who have received land and water from the diversion has reached their fields have started to grow crops with supplementary irrigation from the diversion. They are also producing forages such as alfalfa and elephant grass. A previously weak or non-existent market for animal feeds, milk and vegetables has been created in subzoba Habero. Farmers in Qar'obel are requesting the construction of diversions in their area and have selected (identified) suitable sites. The minimum package implemented in Aretay and Musha Shebah has been so successful that the zoba administration is implementing a similar program in Elabered and Geleb subzobas and similar programs are under study in the sub-zobas of Halhal and Hagaz.

A good example of a lesson learned from the project was witnessed during the visit for the MTR. A farmer near Flfile diverted water from a tributary of Anseba River for supplementary irrigation of sorghum (Figure 13). The stand of the sorghum crop was much better than that of surrounding farmers who depended only on rainfall.

Table 13: Farmer-built diversion near Flfile (left) and sorghum produced from the diversion (right)

4.7 Challenges

The two sub-zobas, particularly Habero, are areas that are highly prone to drought. The practice of dairy production and cultivation of crops, animal feeds, vegetables and fruits is a new phenomenon for farmers in Habero. For these practices to continue, availability of water must be sustainable.

The most important challenges facing this project are:

- Maintenance of the well-being of the diversions at Fiza and Lemayt;
- Prevention of the siltation of the micro-dams in Hamelmalo; and
- Transport problems

A characteristic feature of Anseba River and its tributaries is that they flow violently carrying with big stones and boulders that damage the diversion structures and wells. It would be more advantageous if the tributaries found in Flfile, Qaro'bel and the surrounding areas could be slowed down with check dams.

The main challenge with the micro-dams is the risk of siltation. To reduce the risk of siltation, SWC activities in the catchment area of the dams should be enhanced further.

The project is carrying out its activities in remote places which suffer from lack of regular transport and bad roads. The extension agents should be commended for travelling on foot from the villages to the project sites for hours. Shortage of vehicles has created a problem in the management and monitoring of the activities of the project.

5 Conclusions and Recommendations

5.1 Conclusions

- People from Habero were predominantly pastoralists; but with this project they have started to raise dairy cows in confinement and grow vegetables, crops, animal feeds and fruits for market and home consumption because the project has made water available.
- Yield of crops has increased due to supplementary irrigation and provision of improved varieties by the project.
- Vegetable production has been introduced and a market for vegetables has been created which before the project used to come mainly from Keren. The price of tomato and okra had fallen to as low as 2 and 5nakfa per kg, respectively. This has contributed to diversity, and healthy nutrition of the people.
- Fruit production of mango, guava and banana has started and in the near future the farmers will have a permanent source of income from the sale of these fruit trees.
- Milk has been made available at a reasonably affordable price (15 nakfa / litre) in Aretay. Farmers in Musha Shebah have benefitted from dairy production for household consumption and income from sale of milk.
- Animal feed market has been established in the towns where this project is active contributing to income of the farmers and providing feeds for town dwellers who raise goats for milk production.
- The distributed chicks have helped female-headed needy households improve their household nutrition and their income from sale of eggs and cocks.
- Successful SWC activities have been carried-out in the sub-zobas of Habero and Hamelmalo that have contributed to conservation of soil and water and higher crop production.
- Over 80% of the activities of Outcome 1 and 2 have been accomplished. However, a lot remains to be done in Outcomes 3 and 4. Most of the activities have not been carried-out and the budget allocated for each activity has not been fully utilized. It is too ambitious to expect to realize the Outcomes 3 and 4 in such a short term.

5.2 Recommendations

- Robust and systematic maintenance scheme must be in place to timely respond to physical damages to the irrigation infrastructures including dams and diversion canals that are caused due to seasonal flash floods;
- The main canals should be extended well into the fields and cleared regularly of silt and weeds;
- Implementation of SWC measures should be enhanced in the catchment to reduce risk of siltation. Construction of check dams on the upstream side of the micro dam will help reduce siltation.

- A ground water monitoring system has to be introduced in order to compare the recharge of underground water as a result of the dams constructed with a benchmark. This will provide a more reliable and scientific method than just visual observations;
- All the areas where SWC and afforestation activities have been carried-out should be properly enclosed and protected;
- There is a severe shortage of grasses in the two sub-zobas due to recurrent droughts and high soil erosion. There is a need to identify places, other zobas if necessary, from where to collect suitable grasses to over-sow in the enclosures;
- Nursery establishment in Habero should be expedited to produce for seedlings for afforestation and for farmers who want to start fruit cultivation;
- Provision of animal health including poultry should be strengthened and adequate training on animal health should be provided to the extension agents and local farmers;
- Females in both sub-zobas traditionally have experience in raising goats. The two sub-zobas are also suitable for goat production because of the availability of plentiful browse trees and shrubs. Taking the significant mortality the distributed chicks suffered into consideration, goat distribution to needy women could be a viable alternative;
- There are plenty of ingredients for compost making available in the integrated minimum package areas. These include manure, weeds, horticultural crop residues from mango leaves, banana stems, etc. The farmers need to be trained on changing these by-products of their farms into compost as there is a high demand for fertilizer for the various crop production activities.
- All the planned meteorological stations have been constructed in six sites. However, the stations are not yet fully functional. This is due to the lack of a single authority which will be in charge of the stations and trained climate experts. These problems need to be urgently solved in order to provide a comprehensive and timely seasonal forecasts to the local farming communities. All the stakeholders concerned have to come together to find a way on making sure that the data being collected concerning agriculture, water and air is reaching the end-users.
- There is a need to recruit a climate change expert at the zoba level to accomplish Outcomes 3 and 4;
- Undertaking of regional study tours as proposed in the plan would contribute to the achievement of Outcomes 3 and 4. If this cannot take place, an expert should give training to extension agents to achieve Outcomes 3 and 4;
- Manuals on water management and meteorological stations management and data collection should be prepared before the end of the project;
- The Ministry of National Development, Ministry of Land, Water & Environment, UNDP, Bank of Eritrea and the Commercial Bank of Eritrea should enhance their collaboration and coordinate their planning process to mitigate delays in project implementation;
- For the sustainability of the diversions and other structures, farmers should initiate contribution of money to raise funds for the repair of damaged structures on time;
- ***Over 80% of the activities of Outcome 1 and 2 have been accomplished. However, a lot remains to be done in Outcomes 3 and 4. Hence, in order for the project to complete the remaining project activities, as per terms and conditions of the Adaptation Fund (AF), we strongly recommend that the project be granted a one year no-cost extension beyond the original completion date***. There should not be change in the project's originally approved scope of work.

6 References

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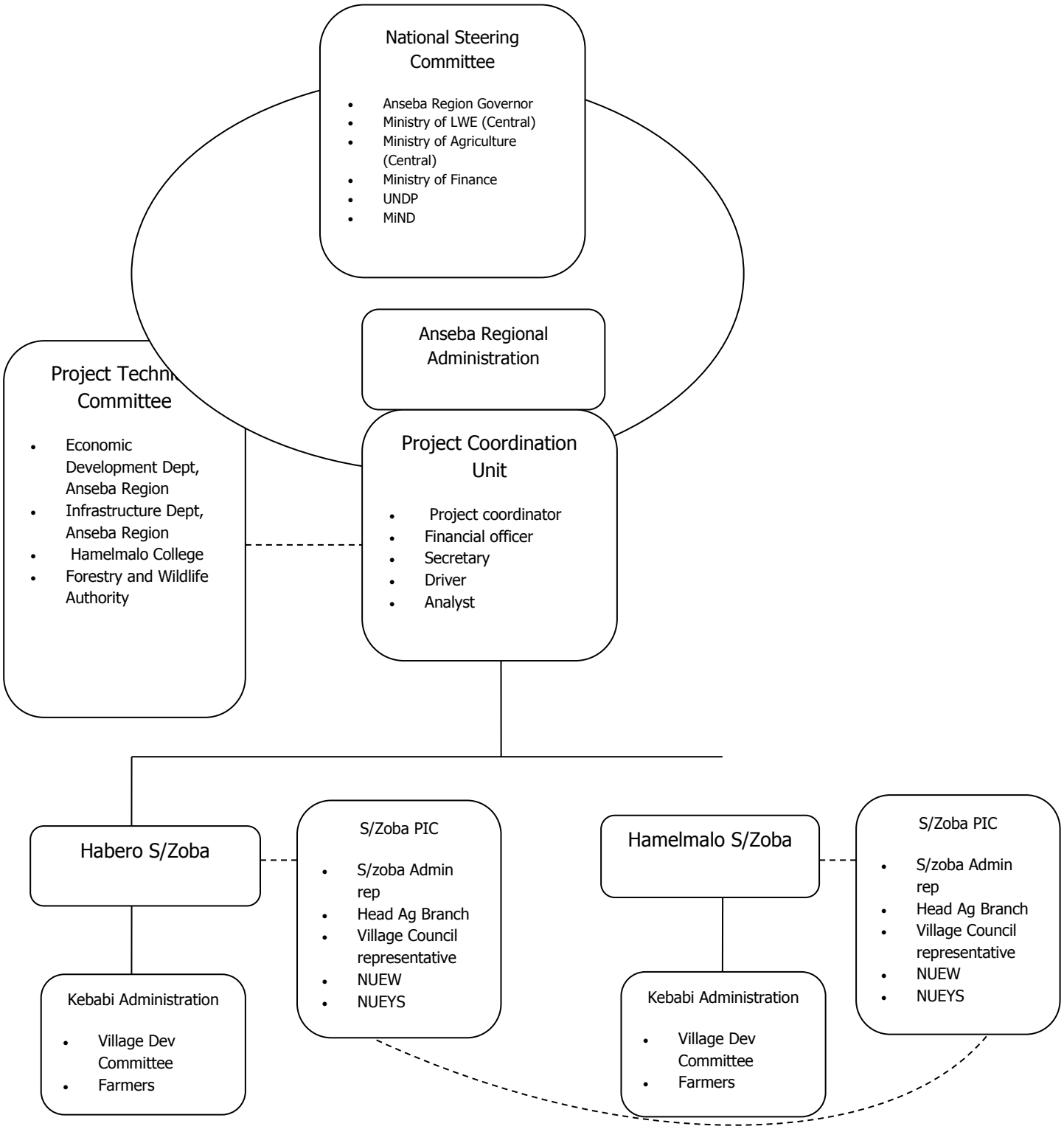
7 Annexes

7.1 Annex 1: Project management structure



7.2 Annex 2. List of Persons Contacted

Contacted person	Organization/position	Location
Mr Gebreselassie Aradom	Director Gen.Agric and land Dept	Zoba Anseba
Mr. Gebremeskel Tewelde,	Coordinator	Zoba Anseba
Mr. Dawit Kibreab,	Director of Environment, MoLWE,	Zoba Anseba
Dr. Teklemariam Zerom	Director of Animal Resource	Zoba Anseba
Mrs. Kibra Gebremeskel	Director of Crop production	Zoba Anseba
Mr Zerai Nor	Director of SWC and Irrigation	Zoba Anseba
Mrs Aster Redaezghi	Director Dept of Environment	MoLWE/Asmara
Mr Aman Salih	Dept of Environment	MoLWE/Asmara
Mr Adam habteab	UNDP	UNDP/Asmara
Mr Solomon Gebreyohannes	Program analyst	UNDP/Asmara
Mrs. Asha Ali Nur	Administrator, sub zoba Habero	Aretay
Mr. Germatsion Kesete	Director of Administration and Finance, sub zoba Habero	Aretay
Mr. Habteab Teklom	Head of Economic Development, sub zoba Habero	Aretay
Mr. Hamed Jabera	village administrator and farmer,	Aretay
Mrs. Meriam Osman M M	representative of NUEW	Aretay
Mrs. Fatma I.Mohammed	representative of NUEW	Aretay
Mr. Hamed Mahmood Ali	Farmer, FGD participant	Aretay
Mr. Mahmood Abe M	Farmer, FGD participant	Aretay
Mr. Mohammed Mahmood	Farmer, FGD participant	Aretay
Mrs. Fatma Ibrahim M	Farmer, FGD participant	Aretay
Ms. Amira Hamed Jabera	Farmer, FGD participant	Aretay
Mrs. Fatna Saleh M	Farmer, FGD participant	Qar'obel
Mrs. Selemet Mahmood I	Farmer, FGD participant	Qar'obel
Mrs. Zeineb Mohammed F	Farmer, FGD participant	Qar'obel
Mrs. Bekhita Mohammed	Farmer, FGD participant	Qar'obel
Mrs. Bekhita Mohammed	Farmer, FGD participant	Qar'obel
Mrs. Bekhita M. Faig	Farmer, FGD participant	Qar'obel
Mrs. Halima M. Ali	Farmer, FGD participant	Qar'obel
Mrs. Amna Mahmood Idris	FGD participants, Qar'obel and chairwoman, NUEW	Qar'obel
Mr Seid Mohammed O	FGD participant	Filfle
Mr. Kemal Idris M	FGD participant	Filfle
Mrs Meriam Ali Hamid	FGD Participant	Filfle
Aish Idris Osman	FGD Participant	Filfle
Mr. Yakob Idris	Administrator, sub zoba Hamelmalo	Hamelmalo
Mr Fitsum Senai	Head of Economic Development Hamelmalo	Hamelmalo
Mr. Idris Adem Haj	village administrator	Berekentia
Mr. Abdurahman M	village administrator	Wazentet
Mr. Mohammed Idris A	Village Administrator	Gonfolo
Ferege Mohammed Omer	Village Administrator	Libena
Mr. Gebriel Berakhi	FGD, Musha Berdeg, village development committee m	Musha Berdeg
Mr. Idris Abdu	FGD participant	Musha Berdeg
Mr. Seid Romadan	FGD participan	Musha Berdeg
Mr. Abduselam Ismail	FGD participant	Musha Berdeg
Mr. Humed Omer	FGD participant, Musha Berdeg	Musha Berdeg

7.3 Annex 3. Draft Terms of Reference for Mid-Term Review/Evaluation

Project Title: Climate Change Adaptation in Water and Agriculture Project in Anseba Region
Activity: Consultancy for a UNDP/GEF/AF Mid-Term Project Review
Duration of Contract: 25 days (spread over 6 weeks)
Contract starting date: - 9th May 2016
Duty station: Asmara
Mode of Application: All candidates should apply through The Ministry of Land, Water and Environment.
Application deadline: - Friday 29th April 2016

1. INTRODUCTION

This is the Terms of Reference (ToR) for the UNDP/GEF/AF Midterm Review (MTR) of the *full*-sized project titled ***Climate Change Adaptation in Water and Agriculture Project in Anseba Region*** (PIMS 4540) implemented through the *Ministry of Land, Water and Environment*, which is to be undertaken in *2016*. The project started on the *September 2012* and is in its *fourth* year of implementation. This ToR sets out the expectations for this MTR. The MTR process must follow the guidance outlined in the document *Guidance For Conducting Midterm Reviews of UNDP-Supported, GEF-Financed Projects http://web.undp.org/evaluation/documents/guidance/GEF/midterm/Guidance_Midterm%20Review%20_EN_2014.pdf*.

2. PROJECT BACKGROUND INFORMATION

Eritrea, lying within the southern limit of the Sahara, is amongst the African countries poised to be vulnerable to the impacts of climate change. Taking its present low adaptive capacity, the climate change induced impacts will constitute a formidable challenge to its efforts to combat poverty and guarantee food security.

Climate change impacts in Africa are predicted to be significant. Climate models suggest that Africa's climate will generally become more variable, with high levels of uncertainty regarding climate projections in the Sahel zone. Manifestations of the anticipated climate change will include among other things temperature increase above the mean global value, increase in variability of rainfall, more frequent dry spell and recurrent droughts. The impacts of these on water resources and the prevalent subsistence farming and the overall livelihood of the population in many African countries will definitely be far reaching.

With worsening climatical conditions in the future, current subsistence of agricultural productivity will be exacerbated, leading to decreased rural household incomes, increased malnutrition, and associated health impacts. This will mean that the number of people at risk from drought events will increase. Thus, climate variability and change are creating poverty traps for many rural households, constantly thwarting efforts to build up assets and increase income. Secondary impacts will be on educational levels and future human resource development, and possible increased social conflict over water and land. Despite Eritrea's commitment to gender equality, climate change threatens to increase levels of inequality between women and men, thus further hampering the country's human resource development. Moreover, climate change is acting to increase the burden of all three of the kinds of situations requiring relief efforts: sudden disasters, slow-onset disasters, and complex emergencies. In Eritrea, this has mainly been experienced in the form of increased dry periods and drought.

This programme is therefore designed to provide a tangible solution to the identified climate change induced problems being experienced in Zoba Anseba. The programme objective is to increase community resilience and adaptive capacity to climate change through an integrated water management and agricultural development approach in the sub-zobas of Hamelmalo and Habero, Anseba Region, Eritrea. The project is expected to deliver on its objectives by achieving the following outcomes;

OUTCOME 1: Increased water availability and erosion control through floodwater harvesting and irrigation technologies;

OUTCOME 2: Enhanced climate-resilient agricultural and livestock production;

OUTCOME 3: Improved climate risk information and climate monitoring used to raise awareness of and enhance community preparedness to climate change hazards;

OUTCOME 4: Lessons learned and shared and policy influenced through knowledge management system.

The project is implemented by the Ministry of Agriculture at the Anseba Zoba Administration. The programme has been designed to adopt a participatory approach working with vulnerable groups in particularly drought-prone areas of Anseba Region (sub-zobas of Hamelmalo and Habero), including small-scale farmers, agro-pastoralists and rural women. Flood water will be harvested, water storage will be developed and soil erosion control measures and irrigation will be introduced. Climate-smart technology will be implemented, including drought-resistant and early maturing crops, by means of enhanced extension services. Rangeland management systems will be enhanced. Improved information on climate change risks will be generated and integrated into farmer and pastoralist practices. The programme will improve knowledge and understanding of climate change impacts among stakeholders, develop a community-based early warning system to reduce climate risks, and an action research approach linking traditional and scientific knowledge through the use of seasonal forecasts. The programme will additionally have a strong learning and knowledge management component to capture and disseminate lessons learned.

3. OBJECTIVES OF THE MID-TERM EVALUATION

This Mid-term evaluation is intended to identify potential project design problems, assess progress towards the achievement of objectives, identify and document lessons learned (including lessons that might improve design and implementation of other UNDP/GEF/AF projects), and to make recommendations regarding specific actions that might be taken to improve the project. It is expected to serve as a means of validating or filling the gaps in the initial assessment of relevance, effectiveness and efficiency obtained from monitoring. The mid-term evaluation will provide the opportunity to assess early signs of project success or failure and recommend/prompt necessary adjustments. The MTR will also review the project's strategy and its risks to sustainability. Findings of this review will be incorporated as recommendations for enhanced implementation during the final half of the project's term. Its main objectives are:

1. To monitor and, particularly, evaluate results, impacts and review all indicators
2. To promote accountability for resources use
3. To document, provide feedback on and disseminate lessons learned
4. To provide a basis for decision making on necessary amendments and improvements

4. MTR APPROACH & METHODOLOGY

The MTR must provide evidence based information that is credible, reliable and useful. The MTR team will review all relevant sources of information including documents prepared during the preparation phase (i.e. PIF, UNDP Initiation Plan, UNDP Environmental & Social Safeguard Policy, the Project Document, project reports including Project Progress Reports (PPRs), project budget revisions, lesson learned reports, national strategic and legal documents, and any other materials that the team considers useful for this evidence-based review). The MTR team will review the baseline GEF focal area Tracking Tool submitted to the GEF at CEO endorsement, and the midterm GEF focal area Tracking Tool that must be completed before the MTR field mission begins.

The MTR team is expected to follow a collaborative and participatory approach[1] ensuring close engagement with the Project Team, government counterparts (the GEF Operational Focal Point), the UNDP Country Office(s), UNDP-GEF Regional Technical Advisers, and other key stakeholders.

Engagement of stakeholders is vital to a successful MTR.[2] Stakeholder involvement should include interviews with stakeholders who have project responsibilities, including but not limited to: National *Steering Committee, Technical Advisory Committee, Ministry of Land, Water and Environment - GEF Operational Focal Point, Anseba Regional Administration, National Project coordination Unit, Ministry of National Development Unit, Sub Regional Administration (Hamelmalo and Habero), Hamelmalo Agricultural College, UNDP, project beneficiaries*; and CSOs, etc. Additionally, the MTR team is expected to conduct field missions to Anseba Region, including the following project sites: Hamelmalo and Habero sub regions.

The final MTR report should describe the full MTR approach taken and the rationale for the approach making explicit the underlying assumptions, challenges, strengths and weaknesses about the methods and approach of the review.

5. DETAILED SCOPE OF THE MTR

Mid-term evaluations are intended to identify potential project design problems, assess progress towards the achievement of objectives, identify and document lessons learned (including lessons that might improve design and implementation of other projects), and to make recommendations regarding specific actions that might be taken to improve the project. It is expected to serve as a means of validating or filling the gaps in the initial assessment of relevance, effectiveness and efficiency obtained from monitoring.

The scope of the evaluation will:

- Assess relevance and effectiveness of the project's strategy and approaches for the achievement of the project objectives;
- Assess performance of the project in terms of effectiveness, efficiency and timeliness of producing the expected outputs;
- Assess the quality and timeliness of inputs, the reporting and monitoring system and extent to which these have been effective;
- Assess relevance of project management arrangements; identify advantages, bottlenecks and lessons learned with regard to the management arrangements;
- Provide recommendations to key project stakeholders for follow-up activities

The Mid-term Evaluation will cover the entire project: this includes GEF/AF, Government and other donors funded activities.

The following aspects will need to be addressed by the Consultant:

Progress towards Results

- *Changes in development conditions.* Assess the progress towards the following, with a focus on the perception of change amongst stakeholders:
    - cost effective and timely delivery of AF resources to the target countries
    - enhancement of individual and institutional capacities for Climate Change Adaptation
    - systemic capacity building and mainstreaming of Climate Change Adaptation and Mitigation principles into development planning

[1] For ideas on innovative and participatory Monitoring and Evaluation strategies and techniques, see UNDP Discussion Paper: Innovations in Monitoring & Evaluating Results, 05 Nov 2013.

[2] For more stakeholder engagement in the M&E process, see the UNDP Handbook on Planning, Monitoring and Evaluating for Development Results, Chapter 3, pg. 93.

- *Measurement of change:* Progress towards results should be based on a comparison of indicators before, during and after (so far) the project intervention. Progress can also be assessed by comparing conditions in the project area prior to the start of the project design process.
- *Project strategy*: How and why outcomes and strategies contribute to the achievement of the expected results:
    - Examine their relevance and whether they provide the most effective route towards results.
    - Will the outcomes really meet the project objective and is the strategy currently followed the best approach for achieving the project objective? Consider alternatives.
    - Assess adequacy of the log frame and indicators in responding to the GEF strategic priorities and achieving project objective
- *Sustainability*: Based on project progress so far, the current prospects for longer-term impacts and using a combination of quantitative and qualitative feedback on project results to date, assess the extent to which the benefits of the project will continue, within or outside the project domain, after it has come to an end. Relevant factors include for example the prospects for: development of a sustainability strategy, establishment of/access to financial and economic instruments and mechanisms, mainstreaming project objectives into the economy or community production activities, adequate follow-up support at the (sub-) regional level, etc. Provide tangible measures that can be undertaken to improve prospects of sustainability.
- *Gender perspective*: Extent to which the project accounts for gender differences when developing and applying project interventions. How are gender considerations mainstreamed into project interventions? Suggest measures to strengthen the project's gender approach.

Project's Adaptive Management Framework

(a) Monitoring Systems

- Assess if the monitoring tools currently being used generate adequate information for project evaluation:
    - Do they provide the necessary relevant information?
    - Do they involve key partners?
    - Are they efficient?
    - Are additional tools required?
- Assess the adequacy/relevance of baseline data. If reconstruction is required this should follow a participatory process.
- Ensure that the monitoring system, including performance indicators, at least meets GEF/AF minimum requirements.
- Apply the GEF/AF Tracking Tool (all elements) and provide a description of comparison with initial application of the tool. If the Tracking Tool has not been previously applied, provide a comparison against the estimated baseline.

(b) Risk Management

- Validate whether the risks identified in the project document and PPRs are the most important and whether the risk ratings applied are appropriate. If not, explain why. Describe any additional risks identified and suggest risk ratings and possible risk management strategies to be adopted
- Assess the project's risk identification and management systems:
    - Is the UNDP-GEF/AF Risk Management System appropriately applied?
    - How can the UNDP-GEF/AF Risk Management System be used to strengthen project management?

(c) Work Planning

- Assess the use of the logical framework as a management tool during implementation and suggest any changes required
    - Ensure the logical framework meets UNDP-GEF/AF requirements in terms of format and content
    - What impact will the possible retro-fitting of impact indicators have on project management?
- Assess the use of routinely updated workplans.
- Assess the use of electronic information technologies to support implementation, participation and monitoring, as well as other project activities
- Are work planning processes result-based? If not, suggest ways to re-orientate work planning.
- Consider the financial management of the project, with specific reference to the cost-effectiveness of interventions. Any irregularities must be noted.

(d) Reporting

- Assess how adaptive management changes have been reported by the project management
- Assess how lessons derived from the adaptive management process have been documented, shared with key partners and internalized by partners.

Underlying Factors

- Assess the underlying factors beyond the project's immediate control that influence outcomes and results. Consider the appropriateness and effectiveness of the project's management strategies for these factors.
- Re-test the assumptions made by the project management and identify new assumptions that should be made
- Assess the effect of any incorrect assumptions made by the project

UNDP Contribution

- Assess the role of UNDP against the requirements set out in the UNDP Handbook on Monitoring and Evaluating for Results. Consider:
    - Field visits
    - Project Executive Committee
    - Global Advisory Committee (TOR, follow-up and analysis)
    - PPR (Project Progress Report) preparation and follow-up
    - GEF/AF guidance
- Consider the new UNDP requirements outlined in the UNDP User Guide, especially the Project Assurance role, and ensure they are incorporated into the project's adaptive management framework.
- Assess the contribution to the project from UNDP "soft" assistance (i.e. policy advice & dialogue, advocacy, and coordination). Suggest measures to strengthen UNDP's soft assistance to the project management.

Partnership Strategy

- Assess how partners are involved in the project's adaptive management framework:
    - Involving partners and stakeholders in the selection of indicators and other measures of performance
    - Using already existing data and statistics
    - Analysing progress towards results and determining project strategies.
- Identify opportunities for stronger substantive partnerships between MoLWE, UNDP and other counterparts, with particular reference to:
    - Contracts and/or MoUs with relevant regional institutions
    - The development of partnerships with any other organizations
- Assess how stakeholders participate in project management and decision-making. Include an analysis of the strengths and weaknesses of the approach adopted by the project and suggestions for improvement if necessary.
- Consider the dissemination of project information to partners and stakeholders and if necessary suggest more appropriate mechanisms.

6. TIMEFRAME

The total duration of the MTR will be approximately ***(25 days)*** over a time period of ***(6 of weeks)*** starting ***(9th May 2016),*** and shall not exceed **(one and a half)** months from when the consultant(s) are hired. The tentative MTR timeframe is as follows:

TIMEFRAME	ACTIVITY
(29th April 2016)	Application closes
(5th May 2016)	Select MTR Team
(9th May 2016)	Prep the MTR Team (handover of Project Documents)
(9th – 11th May 2016) 3 days	Document review and preparing MTR Inception Report
(16th – 17th May 2016) 2 days	Finalization and Validation of MTR Inception Report- latest start of MTR mission
(18th – 31st May 2016) 11 days	MTR mission: stakeholder meetings, interviews, field visits
(1st June 2016) 1 day	Mission wrap-up meeting & presentation of initial findings- earliest end of MTR mission
(2nd – 8th June 2016) 6 days	Preparing draft report
(14th – 15th June 2016) 2 days	Incorporating audit trail from feedback on draft report/Finalization of MTR report (note: accommodate time delay in dates for circulation and review of the draft report)
(16th June 2016)	Preparation & Issue of Management Response
(date)	(optional) Concluding Stakeholder Workshop (not mandatory for MTR team)
(17th June 2016)	Expected date of full MTR completion

Options for site visits should be provided in the Inception Report.

7. MIDTERM REVIEW DELIVERABLES

#	Deliverable	Description	Timing	Responsibilities
1	**MTR Inception Report**	MTR team clarifies objectives and methods of Midterm Review	No later than 4 days before the MTR mission: (11th May 2016)	MTR team submits to the Commissioning Unit and project management
2	**Presentation**	Initial Findings	End of MTR mission: (1st June 2016)	MTR Team presents to project management and the Commissioning Unit
3	**Draft Final Report**	Full report (using guidelines on content outlined in Annex B) with annexes	Within 3 weeks of the MTR mission: (8th June 2016)	Sent to the Commissioning Unit, reviewed by RTA, Project Coordinating Unit, GEF OFP
4	**Final Report***	Revised report with audit trail detailing how all received comments have (and have not) been addressed in the final MTR report	Within 1 week of receiving UNDP comments on draft: (17th June 2016)	Sent to the Commissioning Unit

*The final MTR report must be in English. If applicable, the Commissioning Unit may choose to arrange for a translation of the report into a language more widely shared by national stakeholders.

The structure and content of the report (see Annexe 1) should meet the requirements of the UNDP Monitoring and Evaluation Policy. The length of the Report should not exceed 35 pages in total (excluding the annexes).

8. MTR ARRANGEMENTS

The principal responsibility for managing this MTR resides with UNDP Country Office in Eritrea which will contract the consultant and ensure the timely provision of per diems and travel arrangements within Eritrea for the MTR team. The Project Team will be responsible for liaising with the MTR team to provide all relevant documents, set up stakeholder interviews, and arrange field visits.

Although the final report must be cleared and accepted by MoLWE, Anseba Regional Administration (Project coordination Unit) and UNDP before being made public, the UNDP/GEF/AF Evaluation Policy is clear: the evaluation function should be structurally independent from operational management and decision-making functions in the organization. The evaluation team will be free from undue influence and has full authority to submit reports directly to appropriate levels of decision-making. UNDP management will not impose restrictions on the scope, content, comments and recommendations of evaluation reports. In the case of unresolved difference of opinions between any of the parties, MoLWE /UNDP may request the evaluation team to set out the differences in an annex to the final report.

9. TEAM COMPOSITION

One National/international evaluator will be contracted to undertake the MTR. The consultants shall have prior experience in evaluating similar projects. Experience with GEF financed projects is an advantage. The evaluator is required to combine international calibre evaluation expertise and the latest thinking in Climate Change Adaptation/Mitigation and Regional experience.

The evaluator should possess the following qualifications:

- Post-graduate degree in Climate Change, natural resource or related environmental management field;
- Minimum *8* years of relevant professional experience in conducting project evaluations;
- Knowledge of UNDP/GEF/AF procedures and policies with experience in undertaking UNDP/GEF/AF evaluations;
- Previous experience with results-based monitoring and evaluation methodologies;
- Experience applying participatory monitoring approaches;
- Experience applying objectively verifiable indicators and reconstructing or validating baseline scenarios;
- Demonstrable analytical skills;
- Good interpersonal skills;
- Experience working in developing nations particularly in the Horn of Africa will be desirable;
- Excellent English communication skills (oral, written and presentation).

The evaluator must be independent from both the policy-making process and the delivery and management of assistance. Therefore applications will not be considered from evaluator who has had any direct involvement with the design or implementation of the project. This may apply equally to an evaluator who is associated with organizations, universities or entities that are, or have been, involved in policy-making process and/or delivery of the project. Any previous association with the project or other partners/stakeholders must be disclosed in the application. This applies equally to firms as it does to individual evaluator.

If selected, failure to make the above disclosures will be considered just grounds for immediate contract termination, without recompense. In such circumstances, all notes, reports and other documentation produced by the evaluator will be retained by UNDP.

The evaluator will have overall responsibility for the delivery and quality of the evaluation products. If a proposal is accepted from a consulting firm, the firm will be held responsible for the delivery and quality of the evaluation products and therefore has responsibility for team management arrangements.

10. PAYMENT MODALITIES AND SPECIFICATIONS

10% of payment upon approval of the final MTR Inception Report
30% upon submission of the draft MTR report
60% upon finalization of the MTR report

11. APPLICATION PROCESS[3]

Recommended Presentation of Proposal:

a) **Letter of Confirmation of Interest and Availability** using the template[4] provided by UNDP;
b) **CV** and/or **Personal History Form** (P11 form[5]);
c) **Brief description of approach to work/technical proposal** of why the individual considers him/herself as the most suitable for the assignment, and a proposed methodology on how they will approach and complete the assignment; (max 1 page)
d) **Financial Proposal** that indicates the all-inclusive fixed total contract price and all other travel related costs (such as flight ticket, per diem, etc), supported by a breakdown of costs, as per template attached to the Letter of Confirmation of Interest template. If an applicant is employed by an organization/company/institution, and he/she expects his/her employer to charge a management fee in the process of releasing him/her to UNDP under Reimbursable Loan Agreement (RLA), the applicant must indicate at this point, and ensure that all such costs are duly incorporated in the financial proposal submitted to UNDP.

The National Academia should submit the application to the address: Ministry of Land, Water and Environment, Asmara - Eritrea in a sealed envelope indicating the following reference "Consultant for (Climate Change Adaptation in Water and Agriculture Project in Anseba Region) Midterm Review" or by email at the following address ONLY: (fill email) by ***(5PM of 29th April 2016).*** Incomplete applications will be excluded from further consideration.

[3] Engagement of the consultants should be done in line with guidelines for hiring consultants in the POPP: https://info.undp.org/global/popp/Pages/default.aspx

[4] https://intranet.undp.org/unit/bom/pso/Support%20documents%20on%20IC%20Guidelines/Template%20for%20Confirmation%20of%20Interest%20and%20Submission%20of%20Financial%20Proposal.docx

[5] http://www.undp.org/content/dam/undp/library/corporate/Careers/P11_Personal_history_form.doc

7.4 Annex 4. Key Informants' and FGD Questions

Output 1.2.: *Floodwater harvested to enable irrigation of rain-fed cereal production and rangelands.*

1.2.1. What were the criteria taken to choose the particular location for the diversion weir? Or see for ourselves and check whether the above-mentioned factors have been taken into account.

Output 1.3: *Two micro dams constructed to retain and store rainfall run-off and to enable higher cereal and forage production levels as well as supply of water for livestock*

Have a complete hydrological analysis, crop water requirements, and complete geotechnical survey been determined for the micro dam? Any documents?

Have construction level drawings with accurate costing for the construction of the micro dams and their appurtenant structures (spillway and outlet work) been determined? Any documents?

OUTCOME 2: Climate-resilient agricultural and livestock production enhanced

Output 2.1: *A range of climate-resilient agricultural technologies and methods developed and transferred to farmers*

Have any such options been provided to farmers especially female headed HHs? What extension activities have been done to address these options (crop and livestock)?

Have any such options been provided to farmers especially female headed HHs? What extension activities have been done to address these options (crop and livestock)?

Output 2.2: *Seasonal forecasts used in a farmer-led collaborative action learning process to enhance adaptive capacity and climate-proof production systems*

Any such activities that have taken place? When? Number of participants of all the mentioned kinds?

OUTCOME 3: Improved climate risk information and climate monitoring used to raise awareness of and enhance community preparedness to climate change hazards

Output 3.1: *Improved climate risk information generated and capacity developed for climate monitoring and analysis*

Activities

Activity 3.1.1: Improved knowledge of climate risks generated through downscaled projections from multiple GCMs for the sub-national scale, using either station observations or satellite observations

Activity 3.1.2: User-friendly knowledge dissemination products developed and disseminated using improved climate risk information[6]

What steps have been taken for the above-mentioned two activities? Any documents?

Activity 3.1.3: Analytical study completed to explore reasons for non-operationality of existing Class 1 and other meteorological stations in Eritrea, and to make strategic recommendations to overcome identified constraints. These recommendations will inform the implementation of activities 3.1.4 and 3.1.5 and will be used for advocacy activities to develop commitment at the national level for enhanced and coordinated meteorological observations and analysis

Has any study been carried out to explore reasons for non-operationality of existing Class 1 and other meteorological stations in Eritrea? Any recommendations made?to overcome identified constraints.

Output 3.2: *Awareness raised at different levels on climate change risks facing Zoba Anseba*

Activities

Activity 3.2.1: Develop a detailed strategy for the climate change awareness raising campaign for the programme, spelling out a workplan, target audiences and modes of communication

Activity 3.2.2: Plan and hold a well-publicized launch event for the CC awareness raising campaign to capture public imagination and secure initial political commitment, accompanied by an ongoing radio campaign

Activity 3.2.3: Hold awareness raising events at the policy (zoba) level, sub-zoba level, and community level, two events for each target audience/location over the five-year programme, using innovative methods such as community drama groups and child radio programmes

Have any such activities taken place? Details of what were done and not done?

Output 3.3: *Community preparedness enhanced through development of a community-based early warning system in sub-zobas Hamelmalo and Habero*

Activity 3.3.1: Carry out a stocktaking assessment of former and existing initiatives and structures for community preparedness to climate risks and early warning systems, such as the structures established under the National Food Information System (NFIS)

Any assessment that was carried out?

Activity 3.3.2: Initiate a community-based planning exercise to design the community-based early warning system, using a sustainable livelihoods approach to update and expand existing livelihoods maps for the two programme sub-zobas and to clarify priority climate and related risks. This will entail developing a synthesis of community observations, traditional knowledge and scientific information obtained from the downscaling process

Has any such planning exercise taken place? If yes, what was it followed with?

Activity 3.3.3: Train community members in data collection, carry out institutional strengthening of relevant community institutions and establish community-based early warning system in the two programme sub-zobas

Has such a training taken place? Where? Number of participants? Women? Any documents (handouts)?

OUTCOME 4: Lessons learned and shared and policy influenced through knowledge management system

Output 4.1: *Knowledge management system established and knowledge management activities implemented*

Activities

Activity 4.1.1: Design and establish a knowledge management system for the programme, based on existing processes in the Zoba Anseba administration, to be institutionalised within the administration. This will include identifying a lead agency for this purpose, as well as a coordination mechanism between relevant departments for sharing lessons, and developing a standardised system for capturing lessons learned

Has such a system been designed?

Activity 4.1.2: Conduct a study tour to a country in the region with similar climate risks and environmental constraints, to enable sharing between programme stakeholders and the regional community.

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Any study tour that has been conducted? Details. Where to?

Activities 4.1.3: Organize a regional forum to review and integrate climate risk reduction strategies and measures in the regional development plan and Integrated Water Resources Management Action Plan to facilitate mainstreaming of climate risk reduction measures into the policies, regulations and annual regional and national capital budgets.

Any regional forum or meeting that has taken?

Activity 4.1.4: Facilitate the review of existing standards and regulations relating to the design and implementation of water and agriculture infrastructures and climate-resilient related interventions, and support the National Agricultural Research Institute to incorporate research in climate resilient crop varieties in their research program.

Any such activity?