



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

### ERITREA CASE STUDY

NOVEMBER 2012

<b>Country</b>	Eritrea
<b>Region</b>	Eastern Africa
<b>Key Result Area</b>	Water resource management Agricultural productivity Climate risk information
<b>UNDP PIMS ID</b>	4540
<b>Project Activity Dates</b>	Start: Inception workshop: November 2012 End: December 2017
<b>Key stakeholders</b>	Rural Eritreans living in the Anseba region, subzobas: Habero & Hamelmalo.

## ABSTRACT

**Low agricultural productivity and land degradation have become major features of the Anseba region. Over the last three decades, the region has experienced several droughts as well as erratically distributed rains. Other problems include cultivation of marginal land without fallowing, over-grazing, 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. Furthermore, inadequacy of agricultural extension services has contributed to the low level of development of agriculture in this region.**

**The project will operate in the Habero and Hamelmalo sub-regions. These are ranked in the top five (out of 11) sub-regions most affected by food insecurity, due largely to drought. Habero and Hamelmalo are bisected by the Anseba 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.**

## BRIEF DESCRIPTION OF ISSUES

### Background

Seventy per cent of Eritrea's land area is classified as hot and arid, receiving average annual rainfall of less than 350 mm, and ranging from 190 mm in Habero to about 367 mm in Hamelmalo. Since 1990, the two sub-regions have been seriously affected by drought. During 2002-2004 rainfall was particularly erratic and below average, especially in parts of Habero, resulting in loss of household assets such as livestock and greatly affected the livelihoods of communities. 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. There is no consensus between the projections of the different models as to the direction of change in mean annual rainfall. Projected changes range from -13 to +19 mm per month (-30 to +62%) by the 2090s, although more than half of the models project increases in early winter rainfall and decreases in late winter and spring rainfall, with probabilities more or less likely for different regions of Eritrea. There is no consensus between models with respect to direction of change in the proportion of annual rainfall that falls in heavy events. The model ensemble range tends towards increases in early winter and decreases in late winter and spring.

Mean annual temperature has increased by 1.7°C since 1960. The most recent projections of future climate for Eritrea use the latest SRES emission scenarios of A2, B1, and A1B indicate that mean annual temperature is projected to increase by 1.1 to 3.8°C by the 2060s, and 1.6 to 5.4°C by the 2090s. All projections indicate substantial increases in the frequency of days and nights that are considered 'hot' in the current climate. Increased rates of evaporation related to increased temperature will nullify rainfall increments that may be observed and lead to decreased soil moisture and reduced productivity. 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.

Low agricultural productivity and land degradation have become major features of Anseba zoba. Land degradation is caused to a large extent by inappropriate land management, unsustainable agricultural practices such as cultivation of marginal land without fallowing, lack of investment in land improvement, inadequate levels of animal feed, depletion of underground water and overgrazing and deforestation resulting in clearing of vegetation cover and increased soil erosion. The annual rate of soil loss from cropland is estimated at 12-17 tons/ha and crop yield is declining at the rate of 0.5% per annum owing to soil erosion. The overwhelming dependence on biomass (charcoal, firewood, agro-residues and cow dung) for domestic energy contributes significantly to clearing of forests and woodlands. Furthermore, inadequacy of agricultural extension services has contributed to the low level of development of agriculture in this zoba.

The livestock population in Anseba is highly affected by shortage of feed. To obtain better pasture land, herdsmen in this zoba migrate westwards between July and September and to the eastern escarpment or the Northern Red Sea zoba from November to March. This traditional coping practice has been disturbed by a number of factors, including increasing conflicting land use pressures, land degradation, and newly established Government policies, for example on settling mobile people.

In previous decades, the base flow of the Anseba River was present throughout the year. This is now severely reduced to a couple of months, with groundwater flow having dropped to two to three metres below the stream surface, constraining both the

irrigated crops and water supply for both human and livestock. Current projections of climate change indicate a considerable impact on the Anseba River base flows and shallow groundwater along the stream bank. As noted in the NAPA, it is expected that increase in temperature and variability of rainfall will lower groundwater supply in general and will increase crop water demand. It is likely that in the absence of adaptation actions, climate change will result in an ongoing or accelerated decrease in groundwater along the Anseba valley, leading to drying of most shallow wells.

## BRIEF DESCRIPTION OF PROJECT

### *Solution: Adaptation Approach, Components and Description*

The overall **goal** of the programme is to promote increased food security in Eritrea through ecologically sustainable and climate-resilient improvements in agricultural production. The **objective** of the programme 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 will adopt a participatory approach working with vulnerable groups in particularly drought-prone areas of Anseba Region, 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. Every effort will be made to institutionalise this within the processes of the Ministry of Agriculture at the Zoba Anseba level, the executing agency. The Implementing Partner is the Anseba Administration. The Execution Agency is the Ministry of Lands, Water and Environment.

### *Project Targets*

RESULTS	TARGETS
<b>Outcome 1</b> <b>Increased water availability for farmers</b>	By 2015, 5.3 million cubic meters of renewable water resources used in programme area (an increase of 4.3 million m <sup>3</sup> ).
<b>Outcome 2</b> <b>Climate-resilient production</b>	By 2015, 70% of programme beneficiaries have sufficient food for at least an additional three months of the year.
<b>Outcome 3</b> <b>Improved climate risk information and community preparedness</b>	By 2015, 70% of programme beneficiaries make use of improved climate risk information.
<b>Outcome 4</b> <b>Knowledge management and policy advocacy</b>	By 2015, at least five lessons learned codified and disseminated.

### *Mainstreaming Components*

Assisted by the Hamelmalo Agricultural College, the programme will implement a knowledge management system under Outcome 4, to be located in the Zoba Anseba administration, to capture and disseminate lessons learned through programme activities. This will include lessons learned on the additional burden faced by women and children with respect to climate change. Lessons will be shared through various appropriate regional and global networks, such as the Adaptation Learning Mechanism, to facilitate learning across countries. The knowledge management system will include a feedback loop to policy makers at the zoba and national level, to facilitate uptake of lessons learned into policy

## **Sustainability**

Most rural communities in Eritrea contribute annually in the form of cash or grain or to pay for operation and maintenance of water and irrigation infrastructure projects. In view of the poverty levels of target communities, the proposed small scale irrigation development schemes are designed to have a low operation and maintenance (O & M) costs. O& M of the sub-surface dam, micro dams, flood diversion schemes and soil and water conservation (SWC) structures requires only manual labour, to be provided by beneficiary communities, and technical support from zoba and sub-zoba technicians. Community ownership has been developed in the zoba through the 2002-2009 experience with the Anseba Local Development Project, in which communities took over direct implementation of project activities similar to the proposed project. The ALDP enabled considerable direct involvement of communities and enhanced community ownership. Additionally, a new regional regulation requires that beneficiary communities contribute one day of their labour every week throughout the project life time when such type and size of project are implemented within their kebabi or village.

The irrigation application method selected for the irrigation schemes are flood and surface irrigation application methods which are easily manageable, provide flexibility on the type of traditional cropping pattern practiced, have a low energy requirement, are not capital intensive and therefore remain affordable to communities, and provide opportunity for regular leaching to prevent salinity - a common problem in arid and semi-arid areas. The selection of technology for water sources securing infrastructure (headwork) is based on considering utilization of the locally available expertise (experts and farmers); experience in the design and construction of similar previous projects, the capacity to operate and maintain the system for sustainability and Cost effectiveness. On the other hand the alternative on headwork construction materials like reinforced concrete structures, rolled compacted concretes, still structures etc, will require sophisticated machineries, international expertise and high capital investment for its design and construction including operation and maintained.

To avoid possible water and other resources conflict that may arise during project implementation and beyond the project life, the project will support the establishment of Water Users Associations and will provide training to community WUA members and sub- zoba administrators on conflict resolution over natural resources.

The programme is consistent with the agricultural sector development programmes of the Government of the State of Eritrea. These highlight the commitment to ensuring food security, poverty reduction and environmental sustainability. The programme is completely aligned with the priorities and programme profile set out in the NAPA, as well as with the Interim Poverty Reduction Strategy Paper (I-PRSP), which provides the government's commitment to poverty reduction, and acknowledges drought as one of the major causes of poverty and food insecurity in the country.

## **Replicability**

The primary stakeholders of the targeted intervention will constitute approximately 6,141 households, of which approximately 1350 are woman-headed households. In addition, a far greater number of people in the two sub-zobas (67,500) and the Anseba region more widely could benefit from up-scaling of the programme intervention. Specific methodologies to reach the maximum number of households will include participatory community planning workshops, community groups, and using the existing village-level structures of key NGOs such as the National Union of Eritrean Women (NUEW) and the National Union of Eritrean Youth and Students (NUEYS). The media will also play a role through radio primarily, but also television and print.

Country-wide, over 80 per cent of the population (some 4 million people) relies on traditional subsistence crop cultivation and livestock husbandry, so the replication potential is considerable.

## Funding

AF Project Grant: US\$6,520,000

## Time Frame

January 2013- December 2017

ALM Profile created: November 2012

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