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EX POST EVALUATION #6

AF PROJECT ERI/MIE/Rural/2010/2
CLIMATE CHANGE ADAPTATION PROGRAMME IN WATER AND AGRICULTURE IN ANSEBA REGION, ERITREA

Ex Post Evaluation of Adaptation Fund Project ERI/MIE/Rural/2010/2 in Eritrea

Submitted to the Adaptation Fund Technical Evaluation Reference Group (AF-TERG)

EVALUATION REPORT | 14 NOVEMBER 2025

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Acknowledgements

The Adaptation Fund (the Fund) was established through decisions by the Parties to the United Nations Framework Convention for Climate Change and its Kyoto Protocol to finance concrete adaptation projects and programmes in developing countries that are particularly vulnerable to the adverse effects of climate change. At the Katowice Climate Conference in December 2018, the Parties to the Paris Agreement decided that the Fund shall also serve the Paris Agreement. The Fund supports country-driven projects and programmes, innovation, and global learning for effective adaptation. All of the Fund's activities are designed to build national and local adaptive capacities while reaching and engaging the most vulnerable groups, and to integrate gender consideration to provide equal opportunity to access and benefit from the Fund's resources. They are also aimed at enhancing synergies with other sources of climate finance, while creating models that can be replicated or scaled up. www.adaptation-fund.org

The Technical Evaluation Reference Group of the Adaptation Fund (AF-TERG) is an independent evaluation advisory group accountable to the Adaptation Fund Board. It works on improving the quality and effectiveness of the Adaptation Fund through generating evaluations, promoting evaluation utilization, and supporting evaluation capacity building. AF-TERG's work helps the Fund, and its partner organizations, enhance the impact of climate change initiatives on people, livelihoods, and ecosystems. It also guides responsible investment by the Fund, as an essential element for its political and public support. Learn more at www.adaptation-fund.org/about/evaluation/

This ex post evaluation was commissioned by the Technical Evaluation Reference Group of the Adaptation Fund (AF-TERG). The management team for this evaluation included Susan Legro (AF-TERG focal point), Vladislav Arnaoudov (Team Task Leader) and Mariana Vidal Merino (Evaluation Officer). The evaluation was conducted by Universalia Management Group. The evaluation team consisted of Esther Rouleau (Team Leader), Dr. Eric Abitbol (Senior Evaluator and Quality Assurance Advisor), Beement Alemayehu (Evaluator and Project Manager), Rennie Jordan (Evaluator), and Netsereab Azazi Amir (National Evaluator).

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Acronyms

AfDB	African Development Bank
AF-TERG	Adaptation Fund Technical Evaluation Reference Group
AI	Artificial Intelligence
BS&E	Bureau of Standards and Evaluation
CERF	Central Emergency Response Fund
DRSLP	Drought Resilience and Sustainable Livelihoods Programme
EE	Executing Entity
EQ	Evaluation Question
EWS	Early Warning Systems
ExPost-EAI	Ex Post Evaluation of Adaptation Interventions
FAO	Food and Agriculture Organization of the United Nations
FGD	Focus Group Discussion
GEF	Global Environment Facility
GIS	Geographic Information System
ha	Hectares
hh	Households
HAC	Hamelmalo Agricultural College
HDI	Human Development Index
IE	Implementing Entity
KII	Key Informant Interview
km	Kilometers
M&E	Monitoring and Evaluation
MIHAP	Minimum Integrated Household Agricultural Package
mm	Millimeters
MoA	Ministry of Agriculture
MoLG	Ministry of Local Government
MoLWE	Ministry of Land, Water, and Environment
MTR	Mid-Term Review
NARI	National Agricultural Research Institute
NDC	Nationally Determined Contribution
NUEW	National Union of Eritrean Women
NUEYS	National Union of Eritrean Youth and Students
ODA	Official Development Assistance
O&M	Operations and Maintenance
PPR	Project Performance Report
SQ	Sub-Question

SWC	Soil and Water Conservation
UNDP	United Nations Development Programme
UNDSS	United Nations Department of Safety and Security
UNFCCC	United Nations Framework Convention on Climate Change
VNR	Voluntary National Review
WASH	Water, Sanitation and Hygiene

Executive Summary

Evaluation Background

The ex post evaluation of the *Climate Change Adaptation Programme in Water and Agriculture in Anseba Region, Eritrea* project represents the final of six planned ex post evaluations for the July 2024 – June 2027 period. Adaptation Fund ex post evaluations are typically conducted for projects which have been closed for between three and five years.

This evaluation, commissioned by the Technical Evaluation Reference Group of the Adaptation Fund (AF-TERG) and carried out by Universalia Management Group between March and November 2025, assessed project outcomes seven years after project closure. The evaluation was framed around three overarching questions:

1. Have the project outcomes been sustained since completion?
2. Which factors have contributed to sustaining the project's adaptation outcomes over time?
3. How do the sustained outcome characteristics contribute to local resilience?

Project General Information

The *Climate Change Adaptation Programme in Water and Agriculture in Anseba Region, Eritrea* project was a US$ 6.52 million project carried out with Adaptation Fund support in the Anseba region sub-Zobas of Habero and Hamelmalo, between 2012 and 2018. The project was implemented by the United Nations Development Programme (UNDP), with the Ministry of Land, Water, and Environment (MoLWE) of Eritrea the national executing entity and the Zoba Anseba Administration's Department of Agriculture and Land, the on-ground implementor.

The project responded to critical challenges of climate change vulnerability, low adaptative capacity, and high levels of food insecurity and malnutrition faced by Eritrea. The project region and two sub-Zobas were selected considering criteria related to vulnerability to food insecurity and drought, with land degradation and low agricultural productivity other notable challenges in this area.

The project identified four outcomes corresponding with each of its components. These include:

- **Outcome 1:** Increased Water Availability and Erosion Control through Groundwater Recharge, Rainwater Harvesting, Irrigation and Soil and Water Conservation Measures.
- **Outcome 2:** Climate-Resilient Agricultural and Livestock Production Enhanced.
- **Outcome 3:** Improved Climate Risk Information and Climate Monitoring Used to Raise Awareness of and Enhance Community Preparedness to Climate Hazards.
- **Outcome 4:** Knowledge Management System Established, and Knowledge Management Activities Implemented.

At the time of the final evaluation, the project's goal and objective were found to be satisfactory, though ratings by outcome varied. Overall project sustainability at this time was rated Moderately Likely.

Evaluation Methods

The evaluation pursued a Theory-Based Approach drawing on the AF-TERG Sustainability Framework for the Ex Post Evaluation of Adaptation Interventions (ExPost-EAI). This involved the development of a project Theory of Change and subsequently a Theory of Sustainability.

Within this overarching framework, the evaluation pursued a mixed methods approach for data collection, drawing on Key Informant Interviews (KIIs), Focus Group Discussions (FGDs), document review, project site visits, transect walks, and direct observation as key sources of data. A training session was carried out with the AF-TERG on the ExPost-EAI toolkit early in the inception process.

The evaluation launched in March 2025, and field work was carried out in August 2025. Eight of 16 project sites were visited, including Hamelmalo (two sites), Habero – Fiza (two sites), Habero – Tsa'eda, Musha Shebah, Mahabesh, and Adi Tekelezan. A ninth site – Musha Shebah – was covered by beneficiaries travelling to meet with the evaluation team but was not physically visited. In total, 96 stakeholders were consulted, of which 67 were project beneficiaries and 24 were women.

Key Findings

Outcome 1: Increased Water Availability and Erosion Control through Groundwater Recharge, Rainwater Harvesting, Irrigation and Soil and Water Conservation Measures

Sustained improvements in water access and soil quality are perceived as having significantly supported agricultural and household needs. However, the quality of water infrastructure and persistent maintenance issues, if left unaddressed, pose risks to the long-term sustainability of outcomes.

In five consulted project sites, water management infrastructure constructed through project support (including micro-dams, check dams, diversion structures, reservoirs, and green water harvesting mechanisms) was found to bring continued benefits to community members in terms of improved water access for irrigation, pastoralism, and hygiene. However, in several cases, siltation was identified as a key barrier to sustaining surface water levels seen at project closure, with maintenance issues identified across project sites as key concerns to water availability and thus the sustainability of benefits associated with this outcome.

Clarity in communication around roles and responsibilities, lack of spare parts availability, and financial resources were found to be important contributing factors to maintenance issues. Further, in two project sites infrastructure has been damaged; while there may have been multiple contributing factors, this raises considerations on the suitability of the infrastructure to withstand shocks.

Erratic rainfall continues to contribute to soil erosion in Zoba Anseba; however, terracing activities to reduce erosion and improve soil fertility were observed during project site visits. Stakeholder perceptions on how soil and water conservation activities have contributed to improved soil quality varies, with some reporting positively on this and one site expressing concerns that the water from the dam was saline and not suitable for agricultural production.

Sustainability Rating: Moderately Satisfactory

Outcome 2: Climate-Resilient Agricultural and Livestock Production Enhanced

Sustained shifts toward diversified, climate-resilient agriculture and livestock production have been enabled, including an expansion of the Minimum Integrated Household Agricultural Package (MIHAP) Programme, improved agricultural inputs, and changes in livelihoods.

Three sites visited included beneficiaries of the MIHAP Programme, with one of the sites being a replica. The introduction and expansion of the MIHAP Programme implemented by the Ministry of Agriculture, have contributed to sustained agricultural diversification and increased livestock production, with strong evidence of the institutionalization within the Ministry and expansion of this programme.

MIHAP beneficiaries consulted by the evaluation team reported substantial improvements in food and nutrition security, attributed to dietary diversification and the regular consumption of a variety of fruits, vegetables, and meat, as well as eggs and milk, which were not previously part of their diet.

Two types of economic activities were observed among consulted MIHAP beneficiaries: 1) several practiced subsistence farming with occasional selling of surpluses at local markets; and 2) a small number of beneficiaries engaged in small- and medium-scale commercial farming. This is consistent with quantitative data reported by regional authorities from the Zoba Anseba, which indicate that, among the 640 households participating in the MIHAP Programme, 58 have graduated to small- and medium-sized commercial enterprises.

The ex post evaluation found continued benefits related to improved, drought resistant seeds, including continued distribution to farmers by the Ministry of Agriculture through its extension workers and seed multiplication and redistribution between farmers.

Sustainability Rating: Satisfactory

Outcome 3. Improved Climate Risk Information and Climate Monitoring Used to Raise Awareness of and Enhance Community Preparedness to Climate Hazards

Hydromet stations continue to provide climate data, with promising applications in agriculture and research. However, routine maintenance, more structured dissemination, and system integration remain key areas for strengthening.

Observations of three of the six hydromet stations confirmed that all are generating data, but two had partial functionality due to broken parts. Maintenance practices – under the responsibility of the entity in charge of the station (e.g. Ministry of Agriculture, Hamelmalo Agricultural College [HAC]) – varied across stations, with some stocking spare parts in advance while others did not.

Hydromet data is not yet integrated into a central automated system, limiting its accessibility and timeliness. Extension agents use data from the hydromet stations, which is physically collected, as well as from regional offices, to advise farmers on planting schedules and other agricultural decisions. However, this process is not systematic and only some farmers have benefited from the guidance.

An unintended value of hydromet data has been its use in academic research and teaching at Hamelmalo Agricultural College, contributing to knowledge generation and research capacity in Eritrea.

Sustainability Rating: Moderately Satisfactory

Outcome 4. Knowledge Management System Established, and Knowledge Management Activities Implemented

Knowledge management at multiple levels has contributed to behavior change, replication, and farmer engagement, with untapped opportunities for sharing knowledge beyond the Zoba Anseba. Extension agents have been key in continuing to share knowledge at local level. Farmers have also reported engaging in peer exchange, and Hamelmalo Agricultural College continues to play a key role in producing the knowledge that is then transferred to the farmers. At the Zoba level, there has been one post-project experience-sharing event (MIHAP presentation at Regional Assembly), which has enabled the replication of the MIHAP Programme across other sub-Zobas of the Anseba region.

Sustainability Rating: Moderately Satisfactory

Unintended Outcomes

The project has contributed to several unintended or broader outcomes, particularly in relation to energy access, food diversity and sedentarization. While many have been positive, some have been more nuanced or challenging to sustain, with maintenance a notable shortcoming.

The project supported the introduction of 748 household solar systems (including panels and batteries) across all beneficiary communities, which had multiple unexpected benefits such as: reducing the need to cut trees for lighting; removal of the need to pay for cellphone charging; and increased family, community, and study time beyond daylight hours. These benefits, however, were not sustained due to the limited battery life of the solar systems. The loss of this benefit has reportedly contributed to some tension within households which were accustomed to having light in the evening.

Fish farming emerged as a positive unexpected outcome of the project. With support from the Ministry of Marine Resources, micro-dams were used as fishponds and were managed by local committees, particularly women, enabling households to consume fish regularly – something many had never experienced before. However, the positive unexpected outcome was not sustained because dam siltation made it impossible to continue fish production in the ponds.

The project has also contributed to the government of Eritrea's broader strategy of promoting sedentarization by making water and agriculture the foundation of community livelihoods. Consulted beneficiaries explained that they previously moved in search of pasture and water, but that the availability of permanent water structures has allowed their families to settle, cultivate land, and build new livelihood strategies in the face of climate change.

Continued Relevance of Planned Outcomes

Project outcomes on water access, erosion control, and climate-resilient agriculture remain highly relevant, aligning closely with Eritrea's national climate adaptation priorities.

Water availability and erosion control remain at the heart of Eritrea's adaptation strategies, and climate-resilient agriculture and livestock production are recognized nationally as key to food security and rural development. Further, enhanced climate risk information and monitoring are understood nationally as enabling conditions for adaptation, reinforcing the value of the project's work in this area.

Considerations for Sustainability

- Stakeholder ownership is widespread and multi-level though stratified, from national government, through Zoba, sub-Zoba, Kebabi and down to village level. Limited input in the design of certain project components has inhibited community-level ownership to a limited extent.
- Overall, technical capacities are reasonably strong in areas such as dam repair, soil and water conservation, and agricultural knowledge transfer. Concerns remain over engineering design and quality. Capacities for hydromet services and knowledge management are mixed, with some institutional gaps.
- Sustained outcomes have been enabled by a multi-level national partnership that mobilizes the state apparatus through a 'whole-of-society' approach.
- The Adaptation Fund supported project is one of a number of projects in Eritrea that have worked to address key topics relating to climate change, food insecurity, livelihoods, and natural resource management. There is some indication of subsequent projects building on or planning to build on components or lessons from the Adaptation Fund supported project, which itself can be seen in the context of a wider compendium of investments.

Contribution to Local Resilience

- There are conditions in place to heighten the resilience of the project sub-Zobas and their communities. For example, the project has contributed to increased groundwater levels and reduced soil salinity, which has in turn improved communities' agricultural production, thereby improving their resilience to climate change. However, the functionality of some systems to enable timely and adequate responses to shocks are undoubtedly constrained by significant and persistent maintenance issues.
- The creation of livelihood opportunities through the MIHAP Programme has offered communities new resources to withstand shock. This has resulted in increased food availability for household consumption/subsistence and for sale at market. In some cases, beneficiaries have also reported reinvesting their income to sustain economic activities (e.g. through the purchase a motor pump, seeds or other agricultural inputs). Additional national resources to sustain and expand the MIHAP Programme have helped the population to better prepare for climate-related events through continued livelihood opportunities. However, maintenance issues of water infrastructure limit the degree of community preparedness as there continue to be some water shortages during the dry season, hindering to some extent the productivity of gardening activities.
- Evidence indicates sustained participation and leadership of women in post-project activities, a shift away from burdensome water fetching responsibilities, and improved school attendance among children. Continued engagement of women's organizations as well as women's presence in sub-national government roles reflects a good measure of institutionalization of equitable participation in post-project activities.
- Power dynamics within households and communities have shifted in both positive and challenging ways as a result of the variability of sustained outcomes.
- The project has contributed to sustaining institutional and community capacities to engage in climate risk response, though gaps in information flow and unclear responsibilities continue to limit full adaptive effectiveness.

Conclusions

Seven years after completion of the climate change Adaptation Fund project in Eritrea, the sustainability of project outcomes is assessed to be Moderately Satisfactory. Several outcomes were found to be sustained across project sites visited, including water availability enabled by the micro-dams, check dams, diversion structures, and water harvesting systems developed with project support; climate-resilient agricultural and livestock production, including the expansion of the MIHAP Programme and uptake of drought resistant seeds among farmers. Continued efforts related to combatting soil erosion were also observed.

If left unaddressed, significant and persistent maintenance issues are likely to adversely affect outcome sustainability. Despite improvements in water availability at project sites visited, maintenance issues are persistent, and dams and reservoirs are not functioning to their full capacity. Routine maintenance was also an issue in two of three hydromet stations observed by the evaluation team. While technical expertise to fulfill maintenance requirements is generally present, lack of financial resources and spare parts availability are a major and ongoing impediment, with clear communication around longer-term roles and responsibilities a noted challenge.

While the project resulted in several unintended benefits, it also provided insight into the possibility to contribute to tensions in cases where benefits are not sustained, as seen in the case of solar-powered lighting.

The project also provided a positive example of the long-term benefits of the MIHAP Programme – a model with strong replication potential, that has supported beneficiaries in sustaining and growing their agricultural activities. At the time of this evaluation, the government had invested human resources for the institutionalization and replication of this approach to four additional sub-Zobas in the Zoba Anseba.

Knowledge sharing, particularly at local level through extension services and among farmers themselves, has been fundamental in enabling the uptake and replication of good climate-resilient agricultural practices. Ad hoc knowledge sharing events have also proved key to the replication of the MIHAP programme.

Finally, strong ownership of the project by government and community-based stakeholders, combined with a multi-level and whole-of-society partnership, has contributed to the human and technical capacity as well as financial resources that are needed to sustain project outcomes.

Lessons Learned and Recommendations

Several key lessons and associated recommendations are identified as follows:

For the Implementing Entity

Lesson #1: The sustainability of assets such as water management infrastructures and hydromet stations require ongoing maintenance and repair. A clear definition of the specific roles and responsibilities of each stakeholder, from communities to Kebabi, sub-Zoba and Zoba levels, is fundamental. Equally important is communication to all stakeholders regarding expectations of their involvement in this process. Effective maintenance and repair also require clarity over the financial resources and spare parts required as well as a clear plan for mobilizing these resources.

Associated Recommendation #1: Develop and deploy clear operations and maintenance (O&M) plans for all physical assets of projects, already within project design.

For the Government

Lesson #2: Livelihood and income generation opportunities from climate-resilient agricultural and livestock management activities can provide important socio-economic and health-related benefits to smallholder farmers

and their families. In addition to purchasing additional food items and school supplies, and to pay for any health expenses, the income generated through these activities can be used by farmers to reinvest in agricultural inputs and expand farming activities. In some cases, increased income can also be reinvested into farms, allowing small businesses to further grow their productivity while also generating local demand for employment. However, this requires farmers to have strong capacity to market their products while also ensuring food safety. In this process, opportunities also exist for women to become economically empowered by contributing to food processing and marketing.

Associated Recommendation #2: Develop an enabling environment for agricultural market development and provide technical, financial and administrative support and guidance to MIHAP Programme farmers, to favor the successful development of their agro-entrepreneurship. This process should also ensure opportunities for women's economic empowerment.

Lesson #3: Knowledge management is fundamental to the identification and sharing of good practices on water resources management and climate-resilient agriculture. Knowledge management can take different shapes and forms, from South-South cooperation to political dialogues/encounters – which led to the development and replication of the MIHAP, respectively – to awareness raising and training provided by extension agents to farmers. An intentional learning agenda with clear objectives and learning mechanisms is needed for knowledge management to have a meaningful effect on climate change adaptation objectives by informing the widespread uptake of good practices through replication and scaling up.

Associated Recommendation #3: Pursue an intentional knowledge management agenda with a view to accelerating replication and scaling of project and post-project activities and benefits.

For the Adaptation Fund

Lesson #4: The project has generated important lessons on how climate change adaptation approaches can benefit other countries. At the same time, there are opportunities for Eritrea to continue learning from other countries to strengthen their adaptive capacity to climate change. The Adaptation Fund has a role to play in enabling such learning beyond local contexts.

Associated Recommendation #4: Provide support to enable South-South learning opportunities, to bring to light some of the best sustainability practices and outcomes.

For the AF-TERG on Methods

Lesson #5: While comprehensive, the ex post evaluation methodology includes complex concepts and overlapping criteria that can hinder a shared understanding among AF-TERG, evaluation teams, and beneficiaries. At the same time, early knowledge-sharing initiatives—such as the webinar launching the Ex-Post Toolkit—have proven valuable in aligning approaches and fostering learning across teams. Together, these experiences highlight the need for both simplification and continuous learning to strengthen consistency and usability of the methodology.

Associated Recommendation #5: Continue to develop, refine, and streamline the ex post evaluation methodology and related guidance while institutionalizing learning across evaluations.

- Simplify the methodology by avoiding duplication in evaluation criteria and clarifying the language and expectations under each criterion. (e.g. clearly identifying definitions for flexibility, connectedness/feedback loops, etc. and identify potential overlaps with other criteria).

- Expand the inception and evaluation report outlines to provide concise guidance on anticipated content for each section, allowing flexibility and reducing redundancy.
- Continue to organize learning events and knowledge-exchange opportunities between evaluation teams, using lessons from completed ex post evaluations to improve the Toolkit and guidance materials iteratively.

1. Project General Information

The *Climate Change Adaptation Programme in Water and Agriculture in Anseba Region, Eritrea* project was a US$ 6.52 million project carried out with the support of the Adaptation Fund in two sub-Zobas of the Anseba region, namely Habero and Hamelmalo, between 2012 and 2018. Ultimately, the Adaptation Fund financed US$ 6.01 million and the Government of Eritrea provided US$ 510,850 in cofinancing.[1] Most of the financing was allocated to the first two of four project outcomes (US$ 3.06 million and US$ 1.25 million, respectively).[2] The project's multilateral implementing entity was the United Nations Development Programme (UNDP),[3] its national executing entity the Ministry of Land, Water, and Environment (MoLWE) of Eritrea, and on-ground implementer the Zoba Anseba Administration's Department of Agriculture and Land.

1.1 Project summary table

Summary information on the project is presented in **Table 1.1**.

Table 1.1 Project summary table

PROJECT INFORMATION	
Category	Regular Project
Country	Eritrea
Title	Climate Change Adaptation Programme in Water and Agriculture in Anseba Region, Eritrea
Adaptation Fund Project ID	ERI/MIE/Rural/2010/2
UNDP Project ID	00061576 (PIMS ID 4540)
Implementing Entity	UNDP
Executing Entities	MoLWE
On-ground Implementer	Zoba Anseba Administration – Department of Agriculture and Land
Adaptation Fund Financing	US$ 6,010,000
Government of Eritrea Co-financing	US$ 510,850
Project Start Date (Proposed/Actual)	March 2011/November 2012
Project Closing Date (Proposed/Revised/Actual)	March 2016/November 2018/September 2018

Source: (1) Adaptation Fund. n.d.-b. Request for Project/Programme Funding from Adaptation Fund.; (2) Fobissie et al. 2019. Terminal Evaluation Report.; (3) Adaptation Fund. n.d.a. "Climate Change Adaptation Programme In Water and Agriculture In Anseba Region, Eritrea"

[1] Kalame Fobissie et al., *Terminal Evaluation Report: Climate Change Adaptation Programme in Water and Agriculture in Anseba Region, Eritrea*, Evaluation (2019), 12.
[2] Kalame Fobissie et al., *Terminal Evaluation Report: Climate Change Adaptation Programme in Water and Agriculture in Anseba Region, Eritrea*.
[3] Kalame Fobissie et al., *Terminal Evaluation Report: Climate Change Adaptation Programme in Water and Agriculture in Anseba Region, Eritrea*.

1.2 Summary of project justification

The project responded to critical challenges of climate change vulnerability, low adaptive capacity, and high levels of food insecurity and malnutrition faced by Eritrea.[4] Key climate risk hazards identified for the country included increased climatic variability, drought, flash floods, and sea level rise.[5] Climate change impacts were expected to exacerbate existing challenges around low agricultural productivity; the selection of Anseba region and the two sub-Zobas was done taking into account criteria related to vulnerability to food insecurity and drought, as well as the presence of the seasonal[6] Anseba River.[7] Both Hamelmalo and Habero have "particularly vulnerable livelihood systems (semi-sedentary livestock-based agro-pastoralism, and irrigation-based agro-pastoralism)."[8] These sub-Zobas were selected by the Zoba Administration, which also noted that other vulnerable areas were being addressed by the government through different projects. Land degradation and low agricultural productivity are other challenges facing the Zoba, with recurrent drought an important factor. There is migration of herdsman between July and September, and November and March, though this practice has been disrupted by various factors.

Box 1. Overview of project area

Rainy Season: mid-June to August, variable

Hazard (climatic): drought (recurrent), erratic rainfall distribution

Other features of the area (human/management/geographic): "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"; inadequate agricultural extension services [9]

Challenges: low agricultural productivity, land degradation, overgrazing

1.3 Summary of project strategy

1.3.1 Project objectives and components

The project goal and objective are presented in **Table 1.2**, alongside its four core components, which focus on: increasing water availability for farmers; enhancing climate-resilient agricultural and livestock production; improving climate risk information and community preparedness; and implementing a system for knowledge management and carrying out policy advocacy activities.[10]

[4] Adaptation Fund, *Request for Project/Programme Funding from Adaptation Fund [Climate Change Adaptation Programme in Water and Agriculture in Anseba Region, Eritrea]*, Project/Programme Proposal (n.d.), 2.

[5] Adaptation Fund, *Request for Project/Programme Funding from Adaptation Fund [Climate Change Adaptation Programme in Water and Agriculture in Anseba Region, Eritrea]*, 2.

[6] As per the project proposal, seasonality in this context refers to the base flow of the Anseba River shifting from being present all year long to only a few months per year. (p.4)

[7] Adaptation Fund, *Request for Project/Programme Funding from Adaptation Fund [Climate Change Adaptation Programme in Water and Agriculture in Anseba Region, Eritrea]*.

[8] Adaptation Fund, *Request for Project/Programme Funding from Adaptation Fund [Climate Change Adaptation Programme in Water and Agriculture in Anseba Region, Eritrea]*, 4.

[9] Adaptation Fund, *Request for Project/Programme Funding from Adaptation Fund [Climate Change Adaptation Programme in Water and Agriculture in Anseba Region, Eritrea]*, 4.

[10] Adaptation Fund, *Request for Project/Programme Funding from Adaptation Fund [Climate Change Adaptation Programme in Water and Agriculture in Anseba Region, Eritrea]*, 2.

Table 1.2 Project goal, objective, and components

GOAL AND OBJECTIVE	COMPONENTS
Goal: "promote increased food security in Eritrea through ecologically sustainable and climate-resilient improvements in agricultural production." **Objective:** "increase community resilience and adaptive capacity to climate change through an integrated water management and agricultural development approach."[11]	Component 1. Increased Water Availability for Farmers
	Component 2. Climate-Resilient Production
	Component 3. Improved Climate Risk Information and Community Preparedness
	Component 4. Knowledge Management and Policy Advocacy

1.3.2 Project intended impact

The project contributed to the overarching impact statement of the Adaptation Fund Strategic Results Framework, namely "Increased resiliency at the community, national, and regional levels to climate variability and change," and reported against seven outcome indicators as noted in **Table 1.3**, in addition to various output level indicators (not herein described).

Table 1.3 Project contribution to Adaptation Fund Strategic Results Framework

EXPECTED RESULTS	INDICATORS	SPECIFICATIONS
Impact: Increased resiliency at the community, national, and regional levels to climate variability and change	Core Indicator: No. of beneficiaries	Number of beneficiaries (direct and indirect beneficiaries, % female, % youth)
Outcome 1: Reduced exposure to climate-related hazards and threats	Indicator 1: Relevant threat and hazard information generated and disseminated to stakeholders on a timely basis	Number of targeted stakeholders (% female), hazards information generated and disseminated, overall effectiveness
Outcome 2: Strengthened institutional capacity to reduce risks associated with climate-induced socioeconomic and environmental losses	Indicator 2: Capacity of staff to respond to, and mitigate impacts of, climate-related events from targeted institutions increased	Number of staff targeted, sector, capacity level
Outcome 3: Strengthened awareness and ownership of adaptation and climate risk reduction processes	Indicator 3.1: Increase in application of appropriate adaptation responses	Percentage of targeted population applying adaptation measures, sector
Outcome 4: Increased adaptive capacity within relevant development sector services and infrastructure assets	Indicator 4.1: Increased responsiveness of development sector services to evolving needs from changing and variable climate	4.1: project sector, geographical scale, response level 4.2: sector, targeted asset, changes in asset (quantitative or qualitative)

[11] Adaptation Fund, *Request for Project/Programme Funding from Adaptation Fund [Climate Change Adaptation Programme in Water and Agriculture in Anseba Region, Eritrea]*, 2.

EXPECTED RESULTS	INDICATORS	SPECIFICATIONS
	Core Indicator 4.2: Assets produced, developed, improved or strengthened	
Outcome 5: Increased ecosystem resilience in response to climate change and variability-induced stress	Indicator 5: Ecosystem services and natural resource assets maintained or improved under climate change and variability-induced stress	Natural resource improvement level, sector, type
Outcome 6: Diversified and strengthened livelihoods and sources of income for vulnerable people in targeted areas	Indicator 6.1: Increase in households and communities having more secure access to livelihood assets Indicator 6.2: Increase in targeted population's sustained climate-resilient alternative livelihoods	6.1: No. of targeted households, % of female headed households, improvement level 6.2: No. of targeted households, % of female headed households, % increase in income level vis-à-vis baseline, alternate source
Outcome 7: Improved policies and regulations that promote and enforce resilience measures	Indicator 7: Climate change priorities are integrated into national development strategy	Integration level

Source: Drawn from latest available Project Performance Report (PPR), based on indicators with targets reported.[12]

The Project had four outcomes corresponding to its core components. These are presented in **Table 1.4** alongside the outcome indicators. The full Project Results Framework is presented in **Appendix III**

Table 1.4 Project outcomes

OUTCOME	INDICATOR
Outcome 1: Increased Water Availability and Erosion Control through Groundwater Recharge, Rainwater Harvesting, Irrigation and Soil and Water Conservation Measures.	*Change in level of renewable water resources used in project area* By 2018, 5.3 million cubic meters of water resources used in project area (increase of 4.3 million m3)
Outcome 2: Climate-Resilient Agricultural and Livestock Production Enhanced.	*Change in food security in the project area as a result of using climate-resilient agricultural and livestock production methods, measured as # of months per year additionally covered by local production* By 2018, 70% of project beneficiaries have sufficient food for at least an additional 3 months
Outcome 3. Improved Climate Risk Information and Climate Monitoring Used to Raise Awareness of and Enhance Community Preparedness to Climate Hazards.	*Percentage of project beneficiaries making use of improved climate risk information and climate monitoring processes, disaggregated according to gender* By 2018, 70% of project beneficiaries make use of improved climate risk information
Outcome 4. Knowledge Management System Established, and Knowledge Management Activities Implemented.	*Number of 'lessons learned' about natural resource management in the context of climate change as a result of the project* By 2018 at least 5 lessons learned materials produced and disseminated

Source: Fobissie et al. 2019. Terminal Evaluation Report.

[12] Adaptation Fund, *Project Performance Report (PPR) [Climate Change Adaptation Programme in Water and Agriculture in Anseba Region, Eritrea]*, Project Performance Report July 2016-June 2017 (2018).

1.3.3 Theory of change

Given that no Theory of Change was identified for the project, the evaluation team constructed one based on available documentation (see **Figure 1.1**).

Several vulnerability drivers for the project were identified in the Project Document, notably: Water availability – reduced seasonal flows of the Anseba River and decrease in groundwater; Soil erosion, land and rangeland degradation; low agricultural productivity; Flooding caused by erratic and heavy rains and negatively affecting farming and pastoralism; Recurrent drought affecting crop and livestock production systems and livelihoods in general; High levels of food insecurity and malnutrition; Inadequate agricultural extension services; No early warning systems to help farmers and pastoralists reduce climate risks; Lack of information on climate change risks in the agricultural sector/ downscaled climate projections to the local level; and Lack of lessons learned/ sharing mechanisms (e.g., between projects and regions). These were addressed through the four main components of the project, and 11 associated outputs.

The construction of the Theory of Change drew on several assumptions, articulated below and linked to the different outcomes in the Theory of Change (see **Figure 1.1)**:

- A1. Communities have the resources, capacities, and willingness to implement and maintain the infrastructure, with technical backstopping and support from the government
- A2. Severe drought/ other shocks do not impact project activities – groundwater levels do not drop to extreme levels before the implementation of activities supporting recharge
- A3. There is presence of community leaders who ensure replication of training to sustain stakeholder capacity over time
- A4. Communities have sufficient capacities to understand and use climate change information
- A5. Use of early warning systems and meteorological components is institutionalized
- A6. The Zoba Anseba administration has the resources, capacity, and willingness to implement and maintain a knowledge management system
- A7. Political relationships with neighboring Ethiopia remain stable
- A8. No major changes in socio-political dynamics

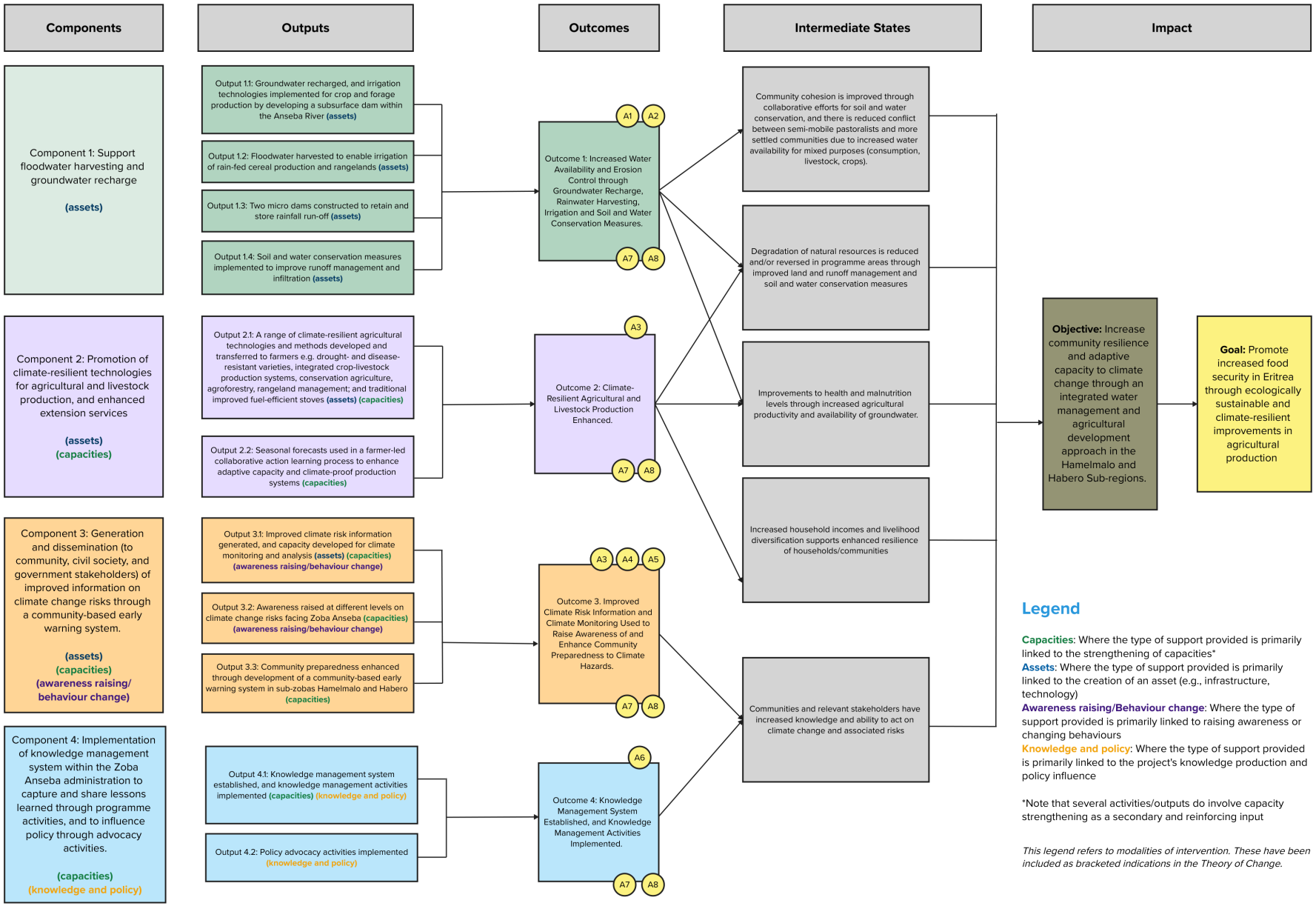
Further, key risks identified in the Project Document include:

- **High degree of risk**
  - Severe drought or other extreme weather events
  - Groundwater level dropping and salinization of wells leading to potential scarcity and competition, possibly leading to conflict
  - Low human and institutional capacity for the implementation of climate change-related interventions, especially at the Zoba and sub-Zoba level
  - Delays in project implementation, and particularly in the development of infrastructure interventions
- **Moderate degree of risk**
  - Price escalation and unavailability of commodities and materials
  - Failure of Zoba Administration to institutionalize early warning system and meteorological/ climate observation components

- **Low degree of risk**
    - Migration of human and livestock population under conditions of extreme severity to localities with a better natural resource base
    - Accessibility and communications in the project
    - Potential political tensions with neighboring countries [13]

[13] Adaptation Fund, *Request for Project/Programme Funding from Adaptation Fund [Climate Change Adaptation Programme in Water and Agriculture in Anseba Region, Eritrea]*.

Figure 1.1 Project Theory of Change (reconstructed)



Theory of Sustainability

Building from the Theory of Change, and anchored in each of the project outcome statements, a Theory of Sustainability has been prepared, which outlines the pathways through which the outcomes of the project have been *expected* to deliver long-term benefits beyond the implementation period. It builds on the sustainability strategies articulated in the project design, as well as insights from the Mid-Term and Final Evaluations. It identifies the institutional, financial, technical, and social elements needed to maintain and build upon the project's achievements.

Outcome 1: Increased Water Availability and Erosion Control through Groundwater Recharge, Rainwater Harvesting, Irrigation and Soil and Water Conservation Measures

Sustaining the gains under Outcome 1 requires that water infrastructures – such as micro-dams, subsurface dams, and diversion canals – remain functional and continue to serve their intended purposes of supporting crop and forage production, mitigating erosion, and enhancing groundwater recharge. In the envisioned sustainability pathway, community ownership plays a foundational role. Where farmers have formed strong associations or informal user groups, these collectives are expected to organize maintenance tasks, mobilize labor, and develop shared rules for water use. The continuation of these functions is assumed to be more likely where the project succeeded in fostering a sense of responsibility and where communities demonstrated initiative – such as in repairing canals after flood damage.

At the same time, long-term sustainability depends on the integration of infrastructure oversight and technical backstopping into the routine operations of government institutions, particularly at sub-national levels. Local offices of the MoLWE are expected to provide periodic technical support, while regional administrations ensure coordination and resource mobilization. However, this chain of sustainability is vulnerable to inflation and fluctuating input prices – such as cement costs – which pose risks to timely repairs. In the absence of a clearly defined mechanism for financing maintenance, especially for larger structures beyond the capacity of communities, sustainability is likely to remain uneven. Further, extreme climate events and trends such as prolonged drought may impact the overall sustainability of this outcome.

Outcome 2: Climate-Resilient Agricultural and Livestock Production Enhanced

The sustainability of climate-resilient agriculture and livestock practices hinges on the continued use and spread of techniques introduced during the project – such as drought-resistant seeds, integrated crop-livestock systems, agroforestry, and improved rangeland management. A successful sustainability pathway envisions that farmers who adopted these innovations during the project will maintain them due to perceived economic and environmental benefits, and that these farmers will, in turn, influence others through local knowledge exchange and demonstration effects.

For these practices to expand and evolve, agricultural extension services must remain active and responsive. The role of trained extension agents – whose availability was limited at the sub-Zoba level according to the Final Evaluation – is crucial for reinforcing best practices, addressing emerging challenges, and introducing incremental innovations. Their continued presence would ensure that the technical knowledge embedded in the project does not dissipate over time. Parallel to this, research institutions such as Hamelmalo Agricultural College (HAC) and the National Agricultural Research Institute (NARI) are expected to continue generating improved inputs and practices and to feed these into extension systems. The sustainability chain is therefore contingent on institutional commitment, stable staffing, and a feedback loop between research, practice, and learning.

Without consistent investment in these systems, there is a risk that gains may stagnate or be reversed. Further, risks such as pest and livestock disease, as well as prolonged drought have the potential to influence the sustainability of this outcome.

Outcome 3. Improved Climate Risk Information and Climate Monitoring Used to Raise Awareness of and Enhance Community Preparedness to Climate Hazards

For Outcome 3, sustainability involves continued generation, dissemination, and use of climate risk information at the local level. The sustainability chain begins with the ongoing operation of the meteorological stations installed during the project, which forms the backbone of the localized climate monitoring system. From there, seasonal forecasts and risk alerts must be translated into actionable information through early warning systems (EWSs) that are trusted, understood by, and available to communities. This pathway assumes institutional capacity within national meteorological services and sustained collaboration with regional actors. This also includes continued financial support, which is central to sustaining hardware and personnel.

To ensure the sustainability of the EWS introduced under Outcome 3, the project envisioned coordinated roles across national, regional, and local institutions. According to the project design, the Meteorological Services was expected to lead on the technical side – generating and disseminating climate forecasts and risk alerts using the six Class A meteorological stations installed through the project. The Anseba Regional Administration and relevant sub-Zoba authorities were responsible for institutionalizing the EWS at local level, through community-level preparedness and communication of warnings. At the community level, village development committees and local leaders were expected to play a central role in embedding early warning messages into existing decision-making and communication practices.

However, a key bottleneck identified in both design and evaluation documents is the absence of climate specialists at the regional level who can act as intermediaries between national data producers and local users. Without such expertise embedded in the Zoba Anseba Administration, the flow of climate information risks becoming a one-way transfer, disconnected from community realities. Sustained preparedness also depends on whether local institutions, such as village development committees, internalize early warning functions into their decision-making processes. If awareness raising remains sporadic or disconnected from local governance, preparedness behaviors are unlikely to persist. Thus, this outcome's sustainability depends not only on hardware (i.e., stations and forecasts) but on embedded processes, trained personnel, and local institutional uptake.

Outcome 4. Knowledge Management System Established, and Knowledge Management Activities Implemented

Outcome 4 represents the most fragile link in the sustainability chain, as knowledge management activities were only partially implemented during the project. Nonetheless, for the outcome to be sustained, it would require that lessons learned – whether in infrastructure design, agricultural practices, or community engagement – be systematically documented, shared, and used to inform future policy and programming.

A robust sustainability pathway would see institutions such as the MoLWE and HAC serve as repositories and promoters of knowledge products, including manuals, policy briefs, and training curricula. These would need to be integrated into ongoing government programming and educational curricula to maintain relevance. At the same time, sustained policy influence would require that project learnings be brought into national and regional development planning through formal coordination platforms or working groups. However, the Final Evaluation noted that this outcome remained underdeveloped, and no clear institutional mechanism for knowledge

management was established. The assumption here is that with renewed support – possibly through future programming – these latent capacities could be activated; but in the absence of such investment, this outcome is the least likely to be sustained.

1.3.4 List of relevant sustainability ratings

At final evaluation, the overall project goal and objective were found to be satisfactory, with variability in ratings per outcome, as presented in **Table 1.5**.

Table 1.5 Outcome ratings at final evaluation

OUTCOME	RATING
Outcome 1. Increased Water Availability and Erosion Control through Groundwater Recharge, Rainwater Harvesting, Irrigation and Soil and Water Conservation Measures.	Satisfactory
Outcome 2. Climate-Resilient Agricultural and Livestock Production Enhanced.	Highly Satisfactory
Outcome 3. Improved Climate Risk Information and Climate Monitoring Used to Raise Awareness of and Enhance Community Preparedness to Climate Hazards.	Marginally Satisfactory
Outcome 4. Knowledge Management System Established, and Knowledge Management Activities Implemented.	Marginally Satisfactory

(1) 6-point scale: Highly satisfactory (HS); Satisfactory (S); Moderately satisfactory (MS); Moderately unsatisfactory (MU); Unsatisfactory (U); Highly unsatisfactory (HS). Source: Adapted from Final Evaluation [14]

Relevant sustainability ratings from the Final Evaluation are presented in **Table 1.6.** The overall project sustainability was rated 'Moderately Likely.'

Table 1.6 Project sustainability rating at final evaluation

EVALUATION RATING	RATING
Overall sustainability	Moderately Likely
Financial resources	Moderately Likely
Socio-economic	Moderately Likely
Institutional and governance	Likely
Environmental	Moderately Likely

4-point scale: Likely; Moderately Likely; Moderately Unlikely; Unlikely. Source: Adapted from Final Evaluation [15]

[14] Kalame Fobissie et al., *Terminal Evaluation Report: Climate Change Adaptation Programme in Water and Agriculture in Anseba Region, Eritrea*.
[15] Kalame Fobissie et al., *Terminal Evaluation Report: Climate Change Adaptation Programme in Water and Agriculture in Anseba Region, Eritrea*.

2. Evaluation Approach

2.1 Evaluation objectives and scope

In the interest of gaining insight into the project's actual impact and the sustainability of its four outcomes after completion, the Adaptation Fund commissioned this ex post evaluation of the *Climate Change Adaptation Programme in Water and Agriculture in Anseba Region, Eritrea* project. This is based on an understanding that results of adaptation activities may appear years after a project is completed. Per the Evaluation Policy of the Adaptation Fund, ex post evaluations are understood to take place typically three to five years after project administrative closure.[16] In this case, it is taking place about seven years after closure.

This evaluation serves three primary purposes, which form the overarching evaluation questions for ex post evaluations, and are addressed sequentially:

- To assess changes in the project impacts from the time of the Final Evaluation to the time of the evaluation ex post, that is, three to five years after the project's administrative closure.
- To identify conditions that contributed to sustaining the project's adaptation outcomes over time.
- To analyze ways through which the sustained outcomes are contributing to the system's resilience and adaptive capacity.

This is one of six planned ex post evaluations for the July 2024 – June 2027 period. These evaluations correspond to Phase 3 of the "Implementation and Learning: to continue ex post evaluations over time, informing approaches, methods, and systems within the Fund" of the Adaptation Fund Technical Evaluation Reference Group (AF-TERG). They represent an advance from Phase 2 pilot evaluations in that they consider all project outcomes.

As per the ex-post evaluation methodology, the inception period should be used to gather preliminary information on the extent to which outcomes have been sustained and identify those outcomes for which additional evaluative resources should be used during data collection to gather more in-depth evidence about key factors of sustainability during data collection. However, given the limitations in reaching key stakeholders during the inception phase, it was not possible to identify outcomes warranting more thorough analysis and, therefore, all outcomes have been considered and examined to the same extent during data collection.

Additionally, the scope of the evaluation includes training of the evaluation team in the ex post evaluation process, framework, and related tools and methods, as appropriate; a kick-off meeting; deskwork; inception report preparation; field work; evaluation reporting (report and presentations), and preparation of an evaluation summary. An important component of this evaluation has been in ensuring the ex post evaluation methodology was adjusted for the context in which the evaluation was undertaken.

To answer the evaluation questions, the evaluation team assessed data from September 2018 (project completion) to July 2025 (including ex post evaluation field work and additional data collection). Due to limited

[16] Adaptation Fund, *Evaluation Policy of the Adaptation Fund*, Policy (Adaptation Fund, 2022), 9–10, https://www.adaptation-fund.org/wp-content/uploads/2022/07/New-Design-Evaluation-Policy.pdf.

data available for this period during the Inception process, the assessment relied in particular on publicly available documentation from the project's implementation, on the one-week field visit to Eritrea, as well as additional information sourced online and shared after the field visit.

2.2 Overview of methods

The evaluation pursued a Theory-Based Approach drawing on the AF-TERG Sustainability Framework for the Ex Post Evaluation of Adaptation Interventions (ExPost-EAI). As noted earlier, this involved the construction of a Theory of Change for the project, which was then used as a basis for developing a Theory of Sustainability (both are presented in **Section 1.3.3**).

Within this overarching framework, the evaluation pursued a mixed methods approach for data collection, drawing on Key Informant Interviews (KIIs), Focus Group Discussions (FGDs), document review, project site visits, and transect walks as key sources of data. Given the unavailability of key informants and limited documentation available in the inception period, the evaluation relied substantively on data collection through the field visit in Eritrea, which took place from 7 to 11 July, 2025. Where possible, data has been triangulated across sources for more robust analysis. Data analysis comprised qualitative and quantitative, descriptive and contextual, explanatory, and gender and inclusion analysis.

The overall approach taken by the evaluation team is illustrated in **Table 2.1** below.

Table 2.1 Overview of methodological approach

Methodological Approaches	Data Collection Methods			Data analysis
Theory-Based Sustainability Framework for the Ex Post Evaluation of Adaptation Interventions	**Mixed Methods Approach**	Key Informant Interviews Focus Group Discussions Document Review Project Site Visits Transect Walks Direct Observation	**Field visit to Eritrea**	Qualitative Analysis Quantitative Analysis Descriptive and Contextual Analysis Explanatory Analysis Gender and Inclusion Analysis

2.2.1 Methods

Document review

Document review covered, primarily, the original funding proposal, annual progress reports, Mid-Term Review (MTR), Final Evaluation, as well as additional documentation found online (e.g., UNDP Eritrea newsletters, the Third National Communication Under the United Nations Framework Convention on Climate Change [UNFCCC]). To supplement documents available through UNDP and Adaptation Fund project webpages and learn about potential influences of the project on subsequent climate change adaptation programming in Eritrea, an artificial intelligence (AI) web search was carried out. This had the primary objectives of (i) identifying and understanding projects planned and carried out in Eritrea since 2017, and the potential influence of this project on subsequent projects, policies, etc., and (ii) understanding discourse around the project (i.e., knowledge outputs, references to the project online). Following the field visit, additional documents were made available, which included government reporting and documents for related or subsequent projects.

KIIs and FGDs

KIIs and FGDs were designed as 45- to 90-minute semi-structured discussions, conducted either individually or in small groups, depending on availability and institutional preference. Stakeholder-specific interview guides were informed by the evaluation matrix and tailored to the role, perspective, and level of engagement of each stakeholder group. The flexible, semi-structured format allowed the evaluation team to explore core questions and indicators while also probing emergent issues and context-specific insights relevant to sustainability and resilience. In total, 96 stakeholders were consulted, including 67 beneficiaries. A quarter of consulted stakeholders were women (see **Table 2.2**).

Table 2.2 Overview of consulted stakeholders

	MEN	WOMEN	ALL
Total (non-beneficiaries)	24	5	29
Total Beneficiaries	48	19	67
TOTAL	**72**	**24**	**96**

Project site visits

Project site visits included KIIs with local leaders/ village development committees and FGDs with project beneficiaries, particularly farmers and community members in six communities. They also included direct observation of project sites (i.e., infrastructure, innovative solutions, etc.) and transect walks with community members in four communities (see below). In total, nine sites were visited, allowing for the observation of a range of project infrastructure, as identified in **Table 2.3**.

Table 2.3 Project site visits

SITE VISITED	DATA COLLECTION METHODS
Hamelmalo (site 1)	1) Direct observation of the hydromet station at HAC
Hamelmalo Village (site 2)	1) Direct observation of dam structure; 2) transect walk and FGD with community members
Habero: Fiza (site 3)	1) Direct observation of diversion structure; solar systems/water pump/reservoir; Minimum Integrated Household Agricultural Package (MIHAP) gardens and livestock; 2) transect walk and FGD with community members
Habero: Fiza (site 4)	1) Direct observation of hydromet station
Habero: Tsa'eda (site 5)	1) FGD with community members
Habero: Mezret (site 6)[17]	1) FGD with community members

[17] Mezret was covered by beneficiaries travelling to Habero Tsa'eda to meet with the evaluation team. However, a physical visit to this site with direct observations was not completed.

Musha Shebah (site 7)	1) Direct observation of dam; MIHAP gardens/livestock; fishpond replica/bosweilia; 2) transect walk and FGD with community members
Mahabesh (site 8)	1) Direct observation of MIHAP replica; 2) transect walk and FGD with community members
Adi Tekelezan (site 9)	1) Direct observation of hydromet station

Transect walks

The evaluation design included observation of project sites combined with transect walks. This method involves systematically walking through project areas alongside informed community members and technical analysts to document environmental, social, and infrastructural conditions. The evaluation also considered additional conditions or variables that might have influenced the maintenance of the system's resilience, adaptive capacity, and adaptation outcomes over time; for example, the policies implemented by the state, the decisions made, and the proactive adaptation measures (or lack thereof) aimed at enhancing resilient natural and built infrastructure, addressing systemic disparities that render certain populations more susceptible to the effects of climate change.

The transect walks facilitated detailed observation and interaction with local stakeholders, allowing the evaluation team to identify tangible evidence of sustained project outcomes, such as improved agricultural practices, water management systems, or climate-resilient infrastructure. The structured nature of the transect walks ensured the collection of data on pre-identified criteria relevant to the project's objectives. Engaging with community members during the walks also provided a participatory platform to understand local perceptions of project impacts, verify outcomes, and gather insights into factors contributing to or hindering their sustainability (e.g., unexpected outcomes). The approach enabled triangulation of observational data with beneficiary experiences and technical analysis, thereby offering a comprehensive understanding of how project outcomes have persisted or evolved since implementation.

2.2.2 Analytic approach

Multiple analytic approaches were pursued for this ex post evaluation, as presented below.

Qualitative analysis formed a core component of the evaluation's approach. The evaluation team analyzed documents and interview data to identify patterns, trends, and divergent views across key units of analysis.

Quantitative analysis was used to examine relevant data and trends in relation to project-level and wider contextual data, to the extent possible.

Descriptive and contextual analysis was critical for understanding the operating environment of the Adaptation Fund project, and how contextual factors have influenced the sustainability of results.

Explanatory analysis was used when presenting the sustainability of results, providing insights that will likely serve in the development of other projects into the future.

In addition to the analytical methods described above, triangulation was at the core of the data analysis process to ensure the reliability of information and to increase the quality, integrity, and credibility of the evaluation findings and conclusions.

2.2.3 Gender analysis

This evaluation employed a mixed-methods approach to assess gender and inclusion outcomes. First, sex-disaggregated data was collected wherever possible, including for quantitative indicators such as participation in project activities, benefits from asset creation (e.g., irrigation access or livestock), and use of improved technologies. Second, FGDs were designed to explore differentiated experiences of men and women in terms of benefit sharing, decision-making, and sustainability of outcomes. In each visited community, to the extent that fieldwork allowed, a separate or gender-balanced FGD was conducted to ensure that women's voices were adequately captured.

Interviews with institutional stakeholders included targeted questions on gender considerations in planning and implementation, and the role of women's institutions and organizations were explored. The evaluation team also conducted interviews and FGDs with such bodies in Zoba Anseba, which were engaged in the implementation of awareness-raising and beneficiary targeting activities. Attention was paid not only to the role of women, but also to other dimensions of inclusion, including youth, poverty status and livelihood type (e.g., agro-pastoralists versus settled farmers), in line with the participatory poverty and wealth ranking methodology originally used by the project.

2.3 Limitations

Table 2.4 presents the limitations identified by the evaluation team, as well as the mitigation strategies.

Table 2.4 Evaluation limitations and mitigation strategies

LIMITATION	MITIGATION STRATEGY
The ex post evaluation was conducted seven years after the completion of the project. As a result, it was expected that many key stakeholders with direct knowledge of project design and implementation may no longer hold the same positions, and institutional memory may have weakened. This challenge also applied to beneficiaries, some of whom may have migrated or moved away, making it difficult to ensure consistent recall and representation.	To address this limitation, the evaluation team purposefully sampled individuals known to have direct involvement in the project and prioritized consultation with former staff of key implementing and executing agencies. A structured and approved snowballing approach was planned for fieldwork to identify and reach additional knowledgeable stakeholders. Given the time-bound nature of the data collection mission, the national consultant was available to conduct targeted follow-up interviews after the mission as needed, ensuring broader coverage and triangulation of institutional memory. Such a mitigation measure was not used in the end because many of the stakeholders who had been involved in the project were still in the community at the time of visit.

LIMITATION	MITIGATION STRATEGY
The design of ex post evaluations typically involves an extended inception phase with multiple stakeholder interviews to develop emerging findings and assess which outcomes have been sustained since the Final Evaluation. This is meant to enable the evaluation team to strategically select project sites that offer the best opportunities to examine the conditions contributing to sustainability. However, during the inception phase, connectivity challenges limited consultations to only two individuals at the central government level. No consultations could be held with regional authorities, who are most likely to hold central information on outcome sustainability. As a result, these insights could not inform the evaluation design or sampling strategy.	To mitigate this limitation, the evaluation team developed a preliminary site sampling strategy based on information available in the Final Evaluation and shared the proposed site list with regional counterparts for written feedback.
While the areas targeted for site visits were stable at the time of data collection, the broader security environment remained unpredictable, which presented a potential risk to field activities.	To minimize security risks, the evaluation team adopted a series of precautionary measures. All project site visits were planned in convoys using two vehicles, and travel was restricted to daylight hours. International consultants were required to register with their respective embassies prior to travel and complete the mandatory online United Nations Department of Safety and Security (UNDSS) Basic and Advanced Security in the Field courses. Upon arrival in-country, they also received a UNDSS briefing and complied with any security advisories or protocols in effect at the time of the mission.
Documentation was limited to publicly available documents accessed through UNDP and Adaptation Fund project pages.	To source additional supporting documents that could inform the desk review and analysis, the evaluation team conducted a keyword search of UNDP annual reports and newsletters (see **Appendix IV**) and carried out a search of the web using AI. Both searches yielded limited but usable results. Following the field visit, additional documents were shared with the evaluation team.

3. Findings

3.1 Project outcomes at final evaluation

The ex post evaluation first reports on project outcomes at Final Evaluation and then discusses the sustainability of these as well as unanticipated outcomes. In brief, outcomes 1 and 2 (increased water availability and erosion control, and enhanced climate-resilient agricultural and livestock production) had satisfactory performance, while outcomes 3 and 4 had marginally satisfactory performance. 10,968 households (hh) benefitted from project activities (compared to the 6,131 hh targeted), and food and livestock productivity (and therefore food

security) were reportedly increased.[18] The Final Evaluation also found integration of additional and new activities, including the integration of MIHAP and solar lighting, which demonstrated adaptive measures of the project as a whole. Each outcome is discussed in further detail below, with some key insights from the output level.

Outcome 1: Increased Water Availability and Erosion Control through Groundwater Recharge, Rainwater Harvesting, Irrigation and Soil and Water Conservation Measures

Outcome 1 was assessed through the following indicator: *By 2018, 5.3 million cubic meters of water resources used in project area (increase of 4.3 million cubic meters)*

At Final Evaluation, this outcome was found to be **satisfactory**. Specifically, almost all planned activities had been implemented, and water availability was found to have increased from 1 to 2 million cubic meters (less than the target of 4.3 million cubic meters). This outcome is understood to have been assessed based on the construction of infrastructure – notably the construction of two micro-dams[19] – which could store water, with the increase in water availability based on the capacity of these dams. These dams, alongside the expansion of irrigation systems and distribution of improved crop varieties, were expected to expand the eligible area for farmland and support food security.[20] Highlights from the Final Evaluation include:

- The construction of water diversion structures (weir, gates, and 170m and 136m long canals), with the participation of 368 people (8% women).
- The construction of an irrigation system (314 cubic meter reservoir and solar pump) to reach farmers further away from the diversion weirs.
- The drilling of a well, which was also equipped with a water pump with underground pipes.
- The distribution of land to farmers for production.
- The construction of dams including two micro-dams and an earthen dam, with water for both livestock and humans. At Final Evaluation, an increase in downstream recharge from some dams was noted. However, water was not accessible to all farmers due to limited equipment in some cases.
- An increase in yields of cereal production and forage production was reported to result in increased sales of grass and milk production of cross-bred cows.
- Hillside terraces, check dam construction, water catchment protection and rehabilitation, creation of enclosure areas that produce grasses and help tree regeneration, planting of sisal and Acacia Senegal seedlings for soil stabilization.
- Did not reach target to establish nursery of 0.5 million seedling capacity, but 850 hh benefitted from soil and water conservation (SWC) activities and crop production reportedly increased by 15-20%. Farmer leadership in SWC activities and during dam construction was reported (>35% of participants were females).[21]

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[18] Kalame Fobissie et al., *Terminal Evaluation Report: Climate Change Adaptation Programme in Water and Agriculture in Anseba Region, Eritrea*, v.

[19] Under Output 1.1, a sub-surface dam was planned but not constructed. The construction of a micro-dam was planned instead, but this was not ultimately built.

[20] Kalame Fobissie et al., *Terminal Evaluation Report: Climate Change Adaptation Programme in Water and Agriculture in Anseba Region, Eritrea*.

[21] Kalame Fobissie et al., *Terminal Evaluation Report: Climate Change Adaptation Programme in Water and Agriculture in Anseba Region, Eritrea*.

Outcome 2: Climate-Resilient Agricultural and Livestock Production Enhanced

Outcome 2 was assessed through the following indicator: *By 2018, 70% of project beneficiaries have sufficient food for at least an additional 3 months*

At Final Evaluation, this outcome was found to be **highly satisfactory**. Farmers were provided with climate-resilient agricultural technologies, methods, and trainings. MIHAP, along with fuel efficient stoves and solar systems "provided resources to improve climate adaptive capacities and resilience of many vulnerable farming households through diverse livelihood options and opportunities." Increasing adaptive capacity of farmers and production systems was reported alongside increasing crop and livestock productivity and sales.[22] Highlights from the Final Evaluation include:

- Capacity development of 232 project beneficiaries (30% female) on the implementation of agricultural and livestock adaptation measures. Topics covered in trainings included animal production (two trainings), crop production (two trainings), horticulture (two trainings), plant protection, and Geographic Information System (GIS) and mapping. All trainings occurred in 2016.
- Climate resilient agricultural production technologies and methods were rolled out, with improved and drought resistant varieties of sorghum and pearl millet purchased and distributed to 9,257 farmers. This included the purchase and distribution of approximately 339.32 quintals of "improved, drought resistant, heat-tolerant and early matured pearl millet and sorghum seeds" to 3,729 farmers. Other improved, early-maturing, drought and striga resistant varieties of sorghum and pearl millet were distributed to 5,528 farmers (18% females).
- MIHAP activities were reported to support income generation through the sale of fruit and mature surplus cocks, and increased milk and egg production in households. This included supporting 255 farmers (37% women) with 450 fruit tree seedlings and 17.5 kg of vegetable seed, and corresponding training. Further, 430 farming households (approximately 89% female led) were each provided with the following: "one improved crossbreed of dairy cow[..], six shoats[..], 25 chickens[..], 100 beehives[..], 20 trees[..], and [0.5] ha land for crop production."
- 400 energy efficient improved stoves were installed, with training of seven women who then trained 67 trainees. The design of the stoves was reported to require the use of charcoal as opposed to the twigs and wood, which were preferred materials.
- Around 750 hh provided with solar systems and training.
- Discussions with farmers on traditional knowledge and indicators of seasonal forecasts were held, with other activities (not informed by seasonal forecasts) implemented. These included, for example, two farmers' field days in HAC and Elabered to show farmers how to practice seed priming.[23]

Outcome 3. Improved Climate Risk Information and Climate Monitoring Used to Raise Awareness of and Enhance Community Preparedness to Climate Hazards

Outcome 3 was assessed through the following indicator: *By 2018, 70% of project beneficiaries make use of improved climate risk information*

[22] Kalame Fobissie et al., *Terminal Evaluation Report: Climate Change Adaptation Programme in Water and Agriculture in Anseba Region, Eritrea*.
[23] Kalame Fobissie et al., *Terminal Evaluation Report: Climate Change Adaptation Programme in Water and Agriculture in Anseba Region, Eritrea*.

At Final Evaluation, this outcome was found to be **marginally satisfactory.** A key achievement was the creation of six meteorological stations. However, there was a failure to capitalize on existing traditional climate forecasting knowledge, and to integrate in design the processes involved in setting up the stations (such as installation, training, generating and analyzing data, etc.). Some highlights include:

- Six meteorological stations were constructed and installed, including two manual and four automatic stations. At the time of the Final Evaluation, data generation was not used for seasonal forecasting for farmers, with the availability of experts and management of stations key limiting factors.[24]
- Climate change awareness raising events were carried out in Habero, Geleb, and Hamelmalo with 135 farmers (20% female). Topics included farm field terracing for sustainable land management, effects of climate change and environmental degradation, water pollution and sanitation, reforestation and afforestation, and construction of micro and check dams.[25]

Outcome 4. Knowledge Management System Established, and Knowledge Management Activities Implemented

Outcome 4 was assessed through the following indicator: *By 2018 at least 5 lessons learned materials produced and disseminated*

At Final Evaluation, this outcome was found to be **marginally satisfactory.** There was no coherent knowledge management system in place and minimal activities had been carried out. While there were some activities related to local media coverage and video development for the project, tools such as policy briefs were not prepared.[26]

3.2 Sustainability

As noted above, Outcomes 1 and 2 achieved a higher rating at project closure than Outcomes 3 and 4. Accordingly, these outcomes were also expected to have a greater potential for sustainability, as compared to Outcomes 3 and 4. Key factors identified that might support project sustainability include: the establishment of farmer associations in communities/ direct involvement of local communities; partnerships with different stakeholder groups; legal and institutional arrangements through work with local extension agents and government agencies; financing through increased income from crop and livestock production and potentially other sources; and support for ecosystem restoration.

A discussion on the sustainability of outcomes is presented below, directly linked to each of the anticipated project outcomes.

[24] Kalame Fobissie et al., *Terminal Evaluation Report: Climate Change Adaptation Programme in Water and Agriculture in Anseba Region, Eritrea*.
[25] Kalame Fobissie et al., *Terminal Evaluation Report: Climate Change Adaptation Programme in Water and Agriculture in Anseba Region, Eritrea*.
[26] Kalame Fobissie et al., *Terminal Evaluation Report: Climate Change Adaptation Programme in Water and Agriculture in Anseba Region, Eritrea*.

3.2.1 Sustainability of project outcomes

Outcome 1: Increased Water Availability and Erosion Control through Groundwater Recharge, Rainwater Harvesting, Irrigation and Soil and Water Conservation Measures

Finding 1: Sustained improvements in water access and soil quality are perceived as having significantly supported agricultural and household needs. However, the quality of water infrastructure and persistent maintenance issues, if left unaddressed, pose risks to the long-term sustainability of outcomes.

Water Availability

The evaluation team undertook direct observations of water management structures during transect walks in three project sites[27] and collected the perceptions of water management structure users through FGDs in two additional sites.[28] These have been a significant source of data for informing the development of sustainability findings.

> *"Before the dam, underground and wells were dry. Winter has changed to summer."* – Community beneficiary, Hamelmalo Village
>
> *"We are really happy with the construction of the dam. It's still good, but silt is a problem."* – Community beneficiary, Mezret Village

Thus, the construction of water infrastructure led to sustained benefits for community members. Water management infrastructures constructed through project support, including micro-dams, check dams, diversion structures, reservoirs, and green water harvesting mechanisms, brought continued benefits to community members in terms of improved water access for irrigation, livestock watering, and hygiene. Beneficiaries from all the project sites visited explained that, before the project, there was little to no water in their village, and that they walked anywhere between 2 to 20 kilometers (km) to fetch water and water their animals. Seven years later, water is still available in all five communities. This allows farmers to irrigate their gardens – in dry and rainy seasons alike – which has resulted in increased agricultural yields, with surpluses frequently sold to local markets for increased income (see Finding 2 for more information on agriculture-related outcomes). Beneficiaries also reported using the water for their cattle and to perform household chores like cooking and cleaning. Micro-dams and check dams continue to play a role in groundwater recharge by retaining runoff and enhancing infiltration into surrounding aquifers. According to authorities from the Zoba Anseba, prior to the construction of micro-dams by the project, the static groundwater level was approximately eight meters below the surface. As of 2025, the static water level had reportedly risen to about two meters below the surface, indicating a continued net increase in groundwater levels of six meters, which substantially improves water accessibility for surrounding communities. In addition, the evaluation team noted the presence of surface water from the Anseba river in all three communities where it undertook transect walks to observe water infrastructures (see **Image 1**). This said, beneficiaries in Musha noted that the level of surface water had decreased compared to project completion due to siltation issues, as further discussed below. In Hamelmalo Village, beneficiaries also noted that the siltation had negative repercussions on the surface area of the water.

[27] Project sites include: 1) Hamelmalo Village, Hamelmalo; 2) Fiza, Habero; 3) Musha Shebah, Hamelmalo
[28] Project sites include: 1) Tsa'eda, Habero; 2) Mezret, Habero

Image 1 From left to right: surface water in Hamelmalo Village, Musha Village, and Fiza

Persistent maintenance issues pose important concerns to continued water availability and thus the sustainability of related benefits, especially during the dry season. Maintenance problems with water infrastructures were identified in all five villages. Dam siltation was reported as the most persistent issue across all micro-dams observed. While siltation consistently reduced the effectiveness of the dams, they were reported to remain approximately 25%-30% functional, primarily contributing to groundwater recharge that sustains downstream wells used by farmers for irrigation. In Fiza, solar powered irrigation pumps installed by the project were estimated to be out of use for at least four months because of a defective part, which had yet to be replaced. This resulted in Fiza's water reservoir – installed with project support – to be currently nonfunctional for irrigation purposes, with farmers noting having had to rely on rainwater to sustain agricultural activities. Overall, despite improvements in water access for irrigation, three of five communities[29] still reported experiencing shortages because of maintenance issues, particularly during the dry season.

Image 2 Solar power irrigated pumps and reservoir in Fiza, Habero

Factors contributing to maintenance issues include lack of clear understanding by communities of roles and responsibilities, lack of spare parts availability, and financial resources. Roles and responsibilities for operations and maintenance are defined by the Government, with responsibility lying with the community once the infrastructure has been handed over by the authorities, on the principle that the lowest (i.e., closest to the community) level of authority should be responsible to the extent possible. Community members are responsible for collecting funds to pay for operations and maintenance through village-level committees (e.g., Village Development Committees). If the community is unable to maintain the infrastructure because the funding or technical requirements go beyond their capacity, they must then elevate the issue to the lowest instance capable of addressing it, from the Kebabi, to the sub-Zoba, and the Zoba. However, although the Government has clearly defined roles and responsibilities for maintenance, these have not been effectively disseminated and understood at the community level, resulting in ambiguity regarding whether responsibility lies with the community or with higher authorities. The evaluation team was informed that the process for conveying maintenance requests from the community all the way to the Zoba level is followed; however, information regarding decisions made in

[29] 1) Fiza, Habero; 2) Musha Shebah; 3) Mezret, Habero.

relation to maintenance plans is not systematically conveyed to the community in a timely manner, according to community members consulted. For example, the community administration of the Musha Village informed the Zoba Anseba of dam siltation problems four years ago and a decision regarding the dam's maintenance has yet to be conveyed to the community. Lack of financial resources has been a major factor in addressing dam siltation issues, which are according to the Anseba Administration often costlier than constructing a new dam. There have been discussions regarding whether the Zoba Anseba may construct a new dam instead of maintaining the old one, but the preference of community members as conveyed during FGDs is to maintain the existing one due to its strategic location in the community. In addition to financial resources, the availability of spare parts (e.g., for innovative technologies such as solar powered irrigation pumps) was identified by multiple stakeholders as a key factor hindering routine maintenance and repair.

The quality, suitability, and functionality of water infrastructures have in some instances affected their sustainability. This was observed in two communities. In Fiza, the diversion structure built with Adaptation Fund project support was damaged during a flash flood in 2017, raising questions regarding its quality, suitability, and functionality. It was rebuilt in 2022 with support from the Zoba Administration and community, but community members complained that the new structure did not divert water to where it most needed to go. Additionally, lack of financial resources to implement the planned design of water infrastructures has adversely affected outcome sustainability in at least two cases. In Mezret, initial project design had planned for the construction of two micro-dams and one check dam but one of the micro-dams could not be constructed due to insufficient funding. This, alongside siltation of the existing dam, has resulted in insufficient water for the community during the dry season.[30]

Erosion Control

Continued soil and water conservation activities have contributed to improving soil fertility and reducing erosion. Consulted stakeholders explained that soil erosion continues to be an important problem in the Zoba Anseba due to erratic rainfall. During project site visits, the evaluation team observed numerous terracing activities (see **Image 3**) to reduce erosion and improve soil fertility. The MIHAP integrated package also continues to focus on erosion control through the provision of vegetable and tubercule seeds, whose roots help stabilize the soil. While stakeholders reported that soil and water conservation activities have contributed to improving soil quality, beneficiaries from the Habero Tsa'eda village expressed concerns that water from the dam was salty – a recurrent issue in the Habero sub-Zoba that the project sought to address – which continues to affect agricultural production.

Image 3 Sustained terracing activities in Habero

[30] FDG with project beneficiaries from Mezret, Habero.

Outcome 2: Climate-Resilient Agricultural and Livestock Production Enhanced

Finding 2: Sustained shifts toward diversified, climate-resilient agriculture and livestock production have been enabled, including an expansion of MIHAP, improved agricultural inputs, and changes in livelihoods.

Of the nine project sites covered by the Evaluation, three involved beneficiaries of the MIHAP programme – including one replica.[31]

The introduction and expansion of the MIHAP programme has contributed to sustained agricultural diversification and increased livestock production. There is strong evidence of the institutionalization and expansion of the MIHAP Programme. The Ministry of Agriculture (MoA) expanded the MIHAP from two (Habero and Hamelmalo) to seven sub-Zobas,[32] benefitting a total of 628 hh.[33] In interviews, the MoA has indicated that MIHAP forms an integral part of its Strategy for the Zoba Anseba, and that it has dedicated one focal point per sub-Zoba responsible for overseeing MIHAP implementation, including the selection of MIHAP beneficiaries. Based on FGDs with community members, MIHAP beneficiaries continue to receive the integrated package, which consists of providing 25 hh in a given community one female cow, 25 chicks, fruit trees and vegetable seeds, and beehives. The ex post evaluation found the MIHAP model to be self-sustained, in that each beneficiary is expected to pass on to another community member its first-born cow, resulting in the potential for growth in beneficiaries. For instance, in the Musha Village, from the 25 initial MIHAP beneficiaries, 58 hh are now owners of a cow. All MIHAP beneficiaries consulted by the evaluation team reported substantial benefits in terms of their food and nutrition security as a result of diet diversification. Beneficiaries confirmed consuming regularly a variety of fruits and vegetables, meat, eggs and milk, the latter of which were not formerly part of their diet. Of course, the sustainability of Outcome 1 and Outcome 2 are inter-related, with the availability of water being a pre-requisite to be selected as a beneficiary of MIHAP. As such, water access and soil improvements have been key enablers of sustained agricultural productivity.

> *"It [MIHAP] improved our health. We have honey" – Community beneficiary, Fiza*

Increased agricultural production has contributed to sustained economic gains for some farmers. Among beneficiaries, two types of economic activities were observed among MIHAP beneficiaries: 1) subsistence farming with occasional selling of surpluses at local markets; and 2) small- and medium scale commercial farming. Among beneficiaries, some – but not all – noted selling surpluses at markets**.** For example, in the Hamelmalo village, three of 12 consulted beneficiaries had a garden and sold their products to the market in Keren. Less commonly, others have gained more substantial and consistent economic benefits. Regional authorities from the Zoba Anseba reported that, among the 640 hh benefitting from the MIHAP Programme, 58 have graduated to small- and medium-sized commercial enterprises.[34] In two of three villages with MIHAP beneficiaries, two (Musha and Mahabesh) engaged in commercial farming. Anseba regional authorities explained that farmers participating in the MIHAP Programme supply milk to a collection and processing center, which initially handled 3,000 liters and has since increased its capacity to 6,000 liters. However, persistent problems were raised

[31] These include: 1) Fiza, Habero; 2) Musha Shebah; 3) Mahabesh (replica).
[32] The sub-Zobas include: Habero, Halhal, Hamelmalo, Keren, Geleb, Elabered, and Aditekelezan
[33] *MIHAP Analysis* (2023).
[34] KII

regarding the value chain, including transportation issues. Anseba regional authorities indicated that there is an intent to further support farmers with linkages to markets, including through a potential project.

Continued use of improved, drought-resistant seeds has contributed to enhanced agricultural production. The ex post evaluation identified continued benefits related to improved, drought resistant seeds. As of 2025, the NARI continues to develop and, in partnership with the HAC, test new drought-resistant seed varieties. Yearly, thousands of seeds are still distributed through extension workers, who continue to work with farmers to raise their awareness about the benefits of these seeds and to also teach them proper cropping and irrigation techniques to maximize production outputs. The seeds are being multiplied by farmers and distributed to other farmers, making the model self-sustaining. Authorities from the Anseba regional administration reported that, as a result of continued use of improved seeds, agricultural production in the two sub-Zobas has increased from two quintal per hectare in 2011 to approximately eight to ten quintal per hectare in 2020. The quality of drought-resistant seeds, namely sorghum and pearl millet, was corroborated by farmers consulted through FGDs, who mentioned that the improved seeds were "good and grew fast."

Limited information was gathered on sustained outcomes linked to energy stoves. Of the consulted beneficiaries, only one had received a cooking stove. The beneficiary reported still using it and that it was fuel efficient, requiring few twigs and thereby contributing to at least to some extent to reducing emissions and minimizing twig collection time.

Outcome 3. Improved Climate Risk Information and Climate Monitoring Used to Raise Awareness of and Enhance Community Preparedness to Climate Hazards

Finding 3: Hydromet stations continue to provide climate data, with promising applications in agriculture and research. However, routine maintenance, more structured dissemination, and system integration remain key areas for strengthening.

Hydromet stations continue to generate climate data, though technical issues and limited spare parts constrain their full functionality. Two types of hydromet stations are in use: manual (Class 1) stations that record data mechanically on paper, and automated (Class 3) stations that store data on memory cards. Both collect data on rainfall, temperature, and wind patterns, each covering an area with a 20 km radius. Observations of three of the six hydromet stations confirmed that all are generating data, but two had partial functionality due to broken parts. Maintenance practices varied across stations, with some stocking spare parts in advance while others did not, resulting in a largely reactive rather than proactive approach. This raises concerns about the sustainability of hydromet data collection.

Hydromet data is not yet integrated into a central automated system, limiting its accessibility and timeliness. Automated stations currently record data on memory cards, while manual stations record it on paper, but neither is connected to a central database. Staff from the MoA must physically collect the data, typically only every few months, which reduces the usefulness of the information, especially in real-time. Plans are underway, with potential support from climate finance and UN organizations, to establish a national multi-hazard Early Warning System that would centralize and automate data flows. However, this remains at Concept Note stage.

Climate data has been applied in practice but is used in a fragmented and ad hoc manner. MoA and Meteorological Services disseminate rainfall information nationally and locally, though coverage is partial. Locally, the extension agents use data from hydromet stations to advise farmers on planting schedules and other agricultural decisions, in addition to data from regional offices. However, this process is not systematic, and only

some farmers have benefited from the guidance. This limits the potential of the data to inform broader climate adaptation and agricultural planning.

Hydromet data has also contributed to academic research and capacity development. Data generated by the stations has been used by Master's and PhD students at the HAC to support academic research and teaching. This also demonstrates the unintended value of hydromet data beyond immediate agricultural decision-making, thereby contributing to knowledge generation and research capacity in the country.

Outcome 4. Knowledge Management System Established, and Knowledge Management Activities Implemented

Finding 4: Knowledge management at multiple levels has contributed to behavior change, replication, and farmer engagement, with untapped opportunities for sharing knowledge beyond the Zoba Anseba.

Systematic knowledge transfer at local level is enabled by the extension agents, HAC, and the farmers themselves. The MoA through extension agents has continued to implement farmer field schools and "farmer days" to promote peer learning and good agricultural practices. The evaluation team found evidence during FGD with farmers that they have engaged with their peers to share their experiences, and that this has contributed to farmers understanding the benefits of engaging in climate-smart agriculture and in using improved and drought-resistant seeding. This also convinced new farmers to join the MIHAP Programme. Extension agents have been key in continuing to share knowledge at local level. They continue to engage with farmers in their daily work to share knowledge on terracing, pest control, and climate-smart agriculture. The HAC also plays a fundamental role in producing knowledge – e.g., on good agricultural practices, drought resistance seeds, etc. – which are then transferred to the farmers through the extension agents. Awareness-raising activities continue to increase community understanding of climate change and land protection. As noted under Outcome 3 above, extension agents also share – albeit in an ad hoc manner – climate information to inform crop planting calendars.

Ad hoc knowledge sharing at Zoba level was instrumental in scaling up MIHAP. At the Zoba level, there has been one post-project experience-sharing event (e.g., MIHAP presentation at Regional Assembly), which has enabled the replication of the MIHAP Programme across other sub-Zobas of the Anseba region. However, there may be opportunities to make these experience-sharing events more systematic to accelerate the replication and scaling of good practices.

Nationally, there is a missed opportunity for a more systematic knowledge management agenda that could inform efficient water management and climate-resilient agriculture beyond the Zoba Anseba. At national level, upon project completion, the MoLWE in collaboration with UNDP produced short videos to disseminate knowledge on the Project's strengths and challenges, which were broadcasted nationally and through social media (e.g., YouTube). While it is important to remember that the objective of Outcome 4 was to support knowledge management in the Zoba Anseba, national stakeholders acknowledged in interviews that the government does not have a national knowledge management system to capture lessons learned from post-project activities related to water resources management and climate-resilient agriculture and livestock management. For example, they highlighted that there are no mechanisms in place to know what different Zobas are doing in these areas and the types of lessons that could improve practices across Zobas. Considering the priority that these areas constitute for the government's adaptation agenda, they explained that a more structured knowledge management agenda and related processes is needed. While it is important to consider that Eritrea is composed of different landscapes and that some practices (e.g. terracing or other) may not be

applicable to all regions, there may be scope for other Zobas to learn from and apply good practices that emerged from the project.

International experiences have shaped Eritrea's MIHAP approach, with South-South experiences representing an opportunity for continued learning. The idea of the MIHAP originated from a knowledge exchange between the governments of Eritrea and Rwanda prior to the start of the project. The "One Cow per Poor Family" initiative, launched in Rwanda in 2006, provided a dairy cow to each vulnerable household to improve nutrition, income, and social cohesion. The project supported the introduction of this initiative in the sub-Zobas of Habero and Hamelmalo, while complementing the one cow approach with an integrated package comprising of chicks, forage, fruit and vegetable seed, and beehives. The MIHAP experience in Eritrea has been shared with different countries through a platform hosted by Burkina Faso and organized by the AfDB, as well as at COP29 in Baku, in 2024. This said, in interviews, government stakeholders acknowledged that there were untapped opportunities for them to share successful experiences related to post-project activities, and in turn also learn from other countries, through South–South and triangular exchanges.

Unintended outcomes

Finding 5: The project has contributed to several unintended or broader outcomes, particularly in relation to energy access, food diversity and sedentarization. While many have been positive, some have been more nuanced or challenging to sustain, with maintenance a notable shortcoming.

Socio-economic benefits of household solar systems emerged as an important positive unexpected outcome, which turned into a negative unexpected outcome when benefits were taken away. The project supported the introduction of 748 hh solar systems (including panels and batteries) across all beneficiary communities. The evaluation team consulted with women and men beneficiaries from Habero Tsa'eda village, which received a total of 390 such systems. The solar household systems had multiple unexpected benefits. A tangible benefit had been the prevention of deforestation, as the need to cut trees for lighting purposes had been significantly reduced. Unexpected economic benefits were also reported by beneficiaries, who no longer had repeatedly to pay five Nakfa to charge their cell phones. But the most important benefit reported by beneficiaries was that solar systems allowed them to have light during night hours, enabling family interaction beyond daylight hours and allowing children to study into the night. Beneficiaries also report families gathering multiple systems to generate light at night for community rituals and celebrations, contributing to strengthening intra-communal relationships. However, during the site visit to Habero Tsa'eda, the evaluation team was told that 350 of the 390 solar systems had maintenance issues and were no longer functional because the batteries had died (in line with the batteries' usual five-year lifespan; one had reportedly even exploded). On the one hand, consulted beneficiaries explained they had not been told about maintenance requirements for the solar systems and expected local authorities to replace the batteries. On the other hand, local authorities explained that it is the responsibility of local communities to gather the resources to replace the batteries. This reinforces the argument, as explained in Finding 1, that there is an information gap regarding roles and responsibilities for the maintenance of infrastructure and other assets once handed to communities. FGD with male beneficiaries in Habero Tsa'eda indicated that maintenance issues have led to an unintended negative consequence of intra-household tension. Wives and children, who had become accustomed to having light at night, continued to request it after access was lost, but husbands were unable to meet this demand.

Fish farming has emerged as a positive unexpected outcome of the project, providing new dietary benefits to local communities. With support from the Ministry of Marine Resources, micro-dams were used as fishponds

and were managed by local committees, particularly women, enabling households to consume fish regularly – something many had never experienced before. This contributed to diet diversification and the introduction of fish protein, which was highly appreciated by villagers. However, the positive unexpected outcome was not sustained because dam siltation made it impossible to continue fish production in the ponds. This reiterates the significant risk that maintenance issues pose to the sustainability of project outcomes.

The project has contributed to the government of Eritrea's broader strategy of promoting sedentarization by making water and agriculture the foundation of community livelihoods. Interviewees explained that, since the country's independence in 1991, the government has been promoting a sedentarization agenda in the Zoba Anseba, whereby pastoralists have been encouraged to settle down and work the land, effectively becoming agro-pastoralists. The MIHAP Programme introduced with the project's support has become a central element of the government's sedentarization strategy as it provides agricultural packages to help households to engage in subsistence farming with the objective of later transitioning to small- and medium-scale farming. Particularly key to the sedentarization agenda has been the availability of water in communities. Consulted beneficiaries explained that they previously moved in search of pasture and water, but that the availability of permanent water structures has allowed their families to settle, cultivate land, and build new livelihood strategies in the face of climate change. They noted that water access has not only enabled them to engage in farming but also created incentives for them to remain in one place, as settlements with reliable water supply increasingly attract or were accompanied by the provision of public services such as health facilities, schools, transport, and other socio-economic activities. All consulted beneficiaries valued this new livelihood, acknowledging socio-economic and dietary benefits.

> *"We are here because of the dam". – Community beneficiary from Musha Shebah Village, Hamelmalo*

> *"With the project, we learned that going after animals is not the better way and now, we live a better lifestyle by having a garden, cows and milk." – Community beneficiary, Fiza*

Continued relevance of planned outcomes

Finding 6: Project outcomes on water access, erosion control, and climate-resilient agriculture remain highly relevant, aligning closely with Eritrea's national climate adaptation priorities.

Water availability and erosion control remain at the heart of Eritrea's adaptation strategies, which demonstrates the continued relevance of the project's contributions. The 2024 Voluntary National Review (VNR) reports national investments in irrigation expansion, dams, ponds, and terracing as essential responses to erratic rainfall and drought vulnerability. It also emphasizes land rehabilitation and soil conservation as priorities for restoring degraded landscapes and sustaining rural livelihoods. These priorities are in line with the outcomes of the project, which has strengthened water harvesting, erosion control, and watershed management. The 2018 Nationally Determined Contribution (NDC) reiterates this relevance, placing sustainable water resource management and land restoration at the center of Eritrea's climate change adaptation framework. In interviews, both government and community stakeholders emphasized the importance of using water efficiently in response to recurrent droughts.

> *"Each drop of water should be conserved"* – National Government Stakeholder

Climate-resilient agriculture and livestock production are recognized nationally as key to food security and rural development, indicating strong alignment with project outcomes. Both the 2024 VNR and the NDC identify sustainable agriculture as a key element of adaptation, calling for climate-smart practices, expansion of irrigation, and integrated land management to address land degradation and recurrent droughts. The NDC further outlines the importance of strengthening livestock systems to build resilience in rural communities. By supporting climate-resilient agriculture and livestock production, the project has contributed to these areas where Eritrea's national strategies for climate change adaptation place the highest priority, particularly in relation to soil fertility, food security, and household adaptation capacity. Development partners explained that, with 80% of the population relying on land for their livelihood, the continued relevance of project Outcome 2 is high. Government and community stakeholders concurred with this statement, emphasizing the relevance of soil conservation and terracing activities in light of growing rain variability.

2018 NDC Targets

- *Promotion of Conservation Agriculture (Climate Smart Agriculture) in 5% of the cultivable land*
- *Development and promotion of irrigation scheme by 170, 000 ha*
- *Afforestation programme will cover over 36,000 ha*
- *Construction of 90 new dams and 120 ponds*
- *Livestock productivity increased by 75%*

Enhanced climate risk information and monitoring are understood nationally as enabling conditions for adaptation, reinforcing the value of the project's work in this area. The 2024 VNR emphasizes the need for data-driven planning and capacity development to respond to climate variability, while the NDC identifies improved monitoring, evaluation, and information systems as cross-cutting requirements for adaptation success. Both documents frame climate risk information not as an isolated technical intervention, but as a foundation for mainstreaming adaptation into development planning and decision-making. By strengthening climate monitoring and risk information systems, the project has supported these national priorities, aiming for adaptation measures that are informed by timely evidence.

3.2.2 Factors of sustainability

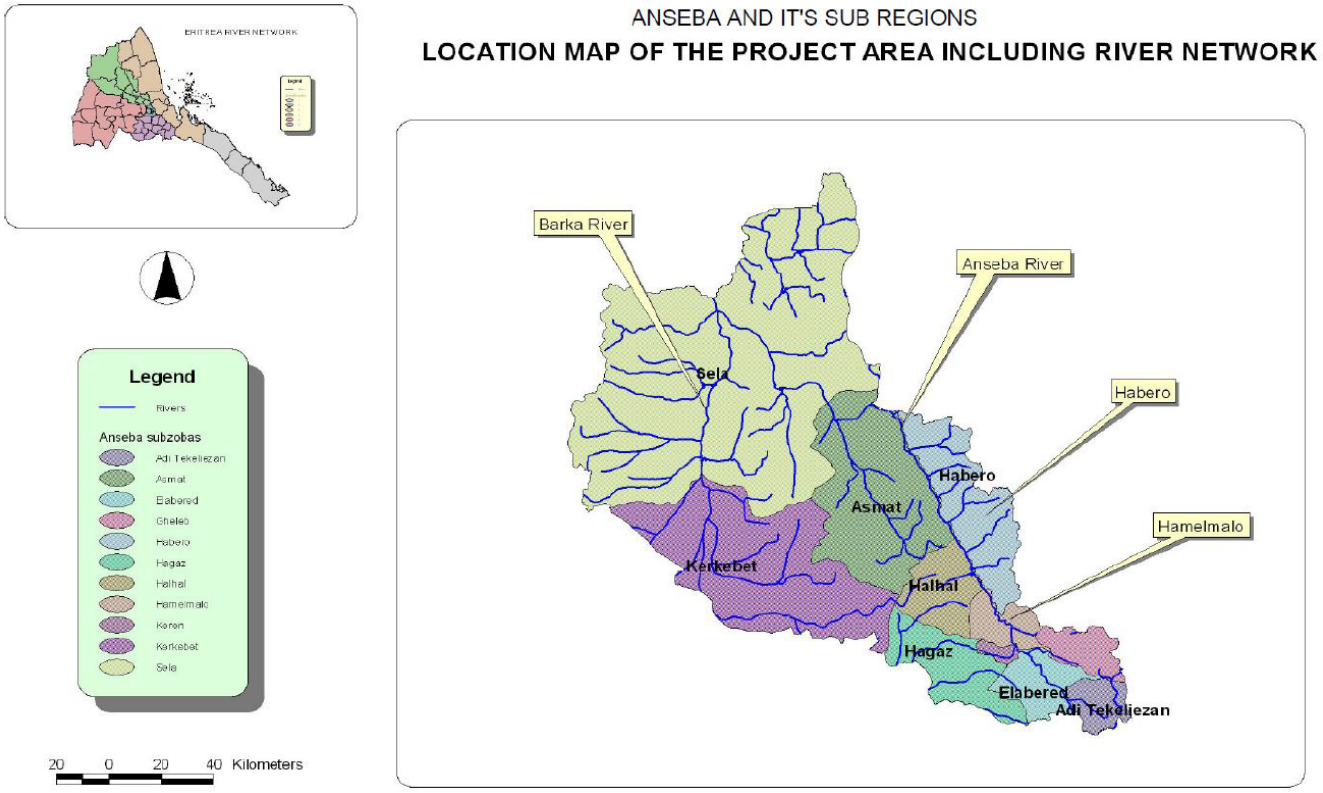
Context: human and natural systems

Finding 7: While growing variability in natural systems is likely to influence the sustainability of some outcomes over time, there is limited possibility of drawing a strong inference between such changes and sustainability at the current time. Some changes in human systems suggest that they are likely already contributing to the sustainability of outcomes, as seen during the ex post evaluation site visit. Broader socio-economic and political trends do not appear to be significant sustainability factors.

Climate Change

While site-specific data was not available or assessed, climate reporting for Eritrea aligns with key risks identified in the Project Document, including a projected continuation in temperature rise, an increase in extreme precipitation events, rising sea levels, and livelihood impacts from climate-driven stress (i.e., flooding and droughts). Thus, while projected changes in natural systems are likely, and are indeed nascent in their emergence, they are noted below, but inferences to sustainability implications could not be made with any degree of significance, scale or confidence.

Figure 3.1 Project location



Source: Adaptation Fund, Request for Project/Programme Funding from Adaptation Fund, p.11.

Figure 3.1 provides a visual snapshot of the project location. Located in the Horn of Africa, Eritrea is a highly drought prone country. Climate risk hazards identified for the country at proposal stage included increased climatic variability, drought, flash floods, and sea level rise. Indeed, the selection of the two sub-Zobas for programme implementation was done based on vulnerability criteria, including related to drought, climate variability and change, and levels of malnutrition.[35]

Anseba is one of six regional administrations in Eritrea, located in the north-west of the country.[36] The Anseba region of Eritrea falls within Köppen-Geiger Climate Classification of "hot desert climate" (1991-2020), with Habero and Hamelmalo characterized by "hot and arid lowlands climate."[37] For the country as a whole, there has been a reported increase of 1.7 degrees Celsius in the mean annual temperature since 1960.[38] Rainy season starts in mid-June and goes through August, with average annual rainfall of 190 mm in Habero and 367 mm in

[35] Adaptation Fund, *Request for Project/Programme Funding from Adaptation Fund [Climate Change Adaptation Programme in Water and Agriculture in Anseba Region, Eritrea]*, 4.
[36] Adaptation Fund, *Request for Project/Programme Funding from Adaptation Fund [Climate Change Adaptation Programme in Water and Agriculture in Anseba Region, Eritrea]*, 8.
[37] World Bank Group, "Eritrea," World Bank Climate Change Knowledge Portal, accessed June 18, 2025, https://climateknowledgeportal.worldbank.org/; Adaptation Fund, *Request for Project/Programme Funding from Adaptation Fund [Climate Change Adaptation Programme in Water and Agriculture in Anseba Region, Eritrea]*, 10.
[38] The State of Eritrea MoLWE, *Third National Communication Under the United Nations Framework Convention on Climate Change (UNFCCC)* (UNFCCC, 2021), 14, https://unfccc.int/sites/default/files/resource/Eritrea%20NC3.pdf.

Hamelmalo.[39] Eritrea's report to the UNFCCC stated that while climate change was impacting surface water and groundwater in dry regions, the Anseba River is an exception to decreasing streamflow, based on the site measured.[40]

Of particular relevance to the assessment of Outcome 1 is the finding of the 2021 Third National Communication Under the UNFCCC, which states that: "In Anseba, there are 34 dams whose water holding capacity varying (sic) greatly. The dam in Habero has a capacity of 90,000 m^3 (sic) is the smallest and the one Mesa-Shebah (Hamelmalo) the largest with a capacity of 600,000 m^3. At present these dams are either fully or partially filled with sedimentation. At a national level, an estimated 35,500 ha of land is under perennial irrigation using water from dams and wells."[41]

Eritrea's Third National Communication under the UNFCCC highlights severe flash flooding between 2006 and 2018, with key factors affecting vulnerability for Zoba Anseba including: "Loss of fertile soil due to erosion, cause pre-harvest losses in various crops, tsese fly in certain villages, livestock movement, dust storms, torrential rains, high temperature, flooding and land degradation, deforestation and loses of biodiversity."[42] The field visit provided some indication of how climate shocks and trends may have influenced the sustainability of outcomes, but there is no clear linkage that can strongly be drawn with available information. In Fiza, flash flooding was reported to have damaged water diversion infrastructure. While stakeholders indicate a general improvement in water availability resulting from project activities, some challenges remain in certain areas, such as sufficient volumes of water, year-round availability, and water quality. Further, as mentioned in previous sections, siltation in dams is a challenge.

Agriculture

The population in Zoba Anseba relies predominantly on agriculture for their livelihood. Livelihood systems in the two sub-Zobas include semi-sedentary livestock-based agro-pastoralism and irrigation-based agro-pastoralism. A key goal of the programme was to support increased food security in Eritrea. This is a critical challenge facing the country, which is described in the Project Document as "the most food insecure in Africa."[43] Similarly, food security is a pressing challenge in the Zoba Anseba, where the programme was implemented, with a major food production deficit in the area. Per the Project Document, the selected sub-Zobas were ranked as being in the top five of 11 sub-Zobas affected by food insecurity, with drought as a major factor.[44]

Changes in human systems have occurred through project activities and also beyond them, with implications for the sustainability of project outcomes. A notable example is the diversification of livelihoods, which as previously reported has enabled households to invest income in further inputs such as seeds or fertilizers, and which has

[39] Adaptation Fund, *Request for Project/Programme Funding from Adaptation Fund [Climate Change Adaptation Programme in Water and Agriculture in Anseba Region, Eritrea]*, 10.
[40] The State of Eritrea MoLWE, *Third National Communication Under the United Nations Framework Convention on Climate Change (UNFCCC)*, xxii.
[41] The State of Eritrea MoLWE, *Third National Communication Under the United Nations Framework Convention on Climate Change (UNFCCC)*, 97.
[42] The State of Eritrea MoLWE, *Third National Communication Under the United Nations Framework Convention on Climate Change (UNFCCC)*, 79.
[43] Adaptation Fund, *Request for Project/Programme Funding from Adaptation Fund [Climate Change Adaptation Programme in Water and Agriculture in Anseba Region, Eritrea]*, 5.
[44] Adaptation Fund, *Request for Project/Programme Funding from Adaptation Fund [Climate Change Adaptation Programme in Water and Agriculture in Anseba Region, Eritrea]*, 4.

the potential to provide a safety net in the case of shocks. Further, project activities have supported a broader government agenda of sedentarization. With such sedentarization, project-specific benefits (in terms of access to water and livelihoods) are likely to persist well into the future, so long as agro-pastoralists in the sub-Zobas remain supportive of the government-directed agenda.

Socio-economic and political trends

As of 2023, Eritrea had a population of about 3.5 million.[45] The Human Development Index (HDI)[46] for Eritrea has increased since project inception, from 0.472 to 0.503; its overall ranking has gone from 165 out of 182 countries with data to 178 out of 193 countries during this period.[47] At project proposal stage, post-independence border conflict with Ethiopia was identified as impacting socioeconomic development, as well as a recurring drought situation in the region. The limited communication and transportation infrastructure outside Eritrea's capital city was noted to "further exacerbate development challenges" in the country.[48] Potential social conflicts over water and land include "increasing conflicting land use pressures, land degradation, and newly established government policies, for example on settling mobile people."[49] Improvements in the transportation network have been made since independence, reaching 15,023 kilometers of road, the majority of which (9,942 kilometers, or 66.2%) are dry weather roads.[50]

At the national level, Eritrea has undergone various changes since the project closure, including the lifting of sanctions, a changing official development assistance (ODA) landscape, and changes in support from international development partners. With the lifting of sanctions in November 2018, this signified the country's emergence from a "decade of international isolation."[51] Further, the World Bank's Eritrea Outlook reports the country's re-engagement with international development partners as strengthening "some bilateral relations" following "an engagement hiatus in 2020"; noted here are the African Development Bank and China.[52] Of note, 2019 saw a sharp increase in ODA inflows to Eritrea (from US$ 84.24 million in 2018 to US$ 265.95 million in 2019). This increase was not sustained with subsequent drops in ODA in 2020 ($61.31 million) and 2021 ($43.95 million).[53]

[45] Numbers vary depending on sources, including UNDP 2025, Eritrea's National Demographic Health Survey, 2002, as cited in Adaptation Fund, *Request for Project/Programme Funding from Adaptation Fund [Climate Change Adaptation Programme in Water and Agriculture in Anseba Region, Eritrea]*, 5. and World Bank Group, "Eritrea.".

[46] The HDI provides an assessment based on "three basic dimensions of human development: a long and healthy life, access to knowledge and a decent standard of living" UNDP, "Eritrea," UNDP Human Development Reports, May 6, 2025, https://hdr.undp.org/data-center/specific-country-data..

[47] UNDP, "Eritrea"; Adaptation Fund, *Request for Project/Programme Funding from Adaptation Fund [Climate Change Adaptation Programme in Water and Agriculture in Anseba Region, Eritrea]*, 5.

[48] Adaptation Fund, *Request for Project/Programme Funding from Adaptation Fund [Climate Change Adaptation Programme in Water and Agriculture in Anseba Region, Eritrea]*, 5.

[49] Adaptation Fund, *Request for Project/Programme Funding from Adaptation Fund [Climate Change Adaptation Programme in Water and Agriculture in Anseba Region, Eritrea]*, 4.

[50] The State of Eritrea MoLWE, *Third National Communication Under the United Nations Framework Convention on Climate Change (UNFCCC)*, 15.

[51] World Bank Group, *Eritrea Outlook* (World Bank Group, 2025).

[52] World Bank Group, *Eritrea Outlook*.

[53] World Bank Open Data, "Net Official Development Assistance and Official Aid Received (Current US$) – Eritrea," World Bank Group, August 25, 2025, https://data.worldbank.org/indicator/DT.ODA.ALLD.CD?locations=ER.

Overall, however, the socio-economic and political factors described above appear not to have as yet significant repercussions on the sustainability of project outcomes, based on feedback from the broad range of consulted stakeholders.

Conditions driving sustainability

Ownership

Finding 8: Stakeholder ownership is widespread and multi-level though stratified, from national government, through Zoba, sub-Zoba, Kebabi and down to village level. Limited input in the design of certain project components has inhibited community-level ownership to a limited extent.

Stakeholder ownership has been evident at all levels, with project activities closely aligned to national policy priorities. The construction of dams and related water management initiatives are consistent with government strategies on food security, climate resilience, and sedentarization, and are embedded in the NDC. Agricultural components, including improved seed distribution, also reflect strong national and regional priorities. MIHAP has also become an integral part of the MoA's agricultural development and livelihood agenda for the Zoba Anseba. The fact that the Government is actively seeking climate finance funding for the construction of a national early warning system also indicates ownership of climate-risk information efforts.

Communities have recognized the value of project outcomes and have actively contributed to their realization. Local ownership has been visible in dam construction, where Zoba and community actors played a key role in sustaining infrastructure. Similarly, farmers have engaged with improved seed distribution and agricultural training, perceiving tangible benefits for food security and resilience. Though not done systematically, efforts by the extension services to analyze and disseminate hydromet data to farmers also show a good level of ownership of climate-risk information.

Community contributions have been central to sustaining project results. Through the work-for-food programme, communities have participated directly in dam construction and agricultural activities, reinforcing their engagement and sense of responsibility. These contributions have strengthened the link between project outcomes and local livelihoods, with benefits perceived by local communities being a key driver of their replication.

Despite strong ownership overall, in some cases community input into water infrastructure design and sitting has been limited. As noted in **Section 3.2.1**, Outcome 1, there are cases – such as in Fiza or the Musha village – where villagers had limited input into project design, which had brought about dissatisfaction regarding the infrastructure and, therefore, affected to some extent the ownership by local communities.

Capacities

Finding 9: Overall, technical capacities are reasonably strong in areas such as dam repair, soil and water conservation, and agricultural knowledge transfer. Concerns remain over capacities to ensure the quality, suitability and sustained functionality of water infrastructures. Capacities for hydromet services and knowledge management are mixed, with some institutional gaps.

Technical capacities for dam repair and soil and water conservation are present, though questions remain about capacities to ensure the quality, suitability, and sustained functionality of water infrastructure. Stakeholders confirmed that the skills needed to maintain and repair water infrastructure exist at local level, and the main persistent constraint is the availability of spare parts. At the same time, the collapse of a diversion wall

in one village raises concerns over engineering design, although the evaluation team was not in a position to fully verify the underlying technical causes.

Capacities for agricultural knowledge transfer are strong, supported by academic institutions and an expanding extension system. The MoA has significantly increased its extension workforce in the Zoba Anseba, from 230 to 440 agents, allowing for a broader delivery of training in soil and water conservation and climate-resilient agriculture. Farmers confirmed that they received practical training and guidance, which has improved their understanding of climate change adaptation and has also increased their ability to engage in more productive agricultural practices, which has in turn increased their agricultural production output, as noted in Finding 2. The HAC has also contributed to building the capacity of extension agents – and consequently farmers - through research on climate-resilient seeds and the roll out of a training manual on climate-resilient agricultural practices. In addition, HAC continues to form Master's and PhD level students on these topics, which indicates the existence of future workforce capacity with strong expertise on climate change adaptation.

Capacities of hydromet services are mixed, with notable gaps in data collection and systematic analysis. Automated and manual stations continue to generate data, but ad hoc collection and weak human capacity limit consistent and optimized use. At the national level, analysis and dissemination are not yet institutionalized, reducing the overall effectiveness of the system.

Institutional capacities for knowledge management remain limited, with no formal mechanisms or dedicated expertise in place. The evaluation did not find evidence of project-specific systematic platforms or dedicated human resources for knowledge management. Instead, knowledge sharing has occurred in an ad hoc manner, such as during farmer field days, indicating reliance on individual rather than institutional capacity. However, the national systems for vertical and horizontal information sharing have been beneficial in contributing to capacity strengthening in ways that favor the sustainability of certain project outcomes.

Partnerships

Finding 10: Sustained outcomes have been enabled by a multi-level national partnership that mobilizes the state apparatus through a 'whole-of-society' approach.

Widespread in-country partnerships at multiple levels and across all four outcomes have proved an essential factor in sustaining outcomes. Across outcomes, partnerships involved several layers of Eritrean society, from national and regional governments to local authorities and community members themselves. Academic institutions and civil society have also been closely involved to support the sustainability of outcomes. The ex post evaluation identified key partnerships in a number of areas, variably discussed below.

Improved agricultural practices (Outcomes 2 and 4): Since the end of the Project, NARI, HAC, and MoA – including its extension services – have worked in close collaboration to generate and disseminate knowledge on climate-resilient agricultural practices and drought resistant seeding. Each partner plays a key role in this process. Each year, NARI works on developing new varieties of drought resistant seeds, which are later tested and distributed to farmers through HAC. Through the project, HAC developed a training manual on climate-resistant agriculture and continues to offer a training course on seed production technologies. This knowledge is then disseminated periodically to farmers through the MoA's extension agents.

Good practice exchanges among farmers (Outcomes 1, 2, 4): The farmers themselves have developed an informal partnership through gatherings such as "farmer days." Information gathered through FGD with farmers that have participated in post-project activities indicates that, during these events, farmers share their positive experience

in relation to efficient water management and climate-resilient agriculture with other farmers, which has prompted these to engage in similar activities.

Climate information monitoring (Outcome 3): MoA, MoLWE, and Meteorological Services work together to collect and analyze hydromet data. Local branches of MoA gather the data from stations and share it centrally with the MoLWE and Meteorological Services, where it is analyzed and broadcast nationally, though this is done in an ad hoc manner. Extension agents of MoA play an integral role in this partnership by relaying climate information to farmers to inform and support agricultural decision-making.

Local governance and decision-making (Outcome 1 and 2): Local committees, such as the Village Development Committees, Water, Sanitation and Hygiene (WASH) committees, and the Kebabi, as well as their local administrators, have played an instrumental role in continued oversight and decision-making in relation to post-project activities, including operations and maintenance. These bodies play an instrumental role in maintaining and reporting issues associated with water-related infrastructures. These committees, along with local branches of the National Union of Eritrean Women (NUEW), play an instrumental role in selecting MIHAP beneficiaries and in providing oversight of its implementation.

Resources/Assets

Finding 11: The Adaptation Fund supported project is one of a number of projects in Eritrea that have worked to address key topics relating to climate change, food insecurity, livelihoods, and natural resource management. There is some indication of subsequent projects building on or planning to build on components or lessons from the Adaptation Fund supported project, which itself can be seen in the context of a wider compendium of investments.

There are some examples of continued government support after project closure, supporting the sustainability of project outcomes; however, this was not ubiquitous across project sites. As discussed in **Section 3.2.1**, Outcome 1, responsibility for maintaining infrastructure lies with the community after hand-off by authorities, with certain circumstances (e.g., when additional funding or technical requirements beyond communities' capacities is needed) resulting in the elevation of a particular challenge to a higher level of authority. Post-project government support has been both financial and non-financial. In Hamelmalo, project beneficiaries report that a foot pump was provided to pull water out of the well. In Mezret, a second dam was constructed using "reserve funds" to take the place of the dam built by the project, which had functionality issues. Further, an increase in the number of MoA Zoba Anseba extension workers has been reported since 2018; notably, from 230 to 440. In at least one reported case (Musha Village), ongoing maintenance challenges related to dam siltation have been reported but not yet addressed through subsequent increases in resources.

Project activities have contributed to improved agricultural productivity, leading to the generation of additional resources that have been used by some farmers to sustain outcomes. For example, increased agricultural production has been reported; data provided by the government states that seed production increased from two quintal per hectare in 2011 to 8-10 quintal per hectare in 2020, with the adoption of improved seeds. Some project beneficiaries reported increased productivity as a result of water availability, which has allowed nearly year-round gardening (in at least the village that was visited). In addition to providing food for subsistence, project activities have in some cases enabled the sale of surplus food at market, with some beneficiaries reporting that income has been reinvested for seeds, pesticides, fertilizer, or machinery, as well as to cover feed for animals and other expenses. In addition to contributing to income, it was also reported by some beneficiaries in Habero Tsa'eda village that while previously they had to pay for water, the dam made this no longer necessary.

Beyond (and in select cases, within) the specific project sites, there is clear evidence of an intent to scale up and replicate certain project components. Additionally, in project planning, there is a purposeful approach within ministries to identifying needs and pursuing resources in alignment with objectives. The project has been referred to as the UNDP model, with the regional administration requesting technical teams "to familiarize themselves with the project for upscaling and replication throughout the region."[54] This is most evident in the expansion of MIHAP programming, though thematic linkages with subsequent projects are also noted.

For example, the African Development Bank's (AfDB) "Drought Resilience and Sustainable Livelihoods Programme – Project V" (DRSLP V, 2019-2025) builds on and scales previous and ongoing DRSLP programing in the country, including DRSLP II (2014-2020) and DRSLP IV (2017-2021). It shares several common themes with the Project, including a focus on infrastructure development and natural resource management, and livelihood diversification. Additionally, the project has one component with MIHAP programme activities targeting 1,500 hh. While not explicitly mentioning the Adaptation Fund project, the DRSLP Project Appraisal Report indicates that the project considered lessons from thematically relevant projects in the region. Intent to incorporate MIHAP in programming is also noted in IFAD's Integrated Agriculture Development Project (2020-2028). Finally, a 2023 MIHAP analysis report reveals an extension of the MIHAP programme to five sub-Zobas beyond Habero and Hamelmalo, benefiting a total of 628 families across the seven sub-Zobas.[55] The MIHAP programme approach is reportedly institutionalized in the MoA.

Other thematic similarities with subsequent projects in the region and country have also been identified. For instance, UNICEF has worked in communities supporting WASH, including the development of rural water supply systems. The organization reportedly funded a new dam in Habero Tsa'eda village, which is used for drinking water. Further, a 2022 Global Environment Facility (GEF) funded[56] and MoLWE executed project "Building Community Based Integrated and Climate Resilient Natural Resources Management and Enhancing Sustainable Livelihood in the South-Eastern Escarpments and Adjacent Coastal Areas of Eritrea" references a range of initiatives with considerations for collaboration/ building on these – the Adaptation Fund project is referenced specifically, with the intent that "The GEF-LDCF project will coordinate with this AF project to integrate lessons learnt and successful practices into the project design and implementation."[57] The Food and Agriculture Organization of the United Nations (FAO) is among other active entities in Eritrea working on thematically relevant topics, with funders including GEF, the GCF, and Central Emergency Response Fund (CERF), as well as bilateral funders.

3.2.3 Sustainability rating

Based on the sustainability analysis conducted and presented throughout this ex post evaluation report, **Table 3.1** presents a snapshot of the overall sustainability ratings per outcome. Overall, it bears noting that a Moderately Satisfactory (MS) overall sustainability rating applies to the Adaptation Fund supported project, seven years after closure.

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[54] Adaptation Fund, *Project Performance Report (PPR) [Climate Change Adaptation Programme in Water and Agriculture in Anseba Region, Eritrea]*, Project Performance Report October 2014 (2015).

[55] *MIHAP Analysis*.

[56] There are also two other GEF projects implemented in Eritrea, including: (1) Mainstreaming climate risk considerations in food security and IWRM in Tsilima Plain and upper catchment area, and (2) Restoring degraded forest landscapes and promoting community-based, sustainable, and integrated natural resource management in the Rora Habab Plateau, Nakfa sub-Zoba, Northern Red Sea Region of Eritrea.

[57] Global Environment Facility, "Building Community Based Integrated and Climate Resilient Natural Resources Management and Enhancing Sustainable Livelihood in the South-Eastern Escarpments and Adjacent Coastal Areas of Eritrea," Global Environment Facility, August 14, 2022, https://www.thegef.org/projects-operations/projects/10789.

Table 3.1 Outcomes and sustainability ratings

Outcome	Description	Sustainability Rating[58]	Ownership	Capacities	Partnerships	Resources
Outcome 1. Increased Water Availability and Erosion Control through Groundwater Recharge, Rainwater Harvesting, Irrigation and Soil and Water Conservation Measures.	• Continued improved water availability and soil conservation • Reduced women's water-fetching burden • Strong MDB and MoA partnerships • Limited maintenance funds for dams • Mixed engineering capacity for infrastructure • Good community and government ownership	**Moderately Satisfactory (MS)**				
Outcome 2. Climate-Resilient Agricultural and Livestock Production Enhanced.	• MIHAP expansion from 2 to 7 Zobas • Increased yields, income, and diet diversity • Government investment in human resources • Effective partnerships for seeds and practices • Strong MoA and academic technical capacity • High ownership at all levels	**Satisfactory (S)**				
Outcome 3. Improved Climate Risk Information and Climate Monitoring Used to Raise Awareness of and Enhance Community Preparedness to Climate Hazards.	• Sustained system but with partial functionality • Data sharing and analysis inconsistent • Limited resources, spare parts a concern • Planned investment for integrated system • Partnerships support data use for farming, but inconsistently • Strong government ownership and scale-up plans	**Moderately Satisfactory (MS)**				
Outcome 4. Knowledge Management System Established, and Knowledge Management Activities Implemented.	• Continued knowledge management drove behavior change • Opportunities to expand sharing beyond Anseba • Some KM resources, no dedicated budget • Farmer exchanges support replication • Strong local ownership of awareness efforts • Institutionalization of knowledge management through MIHAP and extension services	**Moderately Satisfactory (MS)**				

[58] See Annex 9 for the rubric defining sustainability ratings as per the ExPost-EAI. To assign a rating, the rubric assesses the extent to which resources across factors of sustainability are 'sufficient'. This table identifies this for each factor, using a three-color code system, as follows: green means 'sufficient'; yellow means 'moderately sufficient'; and red means 'insufficient'.

3.3 Resilience

This section explores how sustained adaptation outcomes, and their enabling factors support the system's resilience.

3.3.1 Scale

Finding 12: There are conditions in place to heighten the responsiveness of the project sub-Zobas and their communities. However, the functionality of some systems to enable timely and adequate responses to shocks are undoubtedly constrained by significant and persistent maintenance issues.

There is evidence that the project has had a positive influence on the spatial scale of certain project areas. This is seen, for example, in reports on increased groundwater levels (as reported in Section 3.2.1, Outcome 1) and reduced soil salinity accompanied with agricultural production (as reported in Fiza). In Hamelmalo, beneficiaries report significant environmental changes, including the regeneration of trees and the availability of water for livestock and gardens.

Through the project, support for livelihood diversification has the potential to influence the temporal scale of response to adverse climate events, including access to financial resources or other safety nets. As discussed in Section 3.2.1, Outcome 2, project beneficiaries report increased access to food for subsistence, and in some cases for sale to market, alongside the generation and sometimes reinvestment of income. Success stories from MIHAP include replication to other villages and scaling within villages, for example through the dairy cow "pass on process" (see Section 3.3.2).

Limitations to the project's influence on both temporal and spatial scales are observed. Specifically, the meteorological stations established by the project do not yet appear to operate in a manner that would allow them to provide information rapidly and systematically to farmers (e.g., to act as an early warning system), though this is reportedly to be addressed through another project. Regarding spatial scales, consistent water availability has been constrained in some cases by siltation and issues encountered with technologies (e.g., solar powered pumps), with maintenance a common challenge.

3.3.2 Redundancy

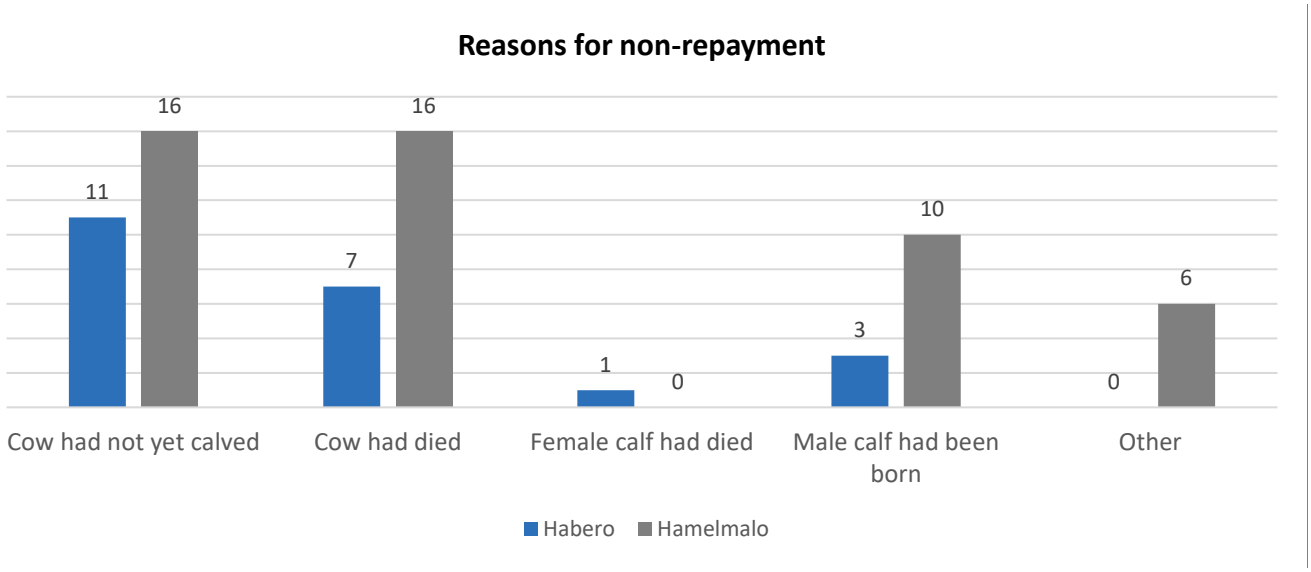
Finding 13: The creation of livelihood opportunities has offered communities new resources to withstand shock. Additional national resources for adaptation also help the population to better prepare for climate-related events. However, maintenance issues limit the degree of community preparedness.

A key contribution to resilience to climate risks is the diversification of livelihoods, supported by enhanced agricultural and soil productivity[59] and the introduction of new activities through MIHAP. This has resulted in increased food availability for household consumption/subsistence and for sale at market. Beneficiaries have also reported reinvesting their income in some cases, e.g., to purchase a motor pump, buy seeds and secure other inputs.

[59] In Fiza, for example, a stakeholder reported that water diversions helped reduce soil salinity and support agricultural production on soils where food was not grown previously.

The extent to which outcomes have contributed to increasing the availability of resources, means, or options, or created new ones, to support resilience to climate risks has, however, been found to be variable, both between and within outcomes. Livelihood diversification, supported by the MIHAP programme, includes the dairy cow "pass on process," where the first-born cow is given to another household, and the bulls are sold for beef. One village which had 25 farmers benefiting from the programme now has 58 farmers in the community who have a cow. Reporting on the MIHAP programme, not specific to this project, does however indicate variable outcomes across this and other activities. For example, in Habero and Hamelmalo specifically, a MIHAP programme survey analysis reports that 28/48 recipients of dairy animals in Habero and 28/67 recipients in Hamelmalo had not repaid their loans at the time of the survey, with key reasons for non-repayment including that the cow had not yet calved (11/20 in Habero and 16/39 in Hamelmalo), that the cow had died (7/20 in Habero and 16/39 in Hamelmalo), that the female calf had died (1/20 in Habero), that a male calf had been born (3/20 In Habero and 10/39 in Hamelmalo) and "other" reasons (6/39 in Hamelmalo) (see **Figure 3.2**).[60] Despite this, a majority of respondents in these sub-Zobas (32/48 in Habero and 45/67 in Hamelmalo) responded "yes" to having benefited from the dairy animal, with money and food reported as primary benefits.[61]

Figure 3.2 Reasons for non-repayment of loans, MIHAP survey



Source: MIHAP Analysis, p.42-43

While specific instances of outcomes supporting resilience to climate risks were not explicitly noted during stakeholders' consultations, it can be inferred that increased and diversified income and agricultural productivity/ food availability likely supports resilience. However, there are also some key barriers that may stand in the way of community preparedness/ resilience, as discussed in prior sections. These include infrastructure maintenance, whereby some dams and other project infrastructures have encountered issues and are not operating optimally (see **Section 3.2.1,** Outcome 1), and animal health and productivity, as noted above and in the 2023 MIHAP Analysis report.

[60] *MIHAP Analysis*, 42–43.
[61] *MIHAP Analysis*, 46.

In the case of MIHAP, the 2023 MIHAP Analysis report also reveals an extension of the MIHAP programme to five sub-Zobas beyond Habero and Hamelmalo, benefiting a total of 628 families across the seven sub-Zobas.[62] Sub-Zobas with MIHAP programme implementation were identified as: Aditekelizan, Elabered, Geleb, Habero, Halhal, Hamelmalo, and Keren. While this expansion is noteworthy, it also constitutes a small proportion of the population in these areas.[63]

3.3.3 Diversity & inclusion

Finding 14: Evidence indicates sustained participation and leadership of women in post-project activities, a shift away from burdensome water fetching responsibilities, and improved school attendance among children. Continued engagement of women's organizations as well as women's presence in sub-national government roles reflects a good measure of institutionalization of equitable participation in post-project activities.

Women have sustained participation in post-project activities, with economic opportunities assessed to be moderate. Women continue to benefit from agricultural extension services and soil and water conservation programs. In the Fiza village, for example, 121 of 200 beneficiaries of extension services are women, and in another, 12 members of the local branch of the NUEW were reported as participating in the MIHAP programme, with testimonies that this has improved their livelihoods. Nonetheless, women's participation has not been fully equal to that of men, with only 22.2% of MIHAP beneficiaries being women. FGDs also revealed that while some women manage home gardens and generate income, men remain the majority of direct beneficiaries. Consulted beneficiaries (women and men alike) reported that income from these activities is usually shared equally within the family.

Improved water access has shifted responsibilities away from women and children and contributed to higher school attendance. Before the construction of dams in the community, women and children walked several km to fetch water, limiting women's available time and contributing to absenteeism among school-aged children. With water now available in the village, this has shifted the burden of responsibility of women away from fetching water and affording them more time for household, agricultural, income-generating and other activities. Across project sites visited by the evaluation team, there are strong indications from beneficiaries that children's school attendance has improved as a result.

The NUEW has remained actively involved in post-project activities. In particular, it has been part of the committees selecting agricultural programme beneficiaries, ensuring continued representation of women in decision-making processes at the local level. This ongoing role signals the institutionalization of women's participation beyond the project period.

[62] *MIHAP Analysis*.

[63] The population of these sub-Zobas has been identified as follows: Aditekelizan: 45,655 (37 villages); Elabered: 68,119 (55 villages); Geleb: 48,417 (39 villages); Habero: 65,328 (36 villages); Halhal: 71,441 (29 villages); Hamelmalo: 37,738 (41 villages); Keren: 106,602 (52 villages). From Annex 1 summary population table: Ministry of Health Eritrea, *Ministry of Health of Eritrea National Master Plan for Neglected Tropical Diseases 2015-2020* (n.d.), https://espen.afro.who.int/sites/default/files/content/document/ERITREA_NTD_Master_Plan_2015_2020.pdf.

Women are also present in sub-national government and technical positions that advance post-project activities. Consulted stakeholders reported women in climatology services, hydromet stations, agricultural extension, and university research roles, as well as in Kebabis and Village Development Committees. This reflects a broadening of women's engagement from direct participation as beneficiaries to leadership and institutional roles in relation to sustained outcomes.

Finding 15: Power dynamics within households and communities have shifted in both positive and challenging ways as a result of the variability of sustained outcomes.

Community-level tensions over water between communities have diminished as a result of improved access from dam construction. Before the project, community members fetched water from neighboring villages, a situation that sometimes led to disputes due to access and scarcity. With the construction of dams, water is now accessible locally to all, and these conflicts have reportedly largely subsided.

Cattle-sharing arrangements have fostered stronger relations among neighbors. Under the MIHAP programme, a farmer who received a cow is expected to transfer the first-born female calf to another household. This practice has helped build solidarity and mutual support, reinforcing community-level cohesion.

Intra-household collaboration has improved as families continue to engage in joint activities. Beneficiaries consulted through FGDs reported that husbands, wives, and children have been working together in post-project farming and land management, contributing to more cooperative family dynamics.

At the same time, the loss of solar energy benefits has reportedly contributed to triggering some tensions within households. As previously discussed in **Section 3.2.1**, Unintended Outcomes, families who had relied on solar systems for lighting experienced frustration when the systems stopped functioning due to the failure of batteries. Women and children, having grown accustomed to having access to light in the evening, requested it from husbands, who have been largely unable to provide it. This unfulfilled demand has reportedly contributed to triggering tension among family members.

3.3.4 Connectedness & feedback loops

Finding 16: The project has contributed to sustaining institutional and community capacities to engage in climate risk response, though gaps in information flow and unclear responsibilities continue to limit full adaptive effectiveness.

There is partial information flow between villages and government administrations. As discussed in **Section 3.2.1**, Outcome 1, there are clear communication channels for reporting issues from community to Kebabi, sub-Zoba and Zoba levels. However, this is not always a timely process and there is more limited clarity around long-term maintenance plans.

Government bodies were found to disseminate only partial information related to climate risks. As discussed in **Section 3.2.1**, Outcome 3, hydromet stations continue to generate data, but two of the three stations observed during the field visit have only partial functionality. Also, climate information is not systematically collected and shared in a timely manner.

Organizations involved in the project (notably HAC, NARI, NUEW) have maintained their capacity to engage in post-project activities. Extension agents remain involved in communities, providing support to farmers and in some cases sharing analysis from the meteorological stations, which are managed by the HAC. HAC is also actively engaged with Zoba Anseba and MoA, as well as other partners, on seed varieties.

4. Conclusions

Seven years after completion of the climate change Adaptation Fund project in Eritrea, the sustainability of project outcomes is assessed to be Moderately Satisfactory. One of the most notable sustained outcomes is the continued availability of water in all communities visited by the evaluation team, enabled by the micro-dams, check dams, diversion structures, and water harvesting systems developed with project support. While maintenance issues have reduced water availability during the dry months, the micro-dams have nonetheless enabled smallholder farmers to cultivate crops and water their livestock throughout most of the year, something that was not possible before their construction. Irrigation water has allowed community members to engage in subsistence farming, contributing to diet diversification and improved health outcomes, with some also selling surpluses to local markets for income.

At ex post evaluation, sustained outcomes related to climate-resilient agriculture and livestock production are also evident, with an expansion of the MIHAP programme and an uptake of drought resistant seeding among farmers. Continued and widespread soil and water conservation activities have proved essential in mitigating erosion and improving water quality, both of which have been key to enhancing agricultural productivity. Considering the environmental threats that increased climate variability and erratic rainfall represent in Zoba Anseba's mountainous terrain, there are no doubts that the outcomes to which the Adaptation Fund project contributed continue to be highly relevant. Continued relevance is also the outcome on climate risk information and monitoring, but persistent gaps in data collection, analysis and dissemination pose an ongoing risk to outcome sustainability.

If left unaddressed, significant and persistent maintenance issues are likely to adversely affect outcome sustainability. Despite continued water availability in all communities visited by the evaluation team in large part because of improved groundwater recharge, widespread maintenance issues – including dam siltation and malfunctioning of water pumping technologies – dams and water reservoirs are not functioning to their full capacity, which has resulted in some water shortages to address all irrigation needs. Routine maintenance was also an issue in two of three hydromet stations observed by the evaluation team. While technical expertise to fulfill maintenance requirements is generally present, lack of financial resources and spare parts availability are a major and ongoing impediment. But most importantly, even though procedures delineate roles and responsibilities for infrastructure maintenance and repair among communities, Kebabis, sub-Zobas, and Zobas exist, the threshold at which a certain level should take responsibility is not always well understood among community members, pointing to a need for clearer communications across levels, and particularly to the village level. Beyond this, clear operations and maintenance plans with associated budgeting to ensure the long-term sustainability of water infrastructures and other assets were not embedded in design, resulting in authorities sometimes taking years to figure out how to address maintenance issues – even in some cases pondering whether to repair existing assets or build new ones.

The project has contributed to fundamental and transformative changes in the lives and livelihoods of beneficiaries; but when benefits were not sustained, some tensions have emerged. Access to a sustained, year-round water supply in villages has been posited as a solution to pastoralists' search for water and pasture. Part of a broader constellation of projects that contributed to the government's sedentarization agenda, the project has supported the government's efforts to transform the lives and livelihoods of communities and beneficiaries, enabling the adoption of newly sedentary livelihoods and cultures, by becoming smallholder farmers and

working the land all year long, as agro-pastoralists. Combined with sustained water access, the provision of agricultural inputs through the MIHAP programme and climate-resilient technologies played a fundamental role in enhancing agricultural productivity in a largely semi-arid region with challenging conditions for cultivation. Consulted beneficiaries expressed recognition of the value such changes ushered in, especially in terms of diet diversification and health benefits reaped from gardening; with the related benefits of having access to social, healthcare and educational services in their communities. Sustained water access has also had an important impact on the lifestyle of women and children, by shifting women's responsibility burden away from fetching water and by freeing children's time, resulting in increased school attendance. Household solar systems also brought about fundamental changes in the lives of villagers, enabling children to study longer hours and allowing for family and community activities into the night. However, when this benefit was taken away, it was reported that tensions emerged among family members, who had grown accustomed to this new lifestyle.

MIHAP is an innovative self-sustained model with strong replication potential, which could be further strengthened by enhancing linkages to markets. The sustained benefits of the MIHAP programme among community beneficiaries are clear. Through its integrated package, beneficiaries have sustained and grown their agricultural activities, ensuring year-round access to diverse foods, from protein sources like meats, milk and eggs to fruits and vegetables that provide essential micronutrients. The self-sustaining model of the integrated package, through which the first-born cow is passed on to another villager, contributes to the multiplication of benefitting households with few financial investments. The government has undertaken the potential of this approach and has invested human resources for its institutionalization and replication to four additional sub-Zobas in the Zoba Anseba, reaching a total of 640 beneficiaries across all seven sub-Zobas. The model has clear potential for economic benefits, with 58 of these households having graduated to small- and medium-scale enterprises. Still, the contribution of enhanced economic opportunities to farmers' resilience and adaptive capacity is relatively small when compared to the size of the population, with meaningful impact requiring a faster replication and scaling of the model. Incipient efforts to enhance farmer-to-market linkages are a positive step towards this acceleration.

Knowledge management at multiple levels has been a fundamental element of sustainability, but a more structured and intentional learning agenda represents an unprecedented opportunity to accelerate and replicate sustained outcomes. Knowledge sharing, particularly at local level through extension services and among farmers themselves, has been fundamental in enabling the uptake and replication of good climate-resilient agricultural practices. Ad hoc knowledge sharing events have also proved key to the replication of the MIHAP programme from Hamelmalo and Habero to other sub-Zobas of Zoba Anseba. Mindful that knowledge management outside Zoba Anseba was beyond the project's scope, there may be opportunities for lessons learned and good practices to inform climate change adaptation practices more broadly, always mindful of contextual differences. In this sense, a more structured and intentional approach to knowledge management, with clearly defined objectives and responsibilities at different levels of the government, could facilitate an expansion of sustained successes, including the MIHAP programme. Born out of South-South exchanges, the MIHAP programme is an example of how South-South and triangular cooperation can inform good climate change adaptation. It provides an argument for making these opportunities more widely available; both to the benefit of Eritrea but also to other countries, which can learn from Zoba Anseba's successes to enhance their resilience and adaptive capacity to growing climate change threats.

Strong ownership of the project by government and community-based stakeholders, combined with a multi-level and whole-of-society partnership, has contributed to the human and technical capacity as well as

financial resources that are needed to sustain project outcomes. Strong ownership of project outcomes by government stakeholders – as demonstrated through the integration of key project components such as MIHAP, terracing, efficient water resources management, and climate-resilient agricultural practices into national strategies and programmes – as well as ownership by villagers, evidenced through sustained community contributions – have been key factors of sustainability. Partnerships with national and academic institutions – for example, in developing drought-resistant seeds and other climate-resilient agricultural tools – and with local extension services to raise awareness and disseminate knowledge, have been key to villagers' uptake of these practices. This uptake has, in turn, strengthened their resilience and adaptive capacity. The partnership base is also evident at the community level, with local committees such as Village Development Committees playing a fundamental role in decision-making related to project components and the sustainability of their outcomes. While this strong partnership base has generally brought together the required technical capacity to sustain and even expand outcomes, financial resources remain a major gap hindering sustainability. Development cooperation with key partners such as the AfDB and climate finance institutions offer promising opportunities to sustain and even scale up outcomes related to water resources management, climate resilient agricultural production, and early warning. Still, there may be room to further capitalize on community contributions as a fundamental resource to sustain outcomes.

5. Lessons Learned and Corresponding Recommendations

This ex post evaluation raises a number of key lessons learned and recommendations for the design and implementation of future climate adaptation projects. Recommendations are targeted at the implementing entity (UNDP), the government, and the Adaptation Fund. There is also a recommendation targeting the AF-TERG, aimed at supporting continued improvement of its ex post evaluation methodology.

5.1 For Adaptation Fund IEs, project developers and project managers

Lesson #1: The sustainability of assets such as water management infrastructures and hydromet stations require ongoing maintenance and repair. A clear definition of the specific roles and responsibilities of each stakeholder, from communities, to Kebabi, sub-Zoba and Zoba levels, is fundamental. Equally important is communication to all stakeholders regarding expectations of their involvement in this process. Effective maintenance and repair also require clarity over the financial resources and spare parts required as well as a clear plan for mobilizing these resources.

Associated Recommendation #1: Develop and deploy clear operations and maintenance (O&M) plans for all physical assets of projects, already within project design.

- For each water-related infrastructure developed and delivered to communities, a clearly articulated O&M plan should identify timebound activities for the routine maintenance of infrastructure.
- The plan should specify roles and responsibilities for each implicated societal and organisational structure (i.e. village, Kebabi, sub-Zoba, Zoba).

- The plan should include a realistic budget for O&M activities, and a clear articulation of distributed responsibilities for covering said expenses. A resources mobilization plan (including for how to mobilize community resources) should be tied to the planned budget.
- The planned budget should also include estimates of spare parts and replacement costs. The sourcing of spare parts should also be identified in a timely way, to avoid significant and lengthy service disruptions. This could include, for example, the establishment of long-term agreements with suppliers as well as the stocking of spare parts.
- The O&M plans should be socialized with all implicated parties (i.e., Village Development Committees, Kebabis, sub-Zobas, Zobas, etc.) at all levels, as part of early project socialization efforts. Responsibilities, compliance indicators, and reporting responsibilities should all be clearly articulated therein.

5.2 For the Eritrean and other Governments implementing projects in similar thematic areas

Lesson #2: Livelihood and income generation opportunities from climate-resilient agricultural and livestock management activities can provide important socio-economic and health-related benefits to smallholder farmers and their families. In addition to purchasing additional food items and school supplies, and to pay for any health expenses, the income generated through these activities can be used by farmers to reinvest in agricultural inputs and expand farming activities. In some cases, increased income can also be reinvested into farms, allowing small businesses to further grow their productivity while also generating local demand for employment. However, this requires farmers to have strong capacity to market their products while also ensuring food safety. In this process, opportunities also exist for women to become economically empowered by contributing to food processing and marketing.

Associated Recommendation #2: Develop an enabling environment for agricultural market development and provide technical, financial and administrative support and guidance to MIHAP programme farmers, to favor the successful development of their agro-entrepreneurship. This process should also ensure opportunities for women's economic empowerment.

- Continue and expand the partnership with FAO related to linkages to markets. Such support could include technical training for farmers on food storage and packaging and, with a focus on ensuring food safety.
- Ensure logistical support for food transportation, including the cold chain, to local markets or food processing centers.
- Support the development of small business plans, including provisions for income reinvestment into agricultural inputs and business expansion objectives with clear productivity monitoring indicators that are accompanied by incremental targets.
- Promote women's economic empowerment by expanding their roles in food processing and related value-added activities. This should include technical training in areas such as fruit jam production. Food processing could also be linked to the development of local restaurants, where women can establish and manage businesses, create recipes, and thereby generate local economic activity. Such initiatives would not only strengthen livelihoods but also foster spaces for community interaction. Supplying these women with functional solar systems could provide the necessary lighting to support the development of a local food service industry.

Lesson #3: Knowledge management is fundamental to the identification and sharing of good practices on water resources management and climate-resilient agriculture. Knowledge management can take different shapes and forms, from South-South cooperation to political dialogues/encounters – which led to the development and replication of the MIHAP, respectively – to awareness raising and training provided by extension agents to farmers. But for knowledge management to have a meaningful effect on climate change adaptation objectives by informing the widespread uptake of good practices through replication and scaling up, an intentional learning agenda with clear objectives and learning mechanisms is needed.

Associated Recommendation #3: Pursue an intentional knowledge management agenda with a view to accelerating replication and scaling of project and post-project activities and benefits.

- Promote learning-oriented encounters with representatives of diverse relevant ministries across Zobas/regions through which innovative programme experience (e.g. MIHAP) can be shared.
- Promote the rotation of extension agents to other Zobas/regions in support of a widespread adoption of good practices on land terracing and other soil conservation activities as well as on agricultural productivity (including practices related to improved seeding).
- Create a repository of good practices / disseminate information in ways that reach targeted stakeholders at different levels (e.g. via radio programme).
- Develop an institutional strategy with clear knowledge management objectives and timebound indicators.
- Appoint a knowledge management focal point responsible for overseeing implementation of the knowledge management strategy and reporting on progress to the Director General.

5.3 For the Adaptation Fund's Readiness Programme

Lesson #4: The project has generated important lessons on how climate change adaptation approaches can benefit other countries. At the same time, there are opportunities for Eritrea or other governments implementing climate change adaptation projects to continue learning from other countries to strengthen their adaptive capacity to climate change. The Adaptation Fund has a role to play in enabling such learning beyond local contexts.

Associated Recommendation #4: Provide support to enable South-South learning opportunities, to bring to light some of the best sustainability practices and outcomes.

- Fund learning missions, study tours, and technical visits between countries or projects facing similar climate challenges. This should ideally be integrated into project design with dedicated budget lines to fund these activities.
- Develop and disseminate evidence-based case studies from completed and ongoing projects, highlighting successful models for sustaining climate adaptation, and making them accessible through an online knowledge platform accessible to practitioners and national governments.
- Create and/or support an online community of practice for governments and project stakeholders to share practical experiences, tools, and lessons learned on sustaining climate outcomes, linked to the knowledge dissemination platform.

5.4 For the AF-TERG on methods

Lesson #5: While comprehensive, the ex post evaluation methodology includes complex concepts and overlapping criteria that can hinder a shared understanding among AF-TERG, evaluation teams, and beneficiaries. At the same time, early knowledge-sharing initiatives—such as the webinar launching the Ex-Post Toolkit—have proven valuable in aligning approaches and fostering learning across teams. Together, these experiences highlight the need for both simplification and continuous learning to strengthen consistency and usability of the methodology.

Associated Recommendation #5: Continue to develop, refine, and streamline the ex post evaluation methodology and related guidance while institutionalizing learning across evaluations.

- Simplify the methodology by avoiding duplication in evaluation criteria and clarifying the language and expectations under each criterion. (e.g. clearly identifying definitions for flexibility, connectedness/feedback loops, etc. and identify potential overlaps with other criteria).
- Further develop the inception and evaluation report outlines to provide concise guidance on anticipated content for each section, allowing flexibility and reducing redundancy.

Continue to organize learning events and knowledge-exchange opportunities between evaluation teams, using lessons from completed ex post evaluations to iteratively improve the Toolkit and guidance materials.

Appendix I Stakeholder Analysis

Stakeholder Analysis

Error! Reference source not found. **I.1** below presents the stakeholder analysis for the Adaptation Fund project ERI/MIE/Rural/2010/2 in Eritrea. It identifies key stakeholder groups and the main organizations or actors within each group and describes their roles in two dimensions: (i) their role in project implementation, organized by outcome area; and (ii) their expected or reported role in sustaining project outcomes after completion. The information on roles in implementation is based on project design documents and validated through available evaluations. The description of stakeholder roles in sustaining outcomes is drawn from the original project strategy—particularly the sustainability and exit plans outlined in the funding proposal—as well as the Mid-Term and Final Evaluations, which provide insights into the likely durability of results.

Table I.1 Stakeholder analysis

STAKEHOLDER TYPE	DESCRIPTION	ROLE IN PROJECT (BY OUTCOME)	ROLE IN SUSTAINING PROGRAMME OUTCOMES
Implementing Entity: United Nations Development Programme (UNDP)	UNDP served as the Implementing Entity (IE) for this Adaptation Fund project. Its responsibilities included overall fiduciary oversight, quality assurance, procurement, and technical support.	**Outcome 1–4:** Provided technical backstopping for the design and delivery of all outcomes. Oversaw financial management and procurement. Coordinated with the Executing Entity on annual work plans and M&E frameworks. Supported knowledge management efforts and facilitated integration of lessons learned into future programming. UNDP also supported reporting to the Adaptation Fund.	**Outcomes 1–4:** Preparation of knowledge products and policy briefs for upscaling and replication; Advocacy for a Phase II proposal to the Green Climate Fund, thus aiming to institutionalize lessons and secure future financing; Mobilization of international learning platforms (e.g., Adaptation Learning Mechanism) for sharing project outcomes.
Executing Entity / Adaptation Fund Designated Authority: Ministry of Land, Water, and Environment (MoLWE)	MoLWE was the Executing Entity (EE) responsible for direct implementation of the project and coordination among national and local actors. It also acted as the	**Outcome 1:** Led implementation of water resource infrastructure (micro-dams, diversion structures, and rainwater harvesting systems) and related land management activities. **Outcome 2:** Coordinated with MoA and research institutions to implement climate-resilient agricultural practices and livestock packages.	**Outcome 1:** Provide continued technical oversight for infrastructure (e.g., micro-dams, subsurface dams), in collaboration with Zoba Anseba's Infrastructure Department and Water Resources Department, especially for repairs beyond local capacity.

STAKEHOLDER TYPE	DESCRIPTION	ROLE IN PROJECT (BY OUTCOME)	ROLE IN SUSTAINING PROGRAMME OUTCOMES
	National Designated Authority to the Adaptation Fund.	**Outcome 3:** Oversaw community-based early warning systems and collaborated with Meteorological Services for installation of monitoring equipment. **Outcome 4:** Supervised the development of a knowledge management system and coordinated with regional actors on advocacy and policy engagement.	**Outcome 2:** Support environmental mainstreaming in agriculture and natural resource policy frameworks. **Outcome 3:** Maintain collaboration with meteorological services and Zoba administration on climate information systems. **Outcome 4:** Responsible for policy advocacy and integrating climate risk reduction into regional and national planning processes
Government Institutions: MoA	MoA is responsible for national agriculture and livestock development, including research, extension services, and input provision.	**Outcome 1:** Supported design and implementation of soil and water conservation (SWC) measures. Supplied technical staff and mobilized agricultural extension services. **Outcome 2:** Provided training on drought-tolerant seeds, livestock care, and integrated production systems. Distributed seeds, heifers, and chicks as part of technology packages. **Outcome 3:** Participated in awareness-raising events and helped connect climate information to farmers' needs.	**Outcomes 1–2:** Continue delivery of agricultural extension services, including technical backstopping on climate-resilient methods and seed/livestock distribution. MoA staff at sub-regional level were expected to support infrastructure maintenance as part of their regular duties. **Outcome 3:** Sustain integration of seasonal forecasts into extension services via trained agents and farmer-to-farmer learning forums. **Outcome 4:** Maintain data repositories and technical documentation from the project, with support from HAC.
Government Institutions: Ministry of Local Government	Oversee local governance structures, including sub-Zoba and village development committees. Plays a key role in administrative coordination.	**Outcome 3:** Helped integrate climate risk awareness and preparedness into local planning and administrative structures. **Outcome 4:** Facilitated communication between central authorities and local administrations for knowledge sharing and policy uptake.	**Outcomes 3–4:** Provide institutional support for: Embedding climate awareness and preparedness into local administrative systems; Facilitate coordination between sub-Zoba administrations and national-level actors; Maintain the Zoba Food Information Committee, a body proposed to support EWS continuity.

STAKEHOLDER TYPE	DESCRIPTION	ROLE IN PROJECT (BY OUTCOME)	ROLE IN SUSTAINING PROGRAMME OUTCOMES
Government Institutions: Bureau of Standards and Evaluation (BS&E)	A national entity responsible for project evaluations and performance tracking.	**Outcome 4:** Participated in M&E functions, including the Mid-Term Review. Supported performance tracking and may have helped develop indicators and data collection protocols.	Unclear. To be further developed in data collection.
Regional Authorities: Zoba Anseba administration, the department of agriculture and land	The regional governing body responsible for leading day-to-day implementation in Anseba, including the sub-Zobas of Hamelmalo and Habero.	**Outcome 1:** Helped identify project sites and mobilize community labor for infrastructure work. **Outcome 2:** Coordinated local training and extension activities in collaboration with MoA and local offices. **Outcome 3:** Facilitated implementation of early warning systems and supported climate awareness campaigns. **Outcome 4:** Acted as a key channel for disseminating knowledge products and feeding local lessons into regional policy planning.	**Outcomes 1–2:** Responsible for financial and technical support to communities for infrastructure maintenance through its Infrastructure Department. Promotion and expansion of MIHAP to different parts of Zoba Anseba, as well as replicating the MIHAP programme to other Zobas and sharing experience. **Outcome 3:** Institutionalize early warning data within the Zoba administration and lead coordination with community data collectors. **Outcome 4:** Host the knowledge management system and policy feedback loops; support mainstreaming of adaptation into development planning.
Local Authorities: Village development committees and Traditional Leaders	Local governance units composed of elected or customary leaders in rural villages.	**Outcome 1:** Facilitated access to land and labor for construction of micro-dams and terraces. **Outcome 2:** Helped mobilize farmers and women's groups for training and production activities. **Outcome 3:** Played a critical role in community preparedness initiatives and in disseminating climate risk information. **Outcome 4:** Supported identification and documentation of traditional knowledge and best practices.	**Outcome 1:** Take on responsibility for operation and maintenance of local water infrastructure, e.g. through Water Use Committees that collect modest user fees for maintenance. **Outcome 2:** Encourage community adherence to sustainable agriculture norms and collective resource management. **Outcome 3:** Help sustain community-based early warning systems through local leadership and integration into traditional decision-making structures.

STAKEHOLDER TYPE	DESCRIPTION	ROLE IN PROJECT (BY OUTCOME)	ROLE IN SUSTAINING PROGRAMME OUTCOMES
			Outcome 4: Provide grassroots insights that inform knowledge products and policy recommendations.
Project Beneficiaries: Farmer Communities in Hamelmalo and Habero	Includes smallholder farmers, agro-pastoralists, pastoralists, and rural women, particularly female-headed households.	**Outcome 1:** Participated in construction and maintenance of water structures; directly benefited from improved water availability. **Outcome 2:** Adopted drought-resilient crops, integrated livestock practices, and fuel-efficient stoves. **Outcome 3:** Received training on climate risks and contributed to community early warning systems. **Outcome 4:** Shared lived experiences for documentation and were featured in success stories and communications materials.	**Outcome 1:** Maintain dams and diversion structures (e.g., Fiza and Lemayt communities repaired temporary embankments independently after flood damage). **Outcome 2:** Continue using drought-tolerant crops and livestock packages; keep using stoves and agroforestry techniques. **Outcome 3:** Act as data collectors for EWS and maintain some functions independently post-project. **Outcome 4:** Share testimonials and experiences that feed into national knowledge repositories and outreach materials.
Other Stakeholders: HAC	A national academic institution providing education and research in agriculture.	**Outcome 2:** Trained extension agents; conducted research on conservation agriculture and drought-resistant varieties. **Outcome 4:** Helped document and disseminate field results, contributed to national knowledge systems.	**Outcome 2:** Continue testing and promoting climate-resilient agricultural techniques. **Outcome 3:** Operate and maintain meteorological stations; train staff and students in climate data use. **Outcome 4:** Support knowledge management infrastructure and backstopped MoA data repositories.
Other Stakeholders: NARI	Government research institute focused on improving agricultural productivity and resilience.	**Outcome 2:** Developed and released improved crop varieties (e.g., Kona millet, Se'are sorghum). **Outcome 4:** Supported field trials and contributed to lessons learned dissemination.	**Outcome 2:** Continue development and dissemination of drought- and disease-resistant varieties. **Outcome 4:** Participate in documentation of lessons learned and research-extension linkages.

STAKEHOLDER TYPE	DESCRIPTION	ROLE IN PROJECT (BY OUTCOME)	ROLE IN SUSTAINING PROGRAMME OUTCOMES
Other Stakeholders: Meteorological Services	National provider of weather data, forecasts, and climate services.	**Outcome 3:** Installed and maintained weather stations; trained local staff; helped produce seasonal forecasts and risk information.	**Outcome 3:** Provide seasonal forecasts and supported climate data analysis through enhanced Class A stations. Play a central role in sustaining the climate information system at regional level.
Other Stakeholders: NUEW	Government-affiliated women's organization with representation at all administrative levels.	**Outcome 2:** Supported identification and training of female beneficiaries, particularly for poultry, dairy, and stove initiatives. **Outcome 3:** Participated in awareness campaigns and helped ensure women's engagement in early warning efforts.	**Outcomes 2–3:** Continue to mobilize rural women for agricultural activities and awareness raising. Ensure gender-sensitive approaches remain visible in follow-up actions.
Other Delivery Partners	Bilateral donors and UN agencies that replicated project components post-implementation.	**N/A**	**Outcome 1–2:** Replicate or scale micro-dam or irrigation infrastructure and agricultural innovations. **Outcome 3:** Help institutionalize or extend early warning systems. **Outcome 4:** Integrate knowledge products from the project into broader resilience initiatives.

Appendix II List of Interviewed Stakeholders

Table II.1 Stakeholders consulted

LAST NAME	FIRST NAME	POSITION	ORGANIZATION
YOHANES	Nemariam	Head, International Development Cooperation	Ministry of Finance and National Development
HABTEAB	Adam	Programme Specialist	UNDP
		Extension Worker #1	Ministry of Agriculture
		Extension Worker #2	Ministry of Agriculture
		Extension Worker #3	Ministry of Agriculture
		Extension Worker #4	Ministry of Agriculture
SOLOMON	Andebrhan	Head of Sub-Zoba, Agricultural Extension Department	Ministry of Agriculture
ABRAHA	Berhane	Senior instrument technical for mechanical meteorological instruments	Ministry of Transport and Communications
MEBRATU	Iyassu	Director General, Water Resources Department	Ministry of Land, Water, and Environment
MAHMOUD	Adam	Representative	Ministry of Agriculture
MEHARI	Kibirti	Administrator of Feledareb	Kebabi Administration
OSMAN	Amna Haj	Administrator	
ARAIA	Woldeamlak	Professor, Dean	Hamelmalo Agricultural College (HAC)
WELDEGEBRIEL	Kibrom Asmeron	Acting Director General	Ministry of Land, Water & Environment
SALEH	Aman	Director of Environmental Information and Awareness	Ministry of Land, Water & Environment
KUBROM	Tedros	Planning and Projects Officer, Office of the Minister	Ministry of Land, Water & Environment
SALEH	Brhan Khiar		National Institute of Higher Education
HAILE	Eyob		National Institute of Higher Education

LAST NAME	FIRST NAME	POSITION	ORGANIZATION
TESFATSION	Kesete	Head, Forestry and Wild Life Development Authority	Ministry of Local Government (Zoba Anseba)
HAGOS	Tesfabithar	Head, Seed Unit (MoA)	Ministry of Local Government (Zoba Anseba)
EMBAYE	Tsegazeab	Dairy Expert & MIHAP Focal Point	Ministry of Local Government (Zoba Anseba)
KEBREAB	Dawit	Head, Land Division of Anseba Region	Ministry of Local Government (Zoba Anseba)
GLHIWET	Testamariam	Head of Environment	Ministry of Local Government (Zoba Anseba)
ABRAHA	Negusse	Senior research in plant breeding, Director of Crop Improvement Research Division	National Agricultural Research Institute, (Zoba Anseba)
TEWOLDE	Ghebremeskel	Director General, Land and Agriculture	Ministry of Local Government (Zoba Anseba)

Also consulted were community beneficiaries from the following villages: Hamelmalo (12), Fiza (19), Habero Tsa'eda (20), Mousha (5), Mezret (6), Mahabesh (3)

Appendix III Results Framework

Table III.1 Results framework

OUTCOMES	OUTCOME TARGETS	OUTPUTS	OUTPUT INDICATORS	MEANS OF VERIFICATION OUTCOME LEVEL		RESPONSIBLE PARTIES)
				METHOD	TIMING	
Outcome 1: Increased Water Availability and Erosion Control through Groundwater Recharge, Rainwater Harvesting, Irrigation and Soil and Water Conservation Measures. **Indicators** - Change in level of renewable water resources used in project area **Baseline** Only about 1million cubic meters is put in use	By 2018, 5.3 million cubic meters of water resources used in project area (increase of 4.3 million cubic meters) (TE, p.4)	Output 1.1: Groundwater recharged, and irrigation technologies implemented for crop and forage production by developing a subsurface dam within the Anseba River	Indicator 1.1.1: Sub-surface dam with associated pumping and irrigation water distribution facilities completed	- Annual survey - Project final evaluation	Annually and at the end of the project	- Ministry of Agriculture - MoLWE - Zobe Anseba Administration - Village development committees - community members
			Indicator 1.1.2: Number of households of agro-pastoralists using the water supply to increase their agricultural and rangeland productivity by twenty-fold			
		Output 1.2: Floodwater harvested to enable irrigation of rain-fed cereal production and rangelands	Indicator 1.2.1: Number of hectares of rangeland that become fully under supplementary irrigation and have an increased productivity of 40%			
			Indicator 1.2.2: Number of hectares of cereal production that are converted to be fully under supplementary irrigation			
			Indicator 1.2.3: Number of hectares of the dominant cereal crops (sorghum and pearl millet) that have an increased production of from 0.36 (baseline) tons per hectare to 0.7 tons per hectare			

OUTCOMES	OUTCOME TARGETS	OUTPUTS	OUTPUT INDICATORS	MEANS OF VERIFICATION OUTCOME LEVEL		RESPONSIBLE PARTIES)
		Output 1.3: Two micro dams constructed to retain and store rainfall run-off.	Indicator 1.3.1: Number of hectares of cereal production that is converted to be fully under supplementary irrigation and in which the production of the dominant cereal crops (sorghum and pearl millet) is increased from 0.36 tons per hectare (baseline) to 1.0 tons per hectare			
			Indicator 1.3.2 Increase in forage production per ha of irrigated land.			
			Indicator 1.3.3: Amount of time spent in search of water and forage for livestock.			
		Output 1.4: Soil and water conservation measures implemented to improve runoff management and infiltration	Indicator 1.4.1: Livestock carrying capacity of rangelands under this protection and rehabilitation project			
			Indicator 1.4.2: Agricultural production of farm lands under the on-farm soil and water conservation project			
			Indicator 1.4.3: Percentage of households migrating to other areas due to climatic shock			
Outcome 2: Climate-Resilient Agricultural and Livestock Production Enhanced. **Indicator** Change in food security in the project area as a result of using climate-resilient	By 2018, 70% of project beneficiaries have sufficient food for at least an additional 3 months (TE, p.4)	Output 2.1: A range of climate-resilient agricultural technologies and methods developed and transferred to farmers e.g. drought- and disease-resistant varieties, integrated crop-livestock production systems, conservation agriculture, agroforestry, rangeland management; and traditional improved fuel-efficient stoves	Indicator 2.1.1 Number of project beneficiaries involved in capacity development for implementation of specific agricultural and/or livestock adaptation measures, disaggregated according to gender	- Annual livelihoods survey - National food security monitoring system - Project final evaluation	Annually, to the end of the project. Annually, to the end of the project. End of project	- Ministry of Agriculture - MoLWE - Zoba Anseba Administration - Village development committees - community members - Hamelmalo Agricultural College
			Indicator 2.1.2: Number of professionals involved in capacity development to enable rolling out of climate-resilient agricultural production technologies and methods, disaggregated according to gender			

OUTCOMES	OUTCOME TARGETS	OUTPUTS	OUTPUT INDICATORS	MEANS OF VERIFICATION OUTCOME LEVEL		RESPONSIBLE PARTIES)
agricultural and livestock production methods, measured as # of months per year additionally covered by local production **Baseline** (Baseline to be established by project through livelihoods survey1 # of months per year covered by local farming and livestock production before & after the project. List some concrete examples.			Indicator 2.1.3: Percent change in beneficiaries' capacities to make resource management decisions based on climate information			- National Agricultural Research Institute - National Union of Eritrean Women - National Union of Eritrean Youth and Students
			Indicator 2.1.4: Increased agricultural and livestock production as a result of implementing climate-resilient technologies and methods			
			Indicator 2.1.5: Number of improved traditional energy-efficient stoves distributed and in regular use			
		Output 2.2: Seasonal forecasts used in a farmer-led collaborative action learning process to enhance adaptive capacity and climate-proof production systems	Indicator 2.2.1: Number of farmers using seasonal forecasts to develop on-farm adaptive strategies			
			Indicator 2.2.2: Increased production and farm income as a result of using seasonal forecasts to guide on-farm activities			
Outcome 3. Improved Climate Risk Information and Climate Monitoring Used to Raise Awareness of and Enhance Community	By 2018, 70% of project beneficiaries make use of improved climate risk information (TE, p.4)	Output 3.1.: Improved climate risk information generated, and capacity developed for climate monitoring and analysis	Indicator 3.1.1: Downscaled climate change projections at the sub-national scale from multiple GCMs for Zoba Anseba	Survey	Annually and on project completion	- Ministry of Agriculture - MoLWE - Zoba Anseba Administration - Village development committees
			Indicator 3.1.2: Number of gender-sensitive knowledge products developed and disseminated using improved climate risk information			

OUTCOMES	OUTCOME TARGETS	OUTPUTS	OUTPUT INDICATORS	MEANS OF VERIFICATION OUTCOME LEVEL		RESPONSIBLE PARTIES)
Preparedness to Climate Hazards. **Indicator** Percentage of project beneficiaries making use of improved climate risk information and climate monitoring processes, disaggregated according to gender **Baseline** Baseline is zero – no improved climate risk information yet available			Indicator 3.1.3: Class 1 meteorological station installed in sub-Zoba Habero and six Class 3 meteorological stations installed, three in each sub-Zoba			- community members - Meteorological Services - Hamelmalo Agricultural College - National Agricultural Research Institute - National Union of Eritrean Women - National Union of Eritrean Youth and Students
			Indicator 3.1.4: Number of staff trained on meteorological observation and analysis, disaggregated according to gender			
		Output 3.2: Awareness raised at different levels on climate change risks facing Zoba Anseba	Indicator 3.2.1: Number of stakeholders participating in awareness raising events, disaggregated according to gender and age where possible			
			Indicator 3.2.2: Perceived change in decision making as a result of participation in awareness raising activities			
			Indicator 3.3.1: Number of community members trained on EWS			
			Indicator 3.3.2: Number of stakeholders served by community-based EWS			
		Output 3.3: Community preparedness enhanced through development of a community-based early warning system in sub-Zobas Hamelmalo and Habero	Indicator 3.3.3: Losses resulting from climate-related disasters (e.g. mortality, injury, property or infrastructure lost or damaged) compared with recent historical experience or projected baseline, in the area served by the community-based EWS			
Outcome 4. Knowledge Management System Established, and Knowledge	By 2018 at least 5 lessons learned materials produced and	Output 4.1: Knowledge management system established, and knowledge management activities implemented	Indicator 4.1.1: Number of 'lessons learned' codified	Project final evaluation	End of the project	- Ministry of Agriculture - Zoba Anseba Administration - Hamelmalo
			Indicator 4.1.2: Number of relevant networks or communities through which lessons learned are disseminated			

OUTCOMES	OUTCOME TARGETS	OUTPUTS	OUTPUT INDICATORS	MEANS OF VERIFICATION OUTCOME LEVEL		RESPONSIBLE PARTIES)
Management Activities Implemented. **Indicators** Number of 'lessons learned' about natural resource management in the context of climate change as a result of the project **Baseline** Baseline is zero – no relevant lessons learned are currently being captured or disseminated	disseminated (TE, p.4)	Output 4.2: Policy advocacy activities implemented	Indicator 4.2.1: Number of knowledge products developed for use in policy advocacy activities Indicator 4.2.2: Number of policies/plans/strategies/projects revised or developed as a result of policy advocacy activities			Agricultural College

Appendix IV Analysis of Data Quality for Each Project Outcome/Outputs

Data availability was identified as a primary limitation during the inception stage, with the main documents available to the evaluation team including publicly available documents accessible through the Adaptation Fund and UNDP project pages.[64]

To support the identification of additional documents as well as potential project influence on subsequent programming, the evaluation team:

- Did a keyword search in available UNDP Eritrea reports and newsletters, using the following keywords: agriculture, water, climate change, adaptation, Anseba, Habero, Hamelmalo
- Used AI to scan the web for documentation referencing the project.

In both cases, limited additional reference information was returned.

Following the field visit, the evaluation team was provided with additional supporting documents, notably relating to the expansion of MIHAP programming and subsequent projects in the Anseba region and Eritrea.

[64] Adaptation Fund: https://www.adaptation-fund.org/project/climate-change-adaptation-programme-in-water-and-agriculture-in-anseba-region-eritrea/
UNDP: https://www.adaptation-undp.org/projects/af-water-and-agriculture-adaptation-anseba-region-eritrea

Appendix V List of Project Documents and M&E Data Available

Project Design

Project Document (Project/Programme Proposal), n.d.

Project Progress

Project Performance Report, 2013

Project Performance Report, 2014

Project Performance Report, 2015

Project Performance Report, 2018

Mid-Term Evaluation, 2017

Terminal Evaluation, 2019

Project Extensions

Project Decision B.15-16/2, 2011

Project Decision B.30-31.17, 2018

Project News and Stories

Climate change adaptation interventions improve livelihoods in Anseba

UNDP Eritrea Newsletter: Special Edition, 2017

UNDP Videos

Government Report

MIHAP Analysis (December 2023)

Other Documents of Interest

First Biennial Update Report (BUR I) Under the United Nations Framework Convention on Climate Change (UNFCCC) (MoLWE, 2021)

Third National Communication Under the UNFCCC

World Bank 2025 Eritrea Outlook

UN Eritrea Cooperation Framework (2022-2026) Results Framework

UNDP Eritrea Thematic Fact Sheet – GEF Small Grants Programme

UNDP National Union of Eritrean Women (NUEW)

2024 Voluntary National Review

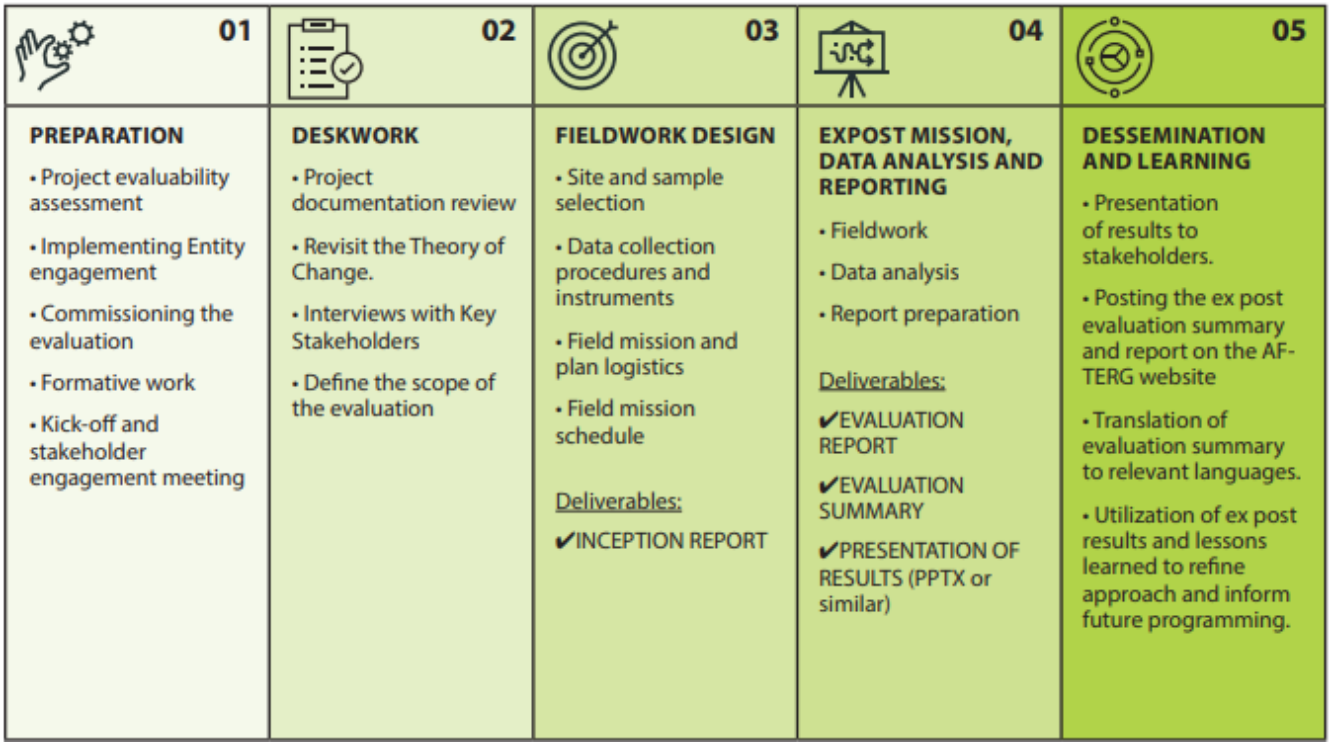
2018 Nationally Determined Contribution

Appendix VI Evaluation Process

Evaluation process

The evaluation process has comprised five key steps, as outlined in **Figure VI.1**Error! Reference source not found.. These were operationalized through the evaluation workplan

Figure VI.1 Steps in the ex post evaluation process



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Appendix VIII Evaluation Matrix

The evaluation matrix for this assignment is aligned with the overall with the Sustainability Framework for the ex post evaluation, with sub-questions broken down by outcome, where relevant. Indicators draw on both output and outcome indicators, with outcome indicators identified using blue font.

Table VIII.1 Evaluation matrix

EVALUATION QUESTIONS				
SUB-QUESTIONS	**SUSTAINABILITY FRAMEWORK CRITERIA**	**INDICATORS / DATA POINTS**	**DATA SOURCES**	**DATA COLLECTION METHODS**
Evaluation Question (EQ) 1: Have the project outcomes been sustained since completion?				
Sub-Question (SQ) 1.1: Were intended outcomes achieved at programme completion?	*Note: This sub-EQ has been broken down per outcome area. Please see breakdown for indicators and data sources			
SQ 1.1.1: To what extent did the programme support increased water availability and erosion control? (Outcome 1)		Outcome: Volume of water resources used in programme area, by million m3 (compared to baseline) Output: Evidence of infrastructure developed – sub-surface dam, micro-dams, diversion structures Evidence of irrigation technologies for crop and forage production Use of rainwater water harvesting for irrigation Evidence of retention and storage of water through micro-dams Evidence of implementation of soil and water conservation measures Hectares (ha) of rangeland under supplementary irrigation Evidence of households migrating due to climate shock	Project Final Evaluation PPRs	Document Review
SQ 1.1.2: To what extent did the programme enhance climate-resilient agriculture and livestock production? (Outcome 2)		Outcome: Increased food availability among programme beneficiaries (for 3 months) Output:	Project Final Evaluation PPRs	Document Review

EVALUATION QUESTIONS				
SUB-QUESTIONS	**SUSTAINABILITY FRAMEWORK CRITERIA**	**INDICATORS / DATA POINTS**	**DATA SOURCES**	**DATA COLLECTION METHODS**
		Increased food production through use of climate-resilient agricultural technologies and methods (e.g. drought- and disease-resistant varieties, integrated crop-livestock production systems, conservation agriculture, agroforestry, rangeland management; and traditional improved fuel-efficient stoves) Use of seasonal forecasts to enhance adaptive capacities and production systems		
SQ 1.1.3: To what extent did the programme improve and support use of climate risk information and climate monitoring? (Outcome 3)		Outcome: Proportion of programme beneficiaries using improved climate risk information Output: Number of meteorological stations built Evidence of strengthened capacities for climate monitoring and analysis Evidence of use of climate-risk information by communities Community preparedness enhanced	Project Final Evaluation PPRs	Document Review
SQ 1.1.4: To what extent did the programme establish a knowledge management system and implement knowledge management activities? (Outcome 4)		Outcome: Number of lessons learned materials produced and disseminated Output: Evidence of a knowledge management system being established Evidence of knowledge management activities Evidence of policy advocacy activities	Project Final Evaluation PPRs	Document Review
SQ 1.2: What outcomes have been sustained since programme completion?	*Note: This sub-EQ has been broken down per outcome area. Please see breakdown for indicators and data sources			

EVALUATION QUESTIONS				
SUB-QUESTIONS	**SUSTAINABILITY FRAMEWORK CRITERIA**	**INDICATORS / DATA POINTS**	**DATA SOURCES**	**DATA COLLECTION METHODS**
SQ 1.2.1: To what extent has increased water availability and erosion control been sustained since programme completion? (Outcome 1)		Outcome: Volume of water resources used in programme area, by million m3 (compared to Final Evaluation) Output: Evidence of infrastructure developed through programme still in place/functioning: – micro-dams – water diversion structures – irrigation systems – earthen dams – solar systems – meteorological stations – hillside terraces – check dams – enclosure areas for grass production and tree regeneration – soil stabilization measures Beneficiary perceptions on availability of water for humans, irrigation, and livestock compared to at time of programme completion Ha of rangeland under supplementary irrigation, compared to at time of programme completion Evidence of sustained soil and water conservation measures (e.g., trees that were planted) Beneficiary perceptions on erosion control compared to at time of programme completion	Project site observations Beneficiaries (farmers, village development committees, community members, local leaders) Ministry of Agriculture MoLWE Zoba Anseba Administration UNDP Annual livelihoods survey [if available] National food security monitoring system [if available]	Field visit Transect walks KIIs FGDs

EVALUATION QUESTIONS				
SUB-QUESTIONS	**SUSTAINABILITY FRAMEWORK CRITERIA**	**INDICATORS / DATA POINTS**	**DATA SOURCES**	**DATA COLLECTION METHODS**
		Community perceptions on migration due to climate shock since programme completion		
SQ 1.2.2: To what extent has the programme sustained climate-resilient agriculture and livestock production? (Outcome 2)		Outcome: Food availability among programme beneficiaries (for 3 months) Output: Evidence of climate-resilient agricultural technologies and methods developed/applied through programme still in use: – drought- and disease-resistant varieties – integrated crop-livestock production systems – conservation agriculture – agroforestry – range land management – traditional improved fuel-efficient stoves – solar systems Evidence of diversified livelihood options sustained Reported crop and livestock productivity compared to programme completion Perceptions on adaptation measures implemented in response to shocks Use of seasonal forecasts by farmers following programme completion	Project site observations Beneficiaries (farmers, village development committees, community members, local leaders) Ministry of Agriculture MoLWE Zoba Anseba Administration Hamelmalo Agricultural College National Agricultural Research Institute UNDP Annual livelihoods survey [if available] National food security monitoring system [if available]	Field visit Transect walks KIIs FGDs Document Review
SQ 1.2.3: To what extent have programme beneficiaries continued to use climate risk		Outcome: Evidence of programme beneficiaries using improved climate risk information following programme completion Output:	Project site observations Beneficiaries (farmers, village committees,	Field visit KIIs FGDs

EVALUATION QUESTIONS				
SUB-QUESTIONS	**SUSTAINABILITY FRAMEWORK CRITERIA**	**INDICATORS / DATA POINTS**	**DATA SOURCES**	**DATA COLLECTION METHODS**
information and climate monitoring? (Outcome 3)		Evidence of improved climate risk information being generated Evidence of sustained capacities for monitoring and analyzing climate risk information Perceptions on availability of climate risk information following programme completion Awareness of climate change risks among community members Number of meteorological stations built through programme which have been maintained since programme completion Perceptions on adaptation measures implemented in response to shocks	community members, local leaders) Ministry of Agriculture MoLWE Zoba Anseba Administration Hamelmalo Agricultural College Meteorological Services National Agricultural Research Institute UNDP	
SQ 1.2.4: To what extent have knowledge management systems and activities established through the programme been sustained? (Outcome 4)		Outcome: Number of lessons learned materials produced and disseminated since programme completion Output: Evidence of knowledge management system in place since programme completion Evidence of knowledge produced through the programme being used since programme completion	Ministry of Agriculture MoLWE Zoba Anseba Administration Hamelmalo Agricultural College UNDP	Field visit KIIs FGDs
SQ 1.3: What new outcomes – positive or negative – have occurred since programme completion?		Evidence of positive outcomes since programme completion Evidence of negative outcomes since programme completion	Beneficiaries (farmers, village development committees, community members, local leaders) MoLWE	Field visit Transect walks KIIs FGDs

EVALUATION QUESTIONS				
SUB-QUESTIONS	**SUSTAINABILITY FRAMEWORK CRITERIA**	**INDICATORS / DATA POINTS**	**DATA SOURCES**	**DATA COLLECTION METHODS**
			Zoba Anseba Administration	
SQ 1.4: Are the planned outcomes still desirable?		Stakeholder perceptions of continued relevance of project outcomes	Beneficiaries (farmers, village development committees, community members, local leaders) MoLWE Zoba Anseba Administration	Field visit Transect walks KIIs FGDs
EQ 2: Which factors have contributed to sustaining the project's adaptation outcomes over time?				
SQ 2.1: How have human and natural systems influenced the sustainability of adaptation outcomes?	Context		MTR PPRs TE Project Decisions	Field visit Transect walks Document Review KII FGD
SQ 2.1.1: How have key human and natural systems changed since programme closure?	Context	Evidence of changes in human and natural systems of relevance to programme, following programme closure.	Project site observations Beneficiaries (farmers, village development committees, community members, local leaders) Ministry of Agriculture MoLWE	Field visit Document review KII FGD

EVALUATION QUESTIONS				
SUB-QUESTIONS	**SUSTAINABILITY FRAMEWORK CRITERIA**	**INDICATORS / DATA POINTS**	**DATA SOURCES**	**DATA COLLECTION METHODS**
			Zoba Anseba Administration UNDP	
SQ 2.1.2: To what extent have socio-political dynamics affected the sustainability of the programme outcomes?	Context		Beneficiaries (farmers, village development committees, community members, local leaders)	
SQ 2.1.3: How have human and natural systems influenced water availability and erosion control in Habero and Hamelmalo, following programme completion? (Outcome 1)	Context	Human systems: – Conflicts over water resources – Decisions regarding land use – Decisions regarding crop production – Maintenance of irrigation systems **Natural systems:** – Occurrence of shocks (climate and non-climate) *To be updated as inception progresses*	Beneficiaries (farmers, village development committees, community members, local leaders) Programme site observations Ministry of Agriculture MoLWE Zoba Anseba Administration UNDP	Field visit Transect walks KII FGD
SQ 2.1.4: How have human and natural systems influenced the sustainability of climate-resilient agricultural and livestock production in Habero and Hamelmalo? (Outcome 2)	Context	**Human systems:** – Decisions regarding land use – Decisions regarding crop production **Natural systems:** – Occurrence of shocks (climate and non-climate) – Pests	Beneficiaries (farmers, village development committees, community members, local leaders) Programme site observations Ministry of Agriculture MoLWE	Field visit Transect walks KII FGD

EVALUATION QUESTIONS				
SUB-QUESTIONS	**SUSTAINABILITY FRAMEWORK CRITERIA**	**INDICATORS / DATA POINTS**	**DATA SOURCES**	**DATA COLLECTION METHODS**
		To be updated as inception progresses	Zoba Anseba Administration UNDP	
SQ 2.1.5: How have human and natural systems influenced the sustainability of community awareness and preparedness to climate hazards in Habero and Hamelmalo? (Outcome 3)	Context	**Human systems:** – Presence of interministerial coordination for climate-risk information and monitoring – Presence of trained staff on meteorological observation and analysis **Natural systems:** – TBD *To be updated as inception progresses*	Beneficiaries (farmers, village development committees, community members, local leaders) Programme site observations Ministry of Agriculture MoLWE Zoba Anseba Administration UNDP	Field visit Transect walks KII FGD
SQ 2.1.6: How have human and natural systems influenced the sustainability of knowledge generated through the programme? (Outcome 4)	Context	**Human systems:** – Production and dissemination of knowledge – Presence of other funding in these regions **Natural systems:** – TBD *To be updated as inception progresses*	Beneficiaries (farmers, village development committees, community members, local leaders) Programme site observations Ministry of Agriculture MoLWE Zoba Anseba Administration UNDP	Document Review KII FGD

EVALUATION QUESTIONS				
SUB-QUESTIONS	**SUSTAINABILITY FRAMEWORK CRITERIA**	**INDICATORS / DATA POINTS**	**DATA SOURCES**	**DATA COLLECTION METHODS**
SQ 2.2: How have adjustments to programme strategies, plans, and actions during programme implementation influenced the sustainability of adaptation outcomes?	Strategy	Evidence of programme strategies, plans and actions. Evidence of adjustments to programme strategies, plans, and actions during implementation. Perceptions on influence of adjustments to programme strategies, plans, and actions during implementation on sustainability of adaptation outcomes.	Programme Document (Proposal) MTR PPRs TE Project Decisions Project site observations Beneficiaries (farmers, village development committees, community members, local leaders) Ministry of Agriculture MoLWE Zoba Anseba Administration UNDP	Document Review KII FGD Field visit
SQ 2.3: To what extent has stakeholder *ownership* of programme outcomes and interventions contributed to the sustainability of adaptation benefits?	Conditions Driving Sustainability	Evidence of ownership of programme activities by programme completion, by outcome area Evidence of ownership of programme activities and results since programme completion, by outcome area	TE Project site observations Beneficiaries (farmers, village development committees, community members, local leaders) Ministry of Agriculture	Document Review KII FGD Field visit

EVALUATION QUESTIONS				
SUB-QUESTIONS	**SUSTAINABILITY FRAMEWORK CRITERIA**	**INDICATORS / DATA POINTS**	**DATA SOURCES**	**DATA COLLECTION METHODS**
			MoLWE Zoba Anseba Administration UNDP	
SQ 2.3.1: To what extent has support for and/or dissent to the project's outcomes been expressed? What have been the implications for their sustainability beyond project closure?	Conditions Driving Sustainability	*To be updated as inception progresses*	Project site observations Beneficiaries (farmers, village development committees, community members, local leaders) Ministry of Agriculture MoLWE Zoba Anseba Administration UNDP	
SQ 2.4: To what extent have *capacities* developed during programme implementation been maintained?	*Note: This sub-EQ has been broken down per outcome area. Please see breakdown for indicators and data sources			
SQ 2.4.1: To what extent have the capacities for water resources management been maintained since completion? (Outcome 1)	Conditions Driving Sustainability	*To be updated as inception progresses*	TE Beneficiaries (farmers, village development committees, community members, local leaders) Zoba Anseba Administration	KII FGD Field visit

EVALUATION QUESTIONS				
SUB-QUESTIONS	**SUSTAINABILITY FRAMEWORK CRITERIA**	**INDICATORS / DATA POINTS**	**DATA SOURCES**	**DATA COLLECTION METHODS**
SQ 2.4.2: To what extent has the capacity of farmers for climate-resilient agricultural and livestock production been maintained? (Outcome 2)	Conditions Driving Sustainability	Evidence of implementation of agricultural and livestock adaptation measures among programme beneficiaries who received training Evidence of programme beneficiaries making resource management decisions based on climate information Continued use of Training of Trainers by extension agents Evidence of transfer of capacities (in animal production, crop production, horticulture, GIS mapping) to new farmers *To be updated as inception progresses*	TE Beneficiaries (farmers, village development committees, community members, local leaders) Zoba Anseba Administration	KII FGD Field visit
SQ 2.4.3: To what extent have the capacities of communities for climate-risk information and monitoring been maintained? (Outcome 3)	Conditions Driving Sustainability	Evidence of capacities to maintain meteorological stations Evidence of capacities to analyze climate risk information and to produce/disseminate forecasts Evidence of awareness of climate risks *To be updated as inception progresses*	TE Beneficiaries (farmers, village development committees, community members, local leaders) Zoba Anseba Administration	KII FGD Field visit
EQ 2.5: To what extent have *partnerships* established during programme implementation been maintained?	*Note: This sub-EQ has been broken down per outcome area. Please see breakdown for indicators and data sources			
SQ 2.5.1: To what extent have partnerships for water resources management and soil erosion established during programme implementation	Conditions Driving Sustainability	Evidence of partnerships and/or collaboration between stakeholders through programme implementation	Programme Document (Proposal) MTR PPRs	

EVALUATION QUESTIONS				
SUB-QUESTIONS	**SUSTAINABILITY FRAMEWORK CRITERIA**	**INDICATORS / DATA POINTS**	**DATA SOURCES**	**DATA COLLECTION METHODS**
been maintained? (Outcome 1)		Evidence of continued partnerships and/or collaboration since programme completion, that contributes to sustaining adaptation benefits	TE Beneficiaries (farmers, village development committees, community members, local leaders) Zoba Anseba Administration Ministry of Agriculture MoLWE Delivery partners	
SQ 2.5.2: To what extent have partnerships for climate-resilient agricultural and livestock production been established during programme implementation been maintained? (Outcome 2)	Conditions Driving Sustainability	Evidence of partnerships and/or collaboration between stakeholders through programme implementation Evidence of continued partnerships and/or collaboration since programme completion, that contributes to sustaining adaptation benefits	Programme Document (Proposal) MTR PPRs TE Beneficiaries (farmers, village development committees, community members, local leaders) Zoba Anseba Administration Ministry of Agriculture MoLWE Delivery partners	

EVALUATION QUESTIONS				
SUB-QUESTIONS	**SUSTAINABILITY FRAMEWORK CRITERIA**	**INDICATORS / DATA POINTS**	**DATA SOURCES**	**DATA COLLECTION METHODS**
SQ 2.5.3: To what extent have partnerships for climate-risk information and monitoring been established during programme implementation been maintained? (Outcome 3)	Conditions Driving Sustainability	Evidence of partnerships and/or collaboration between stakeholders through programme implementation Evidence of continued partnerships and/or collaboration since programme completion, that contributes to sustaining adaptation benefits	Programme Document (Proposal) MTR PPRs TE Beneficiaries (farmers, village development committees, community members, local leaders) Zoba Anseba Administration Ministry of Agriculture MoLWE Delivery partners	
SQ 2.5.4: To what extent have partnerships for knowledge management been established during programme implementation been maintained? (Outcome 4)	Conditions Driving Sustainability	Evidence of partnerships and/or collaboration between stakeholders through programme implementation Evidence of continued partnerships and/or collaboration since programme completion, that contributes to sustaining adaptation benefits	Programme Document (Proposal) MTR PPRs TE Zoba Anseba Administration Ministry of Agriculture MoLWE Delivery partners	

EVALUATION QUESTIONS				
SUB-QUESTIONS	**SUSTAINABILITY FRAMEWORK CRITERIA**	**INDICATORS / DATA POINTS**	**DATA SOURCES**	**DATA COLLECTION METHODS**
EQ 2.6: To what extent has the availability of *resources* (tangible, intangible, financial) influenced the sustainability of adaptation benefits?	*Note: This sub-EQ has been broken down per outcome area. Please see breakdown for indicators and data sources			
SQ 2.6.1: To what extent has the availability of resources (tangible, intangible, financial) influenced the sustainability of increased water availability? (Outcome 1)	Conditions Driving Sustainability	Allocation of national/local budget to maintain water infrastructure Personnel dedicated to management and maintenance of water infrastructure Number and type of resources from other development partners	Programme Document (Proposal) MTR PPRs TE Beneficiaries (farmers, village development committees, community members, local leaders) Zoba Anseba Administration Ministry of Agriculture MoLWE Delivery partners	
SQ 2.6.2: To what extent has the availability of resources (tangible, intangible, financial) influenced the sustainability of climate-resilient agricultural and livestock production? (Outcome 2)	Conditions Driving Sustainability	Evidence of use of farmer resources to maintain and expand production	Programme Document (Proposal) MTR PPRs TE Beneficiaries (farmers, village development committees,	

EVALUATION QUESTIONS				
SUB-QUESTIONS	**SUSTAINABILITY FRAMEWORK CRITERIA**	**INDICATORS / DATA POINTS**	**DATA SOURCES**	**DATA COLLECTION METHODS**
			community members, local leaders) Zoba Anseba Administration Ministry of Agriculture MoLWE Delivery partners	
SQ 2.6.3: To what extent has the availability of resources (tangible, intangible, financial) influenced the sustainability of climate-risk information and monitoring? (Outcome 3)	Conditions Driving Sustainability	*To be updated as inception progresses*	Programme Document (Proposal) MTR PPRs TE Beneficiaries (farmers, village development committees, community members, local leaders) Zoba Anseba Administration Ministry of Agriculture MoLWE Delivery partners	
SQ 2.6.4: To what extent has the availability of resources (tangible, intangible, financial) influenced the sustainability of knowledge management systems? (Outcome 4)	Conditions Driving Sustainability	*To be updated as inception progresses*	Programme Document (Proposal) MTR PPRs TE	

EVALUATION QUESTIONS				
SUB-QUESTIONS	**SUSTAINABILITY FRAMEWORK CRITERIA**	**INDICATORS / DATA POINTS**	**DATA SOURCES**	**DATA COLLECTION METHODS**
			Zoba Anseba Administration Ministry of Agriculture MoLWE Delivery partners	
EQ 3: How do the sustained outcome characteristics contribute to the system's resilience and adaptive capacity?				
SQ 3.1: How have sustained adaptation outcomes from the project impacted the temporal and spatial scale needed for natural and/or human systems to maintain or change their functions and/or structures in the face of climate disturbances?	Resilience – Scale	Evidence of increased responsiveness to climate disturbances due to climate-risk information	Project site observations Beneficiaries (farmers, village development committees, community members, local leaders) Ministry of Agriculture MoLWE Zoba Anseba Administration	KII FGD Field visit
SQ 3.2 How have sustained adaptation outcomes from the programme contributed to increased availability of resources, means, or options, or created new ones, to support resilience to climate risks?	Resilience – Redundancy	Production diversification (e.g., shift from pastoralist to agro-pastoralist, etc.) Increased productive yields (fruits, vegetables, etc.) Evidence of water storage and diversion infrastructure providing an alternative water source Evidence of new climate-resistant seed varieties since TE Increased farmer income from production invested in productive assets Evidence of livelihood diversity	Project site observations Beneficiaries (farmers, village development committees, community members, local leaders) Zoba Anseba Administration Ministry of Agriculture	KII FGD Field visit

EVALUATION QUESTIONS				
SUB-QUESTIONS	**SUSTAINABILITY FRAMEWORK CRITERIA**	**INDICATORS / DATA POINTS**	**DATA SOURCES**	**DATA COLLECTION METHODS**
		Evidence of alternative sources of income	MoLWE Delivery partners	
SQ 3.3 How have sustained adaptation outcomes from the programme widened/deepened the variety of actors and inputs[65] working/interacting towards common goals?	Resilience – Diversity and Inclusion	Evidence of interministerial coordination Evidence of participation of diverse interest groups (civil society, private sector) Integration of scientific research and traditional knowledge in decision-making systems *To be updated as inception progresses*	Project site observations Beneficiaries (farmers, village development committees, community members, local leaders) Zoba Anseba Administration Ministry of Agriculture MoLWE Delivery partners	KII FGD Field visit
SQ 3.4 To what extent have sustained adaptation outcomes from the programme supported equity and inclusiveness?	Resilience – Diversity and Inclusion	Evidence of engagement of marginalized groups in programme areas (e.g., in decision-making) *To be updated as inception progresses*	Project site observations Beneficiaries (farmers, village development committees, community members, local leaders) Ministry of Agriculture MoLWE Zoba Anseba Administration	KII FGD Field visit

[65] Understood to include non-actor components such as access to research and knowledge, different farming methods, etc.

EVALUATION QUESTIONS				
SUB-QUESTIONS	**SUSTAINABILITY FRAMEWORK CRITERIA**	**INDICATORS / DATA POINTS**	**DATA SOURCES**	**DATA COLLECTION METHODS**
SQ 3.4.1: Has the project empowered and/or disempowered certain actors, groups, institutions, etc., over time? How has this affected relations between these different stakeholders, particularly since project closure?	Resilience – Diversity and Inclusion		Beneficiaries (farmers, village development committees, community members, local leaders)	
SQ 3.4.2: Have the benefits of the programme been distributed equitably, with perceived equitability, over time? Has this changed over time, particularly since programme closure?	Resilience – Diversity and Inclusion		Beneficiaries (farmers, village development committees, community members, local leaders)	
SQ 3.5 How have sustained adaptation outcomes from the programme contributed to the system's agility in: • **Responding to uncertainty** • **Effectively tackling challenges** • **Seizing opportunities that may arise from change**	Resilience - Flexibility	*To be updated as inception progresses*	Project site observations Beneficiaries (farmers, village development committees, community members, local leaders) Ministry of Agriculture MoLWE Zoba Anseba Administration	KII FGD Field visit
SQ 3.6 How have sustained adaptation outcomes from the programme supported:	Resilience – Connectedness/feedback loops	*To be updated as inception progresses*	Project site observations Beneficiaries (farmers, village development	KII FGD Field visit

EVALUATION QUESTIONS				
SUB-QUESTIONS	**SUSTAINABILITY FRAMEWORK CRITERIA**	**INDICATORS / DATA POINTS**	**DATA SOURCES**	**DATA COLLECTION METHODS**
• **Communication lines** • **Access to information** • **Partnerships to respond or adapt to shocks or stressors**			committees, community members, local leaders) Ministry of Agriculture MoLWE Zoba Anseba Administration	

Appendix IX Sustainability Rating

The rubric for the sustainability ratings is presented in below.

Table IX.i Sustainability Rating for ExPost-EAI (text copied from the Toolkit for the Ex Post Evaluation of Adaptation Interventions)[66]

RATING	DESCRIPTION
Highly Satisfactory (HS)	The project's contributions to adaptation benefits for the environment and/or communities exceed the initially expected outcomes. Complementary, there may be unintended positive benefits of the project. There are sufficient resources, partnerships, capacities, and local ownership of activities that sustain positive benefits.
Satisfactory (S)	The project's contributions to adaptation benefits for the environment and/or communities meet the initially expected outcomes. Complementary, there may be unintended positive benefits of the project. There are sufficient resources, partnerships, capacities, and local ownership of activities that sustain positive benefits.
Moderately Satisfactory (MS)	Only some of the project's adaptation benefits to the environment and communities persist. Complementary, there may be unintended positive benefits of the project for the environment and/or communities. There may not be sufficient resources, partnerships, capacities, and local ownership of activities to sustain all positive benefits.
Moderately Unsatisfactory (MU)	Only some of the project's adaptation benefits to the environment and communities persist. Additional resources, partnerships, capacities, and local ownership of activities are needed to sustain positive results. The project may have unintended negative effects on the environment and/or communities, potentially increasing vulnerability to climate change, exacerbating existing issues, or creating new risks (maladaptation).
Unsatisfactory (U)*	The project's contribution to adaptation benefits for the environment or/and communities is minor. There are insufficient resources, partnerships, capacities, and local ownership of activities to sustain positive results. The project may have unintended negative effects on the environment and/or communities, potentially increasing vulnerability to climate change, exacerbating existing issues, or creating new risks (maladaptation).
Highly Unsatisfactory (HU)*	The project's adaptation benefits for the environment or/and communities do not persist. The project has resulted in maladaptation, meaning it has inadvertently increased the vulnerability to climate change, exacerbated existing problems, or created new risks
Unable to assess (UA)	The available information does not allow assessment of the sustained outcomes

[66] AF-TERG, *Toolkit for the Ex Post Evaluation of Adaptation Interventions* (Adaptation Fund Technical Evaluation Reference Group (AF-TERG), 2025), 12, https://www.adaptation-fund.org/wp-content/uploads/2025/04/Ex-Post-Toolkit-Final.pdf.