

PRE-FEASIBILITY ASSESSMENT REPORT

Building Climate Change Resilience of Vulnerable Households
in Selected Localities of Ethiopia

April 2026

Document Information

Project Title	Building Climate Change Resilience of Vulnerable Households in Selected Localities of Ethiopia
GCF SAP Project ID	29720
Accredited Entity (AE)	Ministry of Finance (MoFEC), Federal Democratic Republic of Ethiopia
Executing Entities (EE)	Government of Ethiopia: Ministry of Water and Energy (MoWE); Ministry of Agriculture (MoA); Ministry of Irrigation and Lowlands (MOIL)
NDA	Ministry of Planning and Development, Federal Democratic Republic of Ethiopia
GCF Funding Requested	USD 24,997,050 (Grant)
Government Co-financing	USD 5,000,000
Total Project Budget	USD 29,997,050
Direct Beneficiaries	96,000 individuals (50% women); approx. 18,000 households
Indirect Beneficiaries	460,000 individuals
Target Woredas	Tenta (Amhara); Wahil Cluster (Dire Dawa); Erer/Sofi (Harari); Adama and Aleltu (Oromia); Lok Abeya (Sidama); Raya Azebo (Tigray)
Implementation Period	4 years (following GCF Board approval)
Project Lifetime	20 years
GHG Co-benefits (indicative)	Approx. 32,293 tCO ₂ -equivalent avoided over 20 years
Predecessor Project	Adaptation Fund Project: Building Climate Resilience of Vulnerable Communities, Ethiopia (2019–2023)
Document Status	Annex 2a to GCF SAP Funding Proposal Version 5, February 2026

Abbreviations and Acronyms

Abbreviation	Full Term
AF	Adaptation Fund
AE	Accredited Entity
BOFED	Bureau of Finance and Economic Development
CRGE	Climate Resilient Green Economy
CSA	Climate-Smart Agriculture
CSU	Climate Services Unit
EE	Executing Entity
ESG	Environmental, Social and Governance
ESAP	Environmental and Social Action Plan
FEWS NET	Famine Early Warning Systems Network
FHH	Female-Headed Household
GCF	Green Climate Fund
GHG	Greenhouse Gas
GoE	Government of Ethiopia
IPCC	Intergovernmental Panel on Climate Change
IPC	Integrated Food Security Phase Classification
IWUA	Irrigation and Water Users Association
MEL	Monitoring, Evaluation and Learning
MFI	Microfinance Institution
MoA	Ministry of Agriculture
MoFEC	Ministry of Finance and Economic Cooperation
MOIL	Ministry of Irrigation and Lowlands
MoWE	Ministry of Water and Energy
MPI	Multidimensional Poverty Index
MRV	Measurement, Reporting and Verification
NDA	National Designated Authority
NMA	National Meteorological Agency
NFCS	National Framework for Climate Services

Abbreviation	Full Term
O&M	Operation and Maintenance
OCHA	Office for the Coordination of Humanitarian Affairs
OPHI	Oxford Poverty and Human Development Initiative
PSNP	Productive Safety Net Programme
SAP	Simplified Approval Process
SNNPR	Southern Nations, Nationalities and Peoples Region
SWC	Soil and Water Conservation
UNICEF	United Nations Children's Fund
USD	United States Dollar
WASH	Water, Sanitation and Hygiene
WUA	Water Users Association

Executive Summary

Project Description

The project "**Building Climate Change Resilience of Vulnerable Households in Selected Localities of Ethiopia**" proposes to extend the integrated climate resilience model proven under the Adaptation Fund predecessor project to 15 additional kebeles across the same seven target woredas. The total project budget is **USD 29,997,050**, comprising a GCF grant of USD 24,997,050 and GoE co-financing of USD 5,000,000. The project will directly benefit **96,000 individuals** (approximately 18,000 households, 50% women) and indirectly benefit a further **460,000 people** through improved ecosystem services, water catchment health, and strengthened local climate governance systems.

Climate Context and Rationale

Ethiopia is among the most climate-vulnerable countries globally. More than 90% of smallholder agricultural production is rain-fed, average farm sizes are under one hectare, and the seven target woredas are situated in agroecological zones characterised by recurrent drought, erratic and declining rainfall, progressive land degradation, chronic food insecurity, and severely constrained water access. These climate stresses are not hypothetical: the National Meteorological Agency documents temperature increases of 0.37–0.49°C per decade in the target agroecologies, and IPCC AR6 projects further warming of 1.2–2.6°C above the 1995–2014 baseline by the 2050s across East Africa, with compounding increases in drought frequency and intra-seasonal dry spells.

Field-level evidence from the 15 target kebeles confirms acute and multi-dimensional vulnerability: clean water access ranges from **0% to 54%** across the target kebeles, with no kebele meeting the Ethiopian government's 80% minimum service standard; women travel between **1.5 and 6 kilometres daily** to collect water; only **24% of irrigable land** (764 ha of 3,166 ha) is currently under development; over **11,849 hectares** of land is degraded; and over **29,000 people** across 13 reporting kebeles currently receive humanitarian food aid.

Scale-Up Rationale

The project is explicitly grounded in the results and recommendations of the AF Terminal Evaluation (2023). The evaluation confirmed that the integrated AF model, combining climate-resilient water access, small-scale irrigation, watershed rehabilitation, climate-smart agriculture, and livelihood diversification, was *strategically relevant, technically sound, and effective*. Most critically, Recommendation 2 of the evaluation explicitly called on government stakeholders to "*work together ... to scale up the project to the adjacent kebeles and sites*" because those communities have "*almost similar economic, social and agro-climatic vulnerabilities*." The SAP project responds directly to this recommendation by extending the same proven model to 15 additional adjacent kebeles that were not reached under the AF project.

Project Components

The project is organised into four interlinked components that replicate and refine the AF approach:

- **Component 1: Institutional and Knowledge Capacity** — Establishing and equipping Woreda Climate Services Units and Kebele Adaptation Committees; developing local climate databases and adaptation plans; training government and community personnel.
- **Component 2: Climate-Resilient Water and Irrigation** — Installing 21 solar-powered potable water systems; rehabilitating and constructing 30 small-scale irrigation schemes; forming and strengthening Water User Associations.
- **Component 3: Adaptive Agriculture and Land Management** — Soil and water conservation on 3,000 ha; reforestation and area enclosure on 5,000 ha; promotion of climate-smart crop and livestock management through demonstration plots and extension services.

- **Component 4: Climate-Resilient Livelihoods** — Supporting 18,000 vulnerable households (targeting 50% women) with diversified income opportunities through cooperative formation, business training, micro-credit linkages, and market access support.

Feasibility Assessment Summary

Feasibility Dimension	Assessment	Key Basis
Technical	Feasible Low Risk	All interventions are extensions of proven AF technologies. No new untested methods. Engineering and implementation capacity confirmed through AF implementation.
Economic / Financial	Feasible Strong Returns	Demonstrated benefit–cost ratios of 3–5× from irrigation in comparable settings. Grant financing appropriate for public-good adaptation outcomes. USD 5M GoE co-finance confirmed.
Social	Feasible High Acceptability	Strong community demand documented from adjacent kebeles. AF established working community governance structures (WUAs, cooperatives, committees) in the same woredas.
Environmental	Feasible net Positive	Project classified Category C / I-3 under GCF safeguards. Design is net environmentally positive through watershed restoration and reforestation. Minor construction impacts manageable.
Institutional	Feasible Strong Framework	Anchored in existing MoFEC/MoWE/MoA/MOIL government structures. Regional and woreda implementation arrangements proven under AF. Clear oversight and accountability systems.

Key Findings and Recommendation

The pre-feasibility assessment finds that all necessary conditions for successful project preparation and implementation are met. The evidence base is strong, the intervention model is proven, community demand is documented, and institutional arrangements are in place. The risks are well-understood from the AF experience and manageable through the mitigation measures incorporated in the project design.

This pre-feasibility report recommends proceeding to full preparation of the GCF SAP Funding Proposal for consideration by the GCF Board. The project represents a high-value, low-risk investment in climate resilience for some of Ethiopia's most vulnerable rural communities, directly responsive to the GCF's mandate to support adaptation in highly climate-vulnerable developing countries.

1. Project Context and Climate Rationale

1.1 Country Context and Climate Vulnerability

Ethiopia's highland and lowland agroecological zones are among the most climate-sensitive in sub-Saharan Africa. The country is exposed to recurrent drought and erratic rainfall variability, with these climate stresses intensifying over recent decades. More than **90% of smallholder agricultural production is rain-fed** and average farm sizes are under one hectare, meaning that climate variability translates directly and immediately into yield losses, food deficits, and household income shocks.

Observed temperature trends in the lowland and midland agroecologies of the target regions show increases of **0.37–0.49°C per decade** (NMA NFCS 2020). IPCC AR6 Working Group II (Trisos et al., 2022, Chapter 9) projects mean annual temperature increases of **1.2–2.6°C above the 1995–2014 baseline by the 2050s** under 1.5–2°C warming scenarios across East Africa, with semi-arid lowland zones warming faster than the regional mean. Compounding increases in drought cycle frequency, intra-seasonal dry spells, and erratic high-intensity rainfall events are projected for the region.

The consequences of these trends for Ethiopian smallholders are severe. Agricultural productivity growth has declined by 34% since 1961 in Africa due to climate change, the largest reduction of any region globally (IPCC AR6, Ch. 9, §9.8). Crop yield reductions of 5.8% for maize and 2.3% for wheat have already been documented (1974–2008 baseline), with projected further reductions of 15–25% at 2°C warming by the 2050s for sub-Saharan Africa.

1.2 Rural Poverty and Climate-Poverty Nexus

Rural poverty in the target areas exacerbates climate vulnerability. Households lack reliable roads, credit, irrigation infrastructure, and climate information, and depend on degraded hillsides for fuelwood and grazing. Approximately **85% of Ethiopia's population** is engaged in smallholder farming, which accounts for **37% of GDP** (FAO/World Bank 2018). Over **21% of Ethiopians** face severe food insecurity nationally (FAO FAOSTAT 2022/23), and up to **15.8 million people** required emergency food assistance in 2024 (FAO Ethiopia 2024).

This vicious cycle — climate shocks reducing yields and incomes, poverty limiting adaptive capacity, degradation worsening exposure — is particularly acute in the seven target woredas. Recurrent drought and flash floods trigger livestock mortality and crop failure, while erosion strips topsoil and gullies form on unprotected hillsides. Communities have almost no alternative income sources or financial reserves to absorb these shocks.

1.3 The Seven Target Woredas

The target localities are characterised by recurrent drought, significant rainfall variability, degraded natural resources, severely limited irrigation coverage, chronic potable water shortages, fragile livelihood systems, and weak access to finance, climate information, and productive assets. All seven woredas were selected under the AF predecessor project on the basis of these documented vulnerabilities, which the AF Terminal Evaluation confirmed remained highly relevant throughout implementation.

The seven woredas and their host regions are:

#	Woreda	Region / Administration	Agroecological Zone
1	Tenta	Amhara Region Debub Wollo Zone	Highland mixed crop-livestock
2	Wahil Cluster	Dire Dawa City Administration	Agro-pastoral lowland

#	Woreda	Region / Administration	Agroecological Zone
3	Erer / Sofi	Harari Region	Arid lowland
4	Adama	Oromia Region East Shewa Zone	Rift Valley semi-arid
5	Aleltu	Oromia Region North Shewa Zone	Highland mixed livelihood
6	Lok Abeya	Sidama Region Great Rift Valley	Mixed lowland-highland farming
7	Raya Azebo	Tigray Region Debub Tigray Zone	Semi-arid lowland

1.3.1 Woreda Level Vulnerability Profile

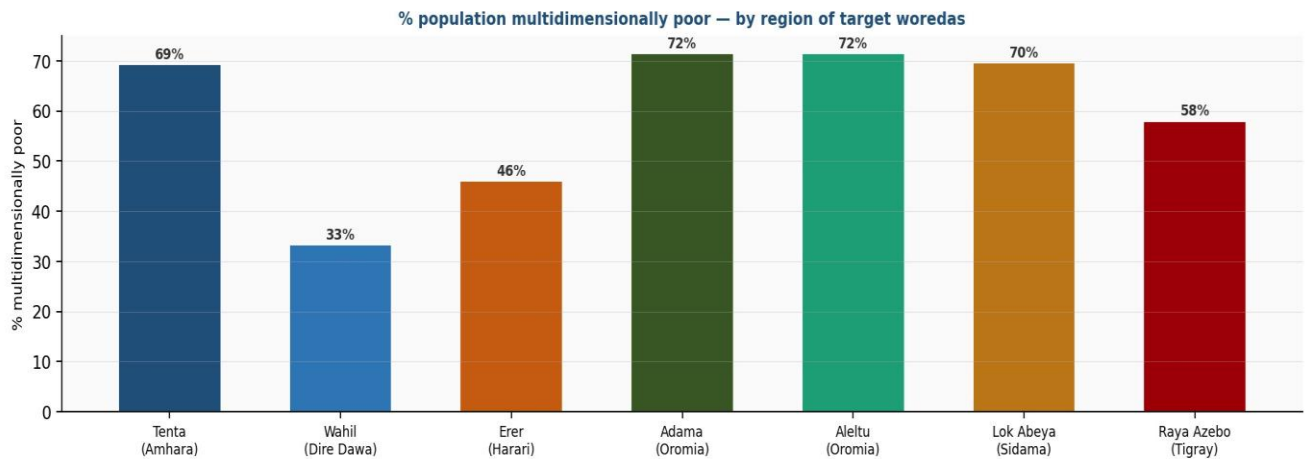
Comparative Vulnerability Overview Across All Seven Woredas

The following charts and heatmap present a comparative view of key vulnerability indicators across the seven target woredas, based on the most recent nationally representative data available at regional level. All seven woredas sit above national averages on multiple deprivation dimensions, confirming the evidence base for their selection as priority targets for GCF SAP investment.

Region	Target Woreda(s)	Global MPI (OPHI 2024)	% Multidim. Poor	Lived Poverty (Afrobar. 2023)	Poverty Headcount (CSA 2016)
Amhara	Tenta	0.360	69.3%	41%	26.1%
Dire Dawa	Wahil	0.178	33.3%	58%	15.4%
Harari	Erer / Sofi	0.241	46.0%	79%	7.1%
Oromia	Adama & Aleltu	0.385	71.5%	62%	23.9%
Sidama (SNNPR proxy)	Lok Abeya	0.363*	69.6%*	55%	24.0%*
Tigray	Raya Azebo	0.305	58.0%	98%	27.0%

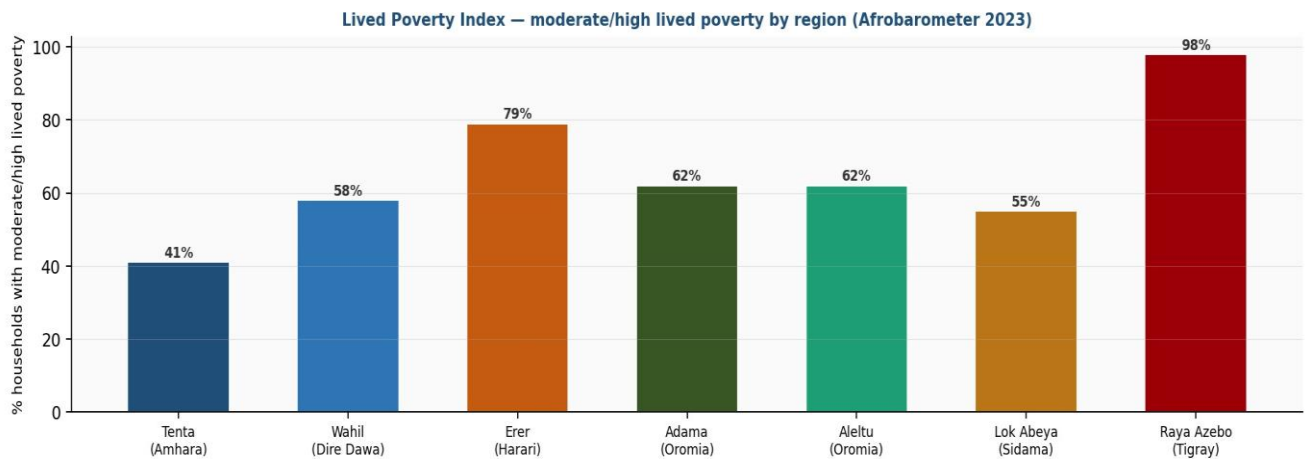
Source: OPHI Global MPI October 2024 (based on DHS 2019); Afrobarometer Dispatch No. 882 (2024); CSA Ethiopia / World Bank Welfare Monitoring Survey 2016. *Sidama uses SNNPR regional proxy (pre-2020 administrative split).

Ethiopia national MPI: 0.367 [A higher score (closer to 1.0) means deeper, more widespread poverty]. All target woreda regions exceed the Addis Ababa benchmark (0.068) by a factor of 2.5–5.6×. Oromia (0.385) and Amhara (0.360) show the highest MPI values; Dire Dawa (0.178) is lowest but still well above the national urban average.



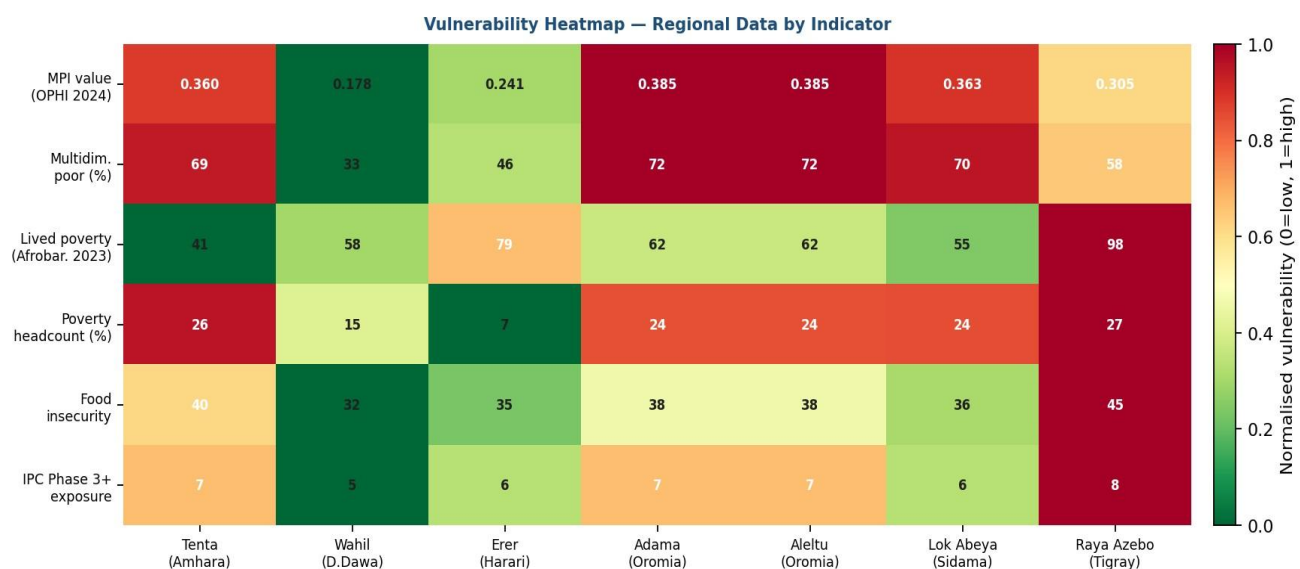
Source: OPHI Global MPI 2024 (DHS 2019). National: 68.7%.

More than two-thirds of the population in Oromia (71.5%), Amhara (69.3%), and Sidama/SNNPR (69.6%) regions, home to five of the seven target woredas, are multidimensionally poor. Intensity of deprivation (average share of weighted indicators in which poor people are deprived) exceeds 52% in all regions.



Source: Afrobarometer Round 9 (2023). Respondents reporting going without food, water, medical care, cooking fuel, or cash income at least once in past 12 months.

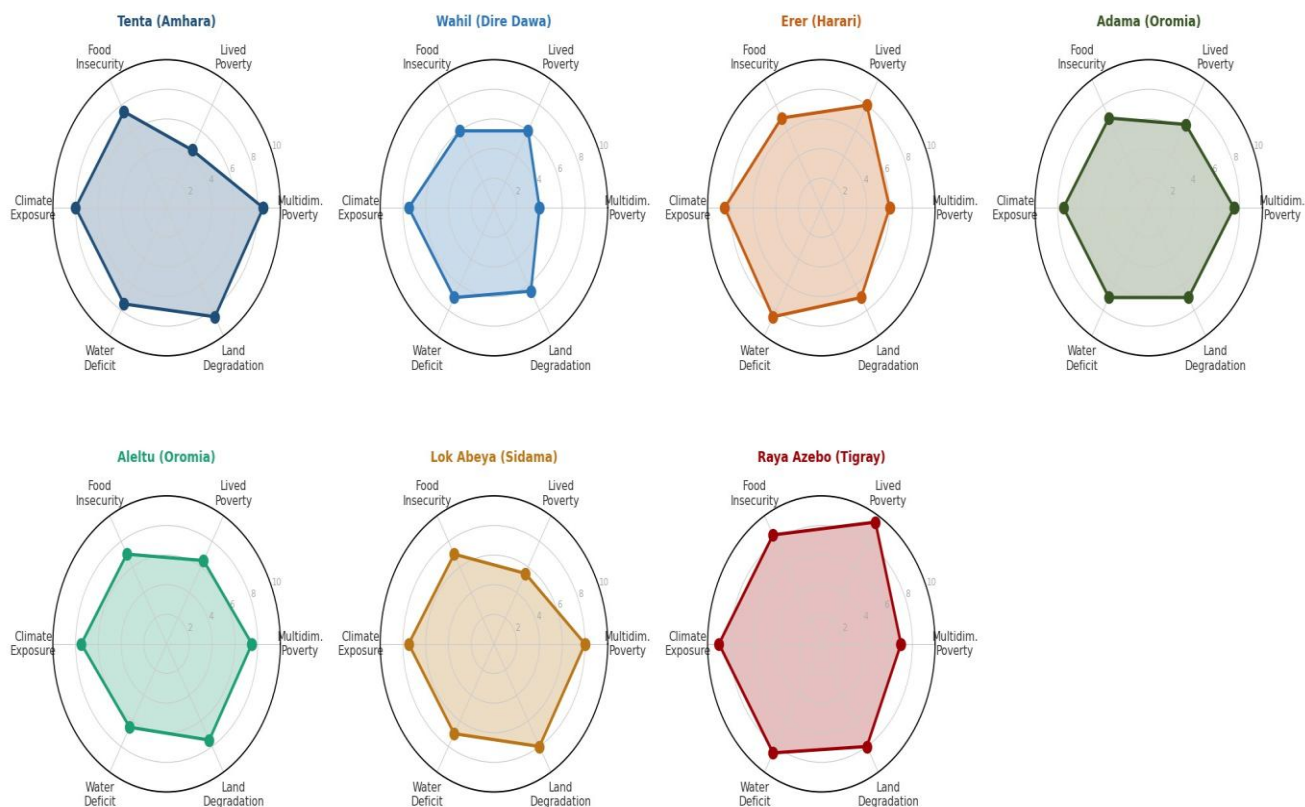
Tigray (98%) and Harari (79%) show the highest lived poverty rates among target woreda regions. Afrobarometer data capture experienced deprivation rather than income thresholds, providing a complementary lens on household-level vulnerability. All seven regions exceed the Addis Ababa benchmark (40%).



Sources: OPHI Global MPI 2024 (DHS 2019); Afrobarometer Round 9 2023; CSA Ethiopia/World Bank 2016 poverty headcount; FEWS NET 2023/24; OCHA Ethiopia Situation Report 2024. *Sidama uses SNNPR regional data.

Heatmap of normalised vulnerability scores across six indicator dimensions. Red = high vulnerability, green = lower relative vulnerability. Raya Azebo (Tigray) and Tenta (Amhara) show the broadest multi-dimensional vulnerability footprints. Erer (Harari) shows elevated lived poverty and water deficit scores.

Multidimensional Vulnerability Radar — All Seven Target Woredas



Scores (0-10) are composite assessments based on: MPI (OPHI 2024), Lived Poverty Index (Afrobarometer 2023), FEWS NET food security data, NMA climate diagnostics, and pre-feasibility field assessments. Higher score = greater vulnerability.

Radar charts show composite vulnerability scores (0–10) for each woreda across six dimensions. Scores are author-derived composites based on the cited regional datasets and pre-feasibility field assessments. Larger filled areas = higher multi-dimensional vulnerability. No single woreda dominates all dimensions, confirming the complementarity of the portfolio.

1.3.2 Individual Woreda Vulnerability Profiles

01. Tenta Woreda		Amhara Region Debub Wollo Zone
Dimension	Evidence and Indicators	
Climate exposure & hazards	Recurrent drought and erratic rainfall are the dominant climate hazards. South Wollo Zone (which contains Tenta Woreda) lies in one of Ethiopia's most drought-prone highland corridors. Temperature increases of 0.37–0.49°C per decade have been recorded in the adjacent lowland and midland agro-ecologies (NMA NFCS 2020). Landslides and soil erosion are frequent on steep terrain. The kiremt (main rainy season) has become increasingly erratic, with documented delayed onset and shortened growing periods.	
Livelihood & food security	Only 6.2% of households in South Wollo Zone can feed their members for all 12 months of the year (Preprints.org, 2024). In eastern Amhara, 40.1% of households are food insecure (Springer Nature, 2025). Livelihoods are predominantly rain-fed mixed crop-livestock (teff, barley, sorghum). Average landholding is below 1 ha. The Productive Safety Net Programme (PSNP) operates extensively in the zone, reflecting chronic food insecurity. Amhara regional MPI is 0.360 with 69.3% of population multidimensionally poor.	
Water access & WASH	Many communities in Tenta Woreda lack access to reliable and safe water for domestic use and livestock. Access to improved water supply is constrained by terrain and limited infrastructure investment. Deforestation and watershed degradation have reduced groundwater recharge and surface water retention. Women and girls spend substantial time collecting water from distant or unsafe sources, displacing productive and educational activity.	
Gender & social inclusion	Women in Amhara region bear disproportionate burdens of food and water insecurity. Female-headed households are over-represented among PSNP beneficiaries and chronically food-insecure groups. Gender-based violence risks increase during drought periods. The MPI intensity of 52.0% indicates deep and overlapping deprivations that fall heavily on women and children. UNICEF (2024) notes ongoing conflict-related displacement in Amhara disrupting access to services, including for women.	

Data sources: OPHI Global MPI 2024 (DHS 2019); Afrobarometer R9 2023; CSA/World Bank poverty line 2016; PMC/Preprints South Wollo food security studies 2023–2024; NMA NFCS 2020; UNICEF Ethiopia 2024.

02. Wahil Cluster Woreda		Dire Dawa Region Dire Dawa City Administration
Dimension	Evidence and Indicators	
Climate exposure & hazards	The Wahil Cluster is an agro-pastoral area characterised by moisture stress, recurrent drought, and periodic flooding. Dire Dawa City Administration, while lower on aggregate MPI than rural regions, contains peri-urban and rural clusters with acute climate vulnerability. The Wahil Cluster lies in a lowland zone exposed to erratic rainfall and seasonal flooding events. OCHA (2024) identifies Dire Dawa and Harari as exposed to flash flood risks from belg/gu/ganna rains, displacing households and damaging infrastructure.	

Livelihood & food security	Dire Dawa's regional poverty headcount of 15.4% (2016) masks significant intra-regional disparity between the urban core and peri-urban/rural clusters such as Wihil. Afrobarometer (2023) records 58% of Dire Dawa households experiencing moderate/high lived poverty — higher than the Amhara regional figure — indicating that experienced deprivation is more acute than income metrics suggest. Livelihoods are heavily tied to agro-pastoral systems sensitive to rainfall variability. Limited livelihood diversification constrains recovery from climate shocks.
Water access & WASH	Water access in the Wihil Cluster is constrained relative to local needs. Existing irrigation and water storage infrastructure is insufficient to support livelihoods during dry periods. Cholera cases have been confirmed in Dire Dawa (OCHA 2023), reflecting inadequate access to safe water and sanitation in affected communities. Solar-powered water access is minimal, with diesel pumps used for the limited mechanised water supply.
Gender & social inclusion	Women in agro-pastoral systems in Wihil bear primary responsibility for water collection and livestock management during dry periods. Female-headed households face heightened exposure to climate shocks due to limited asset bases. Dire Dawa's MPI intensity of 53.4% — the highest among the six target regions — reflects that those who are poor experience very deep and overlapping deprivations.

Data sources: OPHI Global MPI 2024; Afrobarometer R9 2023; CSA Ethiopia 2016 poverty line; OCHA Ethiopia 2023/24; FEWS NET Ethiopia 2025.

03. Erer Woreda Harari Region Harari Region	
Dimension	Evidence and Indicators
Climate exposure & hazards	Erer Woreda is one of the most climate-sensitive and water-stressed areas in Harari Region, lying predominantly in an arid lowland livelihood zone. Erratic and insufficient rainfall makes livelihoods highly vulnerable to prolonged dry spells. FEWS NET (2025) records widespread crop failure in East Hararghe (which borders Erer) due to inadequate kiremt rains, with complete crop failure in the lowlands and households migrating to towns including Harar and Dire Dawa in search of income. Soil erosion, flooding, and vector and water-borne diseases compound climate vulnerability.
Livelihood & food security	Despite Harari's relatively low aggregate poverty headcount (7.1% in 2016 — driven by the urban core of Harar), Afrobarometer (2023) records 79% of Harari households with moderate/high lived poverty — the second highest among target woreda regions. This paradox reflects that the rural and peri-urban populations (including Erer Woreda) experience acute deprivation not captured in urban-skewed poverty lines. Crop and livestock pests, inadequate infrastructure, and low educational attainment constrain adaptive capacity. Livelihoods are closely tied to erratic rainfall and natural resources.
Water access & WASH	Water insecurity is a defining challenge for Erer Woreda. Many communities face limited access to reliable water for domestic use, livestock, and productive activities. The woreda's arid lowland character means that surface water is scarce and seasonal. Groundwater resources are limited and access to solar-powered pumping technology is negligible. Vector and water-borne disease prevalence — including in Dire Dawa and Harari (cholera cases confirmed, OCHA 2023) — reflects the inadequacy of WASH infrastructure serving communities in Erer.
Gender & social inclusion	Women in Erer carry primary responsibility for water collection in an environment where water sources are distant and often unsafe. Harari Region MPI of 0.241 masks the deeper deprivation of rural Erer households. The MPI intensity of 52.4% indicates that poor households in Harari are deprived across more than half of measured wellbeing dimensions. Low educational attainment, noted in the pre-feasibility assessment, further constrains women's access to information and adaptive resources.

Data sources: OPHI Global MPI 2024; Afrobarometer R9 2023; CSA Ethiopia 2016 poverty line; FEWS NET Ethiopia Feb 2025; OCHA Ethiopia Situation Report 2024.

04. Adama Woreda		Oromia Region East Shewa Zone — Rift Valley
Dimension	Evidence and Indicators	
Climate exposure & hazards	Adama Woreda lies in the Rift Valley of Oromia Region, where rainfall is generally inadequate for crop production and recurrent drought is persistent. The Rift Valley zone is characterised by altitude variation, degraded land, and limited usable agricultural area. FEWS NET (2023) identifies areas along the Rift Valley of Oromia as facing rainfall deficits during kiremt, with crops at risk of wilting. Oromia's IDP caseload (29.5% of national total, OCHA 2024) reflects the compounding effects of climate shocks and conflict on population displacement in the region.	
Livelihood & food security	Oromia has the highest regional MPI (0.385) and largest share of multidimensionally poor population (71.5%) among all target woreda regions. Adama Woreda's Rift Valley location places it in an agroecological zone highly sensitive to rainfall variability. Limited irrigation infrastructure means livelihoods remain predominantly rain-fed. Access to finance, productive assets, and markets is constrained for smallholder households. UNICEF (2024) notes that conflict in Oromia has damaged health facilities and severely compromised basic services, compounding food security challenges.	
Water access & WASH	Water insecurity in Adama Woreda is significant. Irrigation infrastructure is insufficient relative to local agricultural needs, and access to reliable potable water supply is limited in rural areas. Solar-powered water systems are effectively absent. The combination of declining surface water flows, limited groundwater access, and inadequate WASH infrastructure creates compound vulnerability, particularly for women and children dependent on distant water sources.	
Gender & social inclusion	Oromia's MPI intensity of 53.8% — the highest among all target regions — reflects that poor households in the region experience deep and overlapping deprivations. Women and girls face structural barriers to education, land rights, and economic participation. Female-headed households in the Rift Valley face heightened exposure to drought-related shocks with limited capacity to recover. Youth unemployment in Oromia is elevated.	

Data sources: OPHI Global MPI 2024; Afrobarometer R9 2023; CSA/World Bank 2016; FEWS NET 2023; OCHA Ethiopia 2024; UNICEF Ethiopia Annual Report 2024.

05. Aleltu Woreda		Oromia Region North Shewa Zone — Highland Mixed
Dimension	Evidence and Indicators	
Climate exposure & hazards	Aleltu Woreda is a highland mixed livelihood system in North Shewa Zone of Oromia characterised by long-standing natural resource degradation. Drought is among the most severe hazards, with direct impacts on crop production, water availability, and household food security. While the highland location differs from the Rift Valley context of Adama, both share the same Oromia regional vulnerability profile. Climate variability has intensified land pressure and reduced the reliability of rain-fed farming on which livelihoods depend.	
Livelihood & food security	Livelihoods in Aleltu are predominantly rain-fed cereal production (maize, teff, sorghum) with livestock as a supplementary asset. Landholdings are small and degraded land further constrains productivity. Irrigation infrastructure is minimal. As with Adama, Oromia regional data apply: 71.5% multidimensionally poor, MPI 0.385. FEWS NET (2023) identifies northern Oromia highland areas as facing food security stress during lean seasons. Limited livelihood diversification leaves households highly exposed to climate-induced production failure.	
Water access & WASH	Water access is constrained in Aleltu by the absence of adequate infrastructure for both potable supply and irrigation. Minimal irrigation coverage means that even when water is physically available in groundwater, communities cannot access it without appropriate pumping technology. Soil and water conservation works are inadequate to retain moisture during prolonged dry spells.	

Gender & social inclusion

Gender-based vulnerabilities in Aleltu mirror broader Oromia patterns. Women bear disproportionate water and food insecurity burdens. MPI intensity of 53.8% reflects deep overlapping deprivations. Structural inequalities in land rights and access to credit limit women's capacity to invest in climate-resilient technologies. Youth unemployment and limited diversification opportunities constrain livelihood options for both men and women.

Data sources: OPHI Global MPI 2024; Afrobarometer R9 2023; CSA/World Bank 2016; FEWS NET 2023. Note: Oromia regional data applied to both Adama and Aleltu.

06. Lok Abeya Woreda

Sidama Region | Sidama Region — Great Rift Valley

Dimension

Evidence and Indicators

Climate exposure & hazards

Lok Abeya Woreda lies in the Great Rift Valley of Sidama Region, with a mixed lowland and highland agroecology. Recurrent drought affects crop performance, water availability, and livestock production. UNICEF (2024) records increases in severe acute malnutrition in Sidama linked to food insecurity and disease outbreaks, with admission rates increasing significantly in 2023. OCHA (2024) identifies Sidama as part of the national cholera outbreak, indicating inadequate WASH infrastructure. Population pressure on land and vegetation degradation reduce the productive capacity of local natural resources.

Livelihood & food security

Sidama was part of SNNPR until 2020 and regional MPI data reflect the SNNPR baseline (0.363 MPI; 69.6% multidimensionally poor). Land degradation and deforestation compound agricultural vulnerability. Livelihoods depend heavily on perennial crops (enset, coffee, root crops) alongside cereals and livestock. Limited diversification and weak market access constrain household income. The Afrobarometer (2023) records 55% of Sidama households with moderate/high lived poverty.

Water access & WASH

Water insecurity and fragile watershed conditions are major concerns in Lok Abeya. Many communities face limited access to reliable water for domestic and productive use. Climate-sensitive farming systems are vulnerable to prolonged dry periods and land degradation reduces water retention capacity. Cholera outbreaks in Sidama (OCHA 2023) confirm the inadequacy of WASH systems in serving rural communities.

Gender & social inclusion

Women in Lok Abeya bear the burden of water collection and agricultural labour in a context of limited assets and structural inequalities. Female-headed households are particularly vulnerable to climate shocks. SNNPR/Sidama MPI intensity of 52.1% reflects deep deprivation among poor households. UNICEF (2024) links increases in child malnutrition in Sidama directly to food insecurity and disease, with women and children disproportionately affected.

*Data sources: OPHI Global MPI 2024 (*SNNPR proxy for Sidama; DHS 2019); Afrobarometer R9 2023; CSA/World Bank 2016; UNICEF Ethiopia Annual Report 2024; OCHA Ethiopia 2023.*

07. Raya Azebo Woreda

Tigray Region | Debub (South) Tigray Zone

Dimension

Evidence and Indicators

Climate exposure & hazards

Raya Azebo Woreda is among the most climate-exposed areas in the project portfolio. It is highly exposed to recurrent drought and increasing rainfall variability in the semi-arid lowland zone. FEWS NET (2025) projects Emergency (IPC Phase 4) outcomes in southern Tigray if gu/genna rainfall is below average, with households having faced three or four consecutive poor seasons since the historic 2020–2023 drought. Flooding, soil erosion, and climate-related health hazards compound drought impacts. The Afrobarometer (2023) records 98% of Tigray households with moderate/high lived poverty — the highest of all target regions — reflecting the devastating combined impact of climate shocks and the 2020–2022 conflict.

Livelihood & food security	Tigray's food security situation is among the most acute in the portfolio. Approximately 1 million people remain internally displaced in Tigray (UNICEF 2024). Despite a regional MPI of 0.305 (relatively lower than Oromia or Amhara), the lived poverty rate of 98% reflects near-universal deprivation in experienced wellbeing. Food assistance is concentrated in Tigray (FEWS NET), with fuel shortages and security constraints impeding timely delivery. Raya Azebo's poverty headcount of 27.0% (2016, before the conflict) will have worsened significantly. FEWS NET (2023) notes that in the aftermath of the 2020–2023 drought and 2020–2022 conflict, Emergency (IPC Phase 4) outcomes persist in northern Ethiopia.
Water access & WASH	Water access in Raya Azebo is critically constrained. The 2020–2022 conflict severely damaged water infrastructure across Tigray, including solar pumping systems, water points, and irrigation schemes. Recovery of water infrastructure has been partial. UNICEF (2024) confirms that significant food insecurity and basic service gaps persist in Tigray despite improvements following the peace agreement. Restoration of solar-powered water systems under the SAP project responds directly to this documented infrastructure deficit.
Gender & social inclusion	Women in Tigray face compounded vulnerabilities from climate shocks, conflict, and displacement. UNICEF (2024) highlights elevated need for mental health and psychosocial support among gender-based violence survivors in Tigray. Female-headed households — disproportionately represented among conflict-displaced populations — face acute water, food, and livelihood insecurity. Tigray's MPI intensity of 52.5% indicates deep overlapping deprivations. The SAP project's emphasis on women as primary beneficiaries is particularly critical in this context.

Data sources: OPHI Global MPI 2024 (DHS 2019); Afrobarometer R9 2023 — highest LPI nationally; CSA/World Bank 2016 poverty headcount; FEWS NET Ethiopia 2023/25; OCHA Ethiopia Situation Report 2024; UNICEF Ethiopia Annual Report 2024.

1.3.3 Overall Site Selection Conclusion

All seven woredas exhibit higher climate exposure, lower adaptive capacity, and stronger feasibility for scale-up than other woredas in the same regions. Each faces recurrent drought, rainfall variability, water stress, and land degradation in more acute and multi-hazard forms than neighbouring districts. All seven are directly adjacent to the successful AF project sites, enabling efficient replication of the proven model and responding to documented community demand for expansion.

Key selection justification:

- **Climate vulnerability:** All seven regions exceed national MPI averages. Raya Azebo (98% lived poverty) and Oromia (71.5% multidimensionally poor) represent the most acute portfolio ends.
- **Water deficit:** Clean water access below 55% across all 13 reporting kebeles. Two kebeles at effectively zero access (0% and 1%).
- **Irrigation gap:** Only 24% of identified irrigable land is currently under development.
- **Land degradation:** Over 11,849 ha degraded across 13 reporting kebeles; 5,954 ha reforestation potential.
- **AF adjacency:** All target kebeles are adjacent to AF project kebeles with similar vulnerability profiles, enabling efficient scale up.

2. Baseline Situation

2.1 Socio-Economic Baseline

The baseline conditions across the seven target woredas represent a continuation and deepening of the conditions documented under the AF project. Average landholdings at approximately 0.9 hectares per household are predominantly unirrigated rain-fed agriculture. Soil fertility is low and erosion is high; hillsides are typically stripped of vegetation cover with gully formation widespread. Households are overwhelmingly dependent on subsistence cereal and livestock production, with very few sources of alternative income or access to formal financial services.

Regional Multidimensional Poverty Index (MPI) data from OPHI (2024, based on CSA/DHS 2019) confirms the depth of deprivation: **71.5% of Oromia's population is multidimensionally poor** (MPI 0.385 — the highest of all target regions), **69.3% of Amhara** (MPI 0.360), **69.6% of Sidama/SNNPR** (MPI 0.363), and **58.0% of Tigray** (MPI 0.305). Afrobarometer (2023) records **98% of Tigray households with moderate or high lived poverty** — the highest nationally — reflecting the compounding effects of the 2020–2022 conflict and 2020–2023 drought sequence.

2.2 Kebele-Level Vulnerability Baseline

Field surveys and consultations with kebele administrations conducted during the 2023–2024 pre-feasibility assessment provide detailed baseline data across 15 target kebeles. The data confirm that the climate-development deficits documented under the AF project persist in unserved adjacent kebeles at comparable or greater severity.

Key baseline findings across the 15 target kebeles:

- **Combined population:** Approximately 96,505 people across approximately 13,608 households.
- **Water access:** Clean water access ranges from 0% (Bate Kelu, Adama) to 54% (Jelobeline, Wahil). No kebele meets Ethiopia's 80% minimum service standard. Women travel 1.5–6 km daily for water, universally exceeding the WHO 0.5 km benchmark.
- **Irrigation gap:** Total irrigable land of approximately 3,166 ha identified across 13 reporting kebeles, of which only 764 ha (24%) is currently under small-scale irrigation.
- **Land degradation:** Approximately 11,849 ha of degraded land identified across 13 reporting kebeles, with approximately 5,954 ha of reforestation potential on public/common land.
- **Food insecurity and aid dependency:** Over 29,000 people receive humanitarian food aid across 13 reporting kebeles. Kurkur (Tenta) has the highest proportional aid dependency at approximately 46% of the kebele population.
- **Livelihood limitations:** Over 4,794 households have severely limited income sources. Approximately 13,427 people (6,184 female; 7,243 male) have been identified as potential participants in alternative income activities.

2.3 Kebele selection criteria and beneficiaries

Kebele-Level Vulnerability Analysis

This section presents a structured analysis of kebele-level vulnerability data collected across 15 target kebeles in the seven project woredas: Adama and Aleltu (Oromia), Wahil Cluster (Dire Dawa), Tenta (Amhara), Lok Abeya (Sidama), Sofi (Harari), and Raya Azebo (Tigray). Data were collected through field surveys and consultations with kebele administrations and local government offices. This analysis informs the kebele selection section and supports the woreda selection justification. All Amharic terms have been translated into English.

Section 1 — Kebele Profile Summary: All 15 Target Kebeles

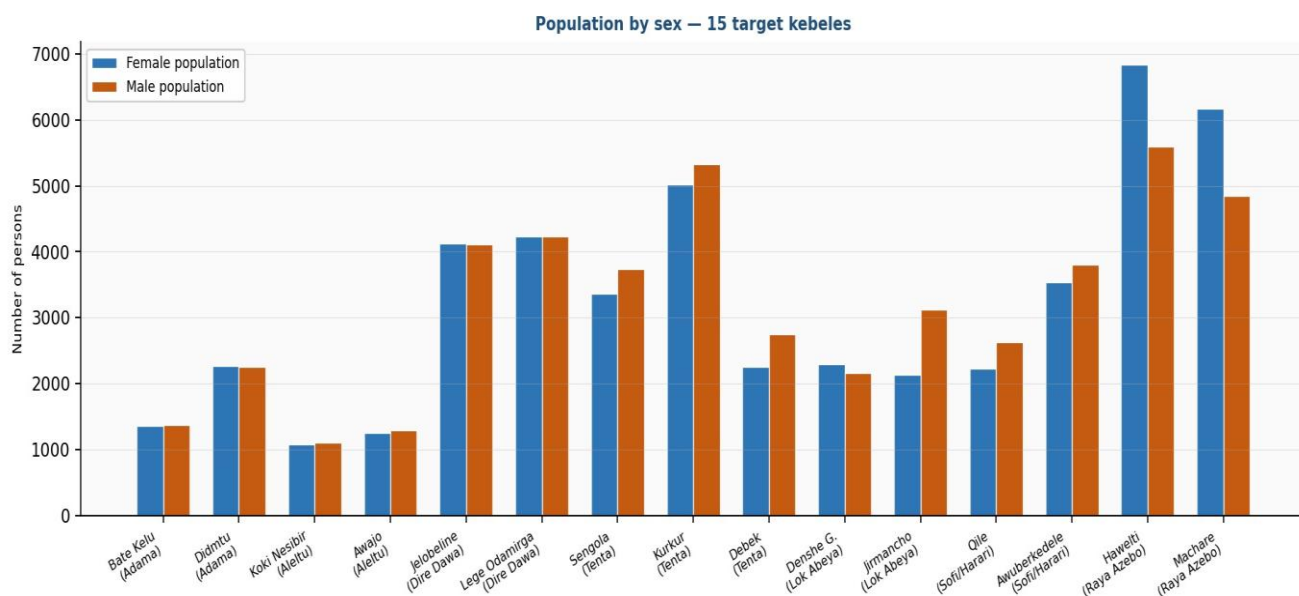
The table below provides a consolidated overview of each target kebele across five key vulnerability dimensions. Data are sourced from kebele administration surveys conducted during the pre-feasibility study field assessment (2023–2024).

Kebele	Woreda	Region	Total Population	Total HHs	Water Access %	Aid Recipients	Irrigable Land (ha)	Degraded Land (ha)
Bate Kelu	Adama	Oromia	2,727	462	0%	1,646	135	320
Didmtu	Adama	Oromia	4,518	511	1%	–	125	192
Koki Nesibir	Aleltu	Oromia	2,192	457	27%	457	258	80
Awajo Nefto Baso	Aleltu	Oromia	2,544	530	18%	560	500	94
Jelobeline	Wahil	Dire Dawa	8,240	1,987	54%	4,362	50	1,880
Lege Odamirga	Wahil	Dire Dawa	8,472	1,704	45%	5,566	85	2,330
Sengola	Tenta	Amhara	7,100	1,051	46%	2,178	78.5	1,765
Kurkur	Tenta	Amhara	10,347	1,277	46%	4,800	235	1,755
Debek	Tenta	Amhara	5,001	1,319	31%	3,000	150	1,986
Denshe Gambela	Lok Abeya	Sidama	4,455	770	54%	–	400	42
Jirmancho	Lok Abeya	Sidama	5,264	878	53%	–	350	235
Qile	Sofi	Harari	4,858	990	26%	2,350	400	650
Awuberkedele	Sofi	Harari	7,337	1,672	32%	200	400	520
Hawelti	Raya Azebo	Tigray	12,439	–	–	–	–	–
Machare	Raya Azebo	Tigray	11,011	–	–	–	–	–

Source: Kebele Administration Survey, Pre-Feasibility Study Field Assessment 2023–24. HHs = households. Water access % = share of kebele population with access to clean water. Aid recipients = number of people receiving humanitarian food or drought assistance. Irrigable land = total land technically suitable for minor irrigation development.

Section 2 — Population and Household Composition

The 15 target kebeles have a combined population of approximately 96,505 people across 13,608 households. The Dire Dawa and Tenta (Amhara) kebeles are the largest by population. Female-headed households — a key vulnerability indicator — range from 34 in Denshe Gambela to 320 in Kurkur, reflecting gender-differentiated livelihood conditions across the project areas.



Source: Kebele Administration Survey 2023-24

Total combined population of 15 kebeles: approx. 96,505 people (48,169 female; 48,335 male). Jelobeline and Lege Odamirga (Wahil/Dire Dawa) are the largest kebeles by population, while Bate Kelu and Koki Nesibir are the smallest.

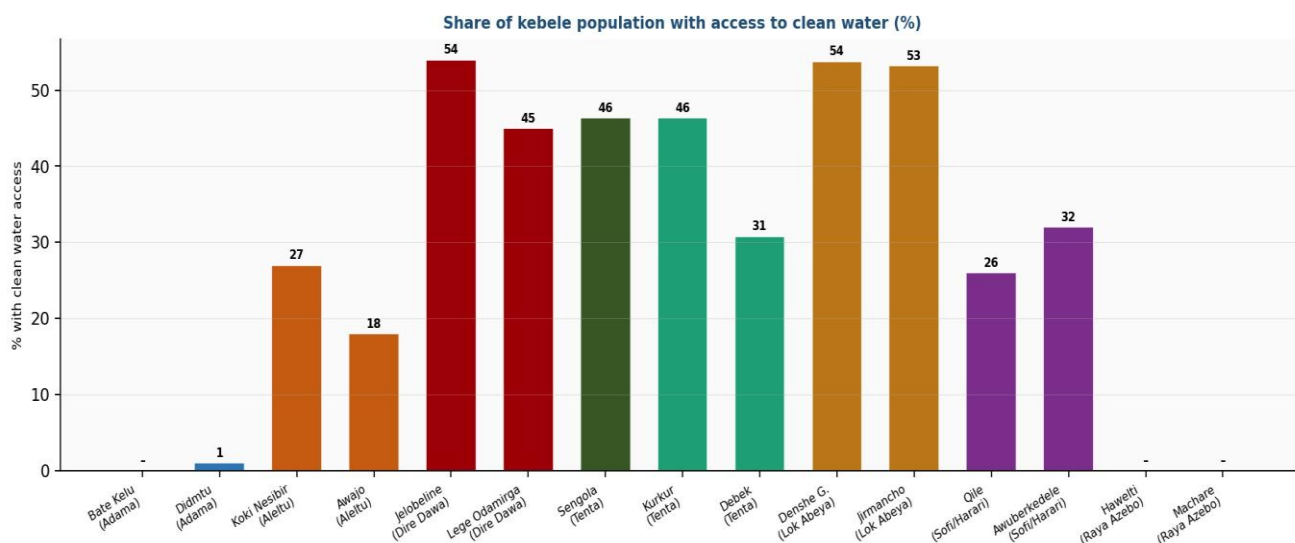
Kebele	Woreda	Male-headed HHs	Female-headed HHs	Total HHs	% Female-headed
Bate Kelu	Adama	390	72	462	15.6%
Didmtu	Adama	368	143	511	28.0%
Koki Nesibir	Aleltu	400	57	457	12.5%
Awajo Nefto Baso	Aleltu	450	80	530	15.1%
Jelobeline	Wahil	1,821	166	1,987	8.4%
Lege Odamirga	Wahil	1,523	181	1,704	10.6%
Sengola	Tenta	853	198	1,051	18.8%
Kurkur	Tenta	957	320	1,277	25.1%
Debek	Tenta	1,109	210	1,319	15.9%
Denshe Gambela	Lok Abeya	736	34	770	4.4%
Jirmancho	Lok Abeya	721	157	878	17.9%
Qile	Sofi	796	194	990	19.6%
Awuberkedele	Sofi	1,362	310	1,672	18.5%
Hawelti	Raya Azebo	–	–	–	–

Machare	Raya Azebo	—	—	—	—
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Female-headed households (FHHs) face disproportionate vulnerability to climate shocks due to limited asset ownership, reduced access to labour, and lower adaptive capacity. Kukur (Tenta) has the highest share at approximately 25.1% FHHs (320 of 1,277 total), followed by Awuberkedele (Sofi/Harari) at 18.5%.

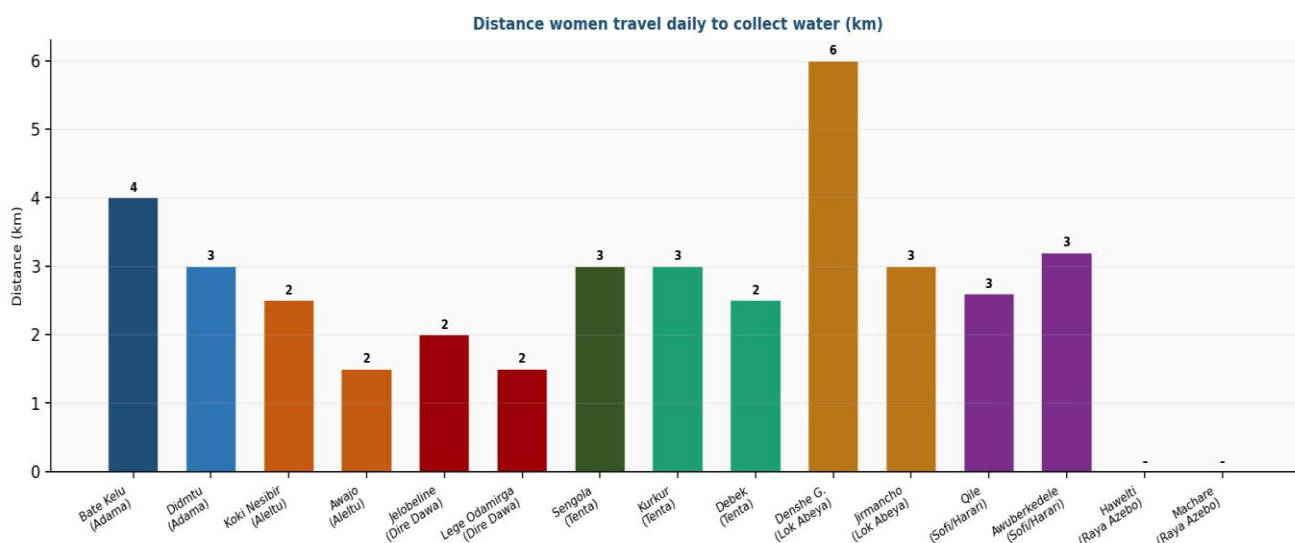
Section 3 — Water Access and Clean Water Deficit

Water insecurity is the most acute and uniform vulnerability across all 15 target kebeles. Access to clean water ranges from 0% in Bate Kelu (Adama) to 54% in Jelobeline (Dire Dawa). No kebele meets the Ethiopian government's minimum service standard of 80% coverage. Women bear the primary burden of water collection, travelling between 1.5 and 6 kilometres daily and spending between 1 and 3 hours on water-fetching activities — time that is displaced from productive, educational and economic activities.



Source: Kebele Administration Survey 2023-24

Red dashed line indicates Ethiopian minimum service standard (80%). No target kebele meets this threshold. Bate Kelu (0%) and Didmtu (1%) in Adama Woreda have effectively no clean water access, representing the most severe water deficit in the portfolio.



Source: Kebele Administration Survey 2023-24. WHO benchmark: 30 min / 0.5 km.

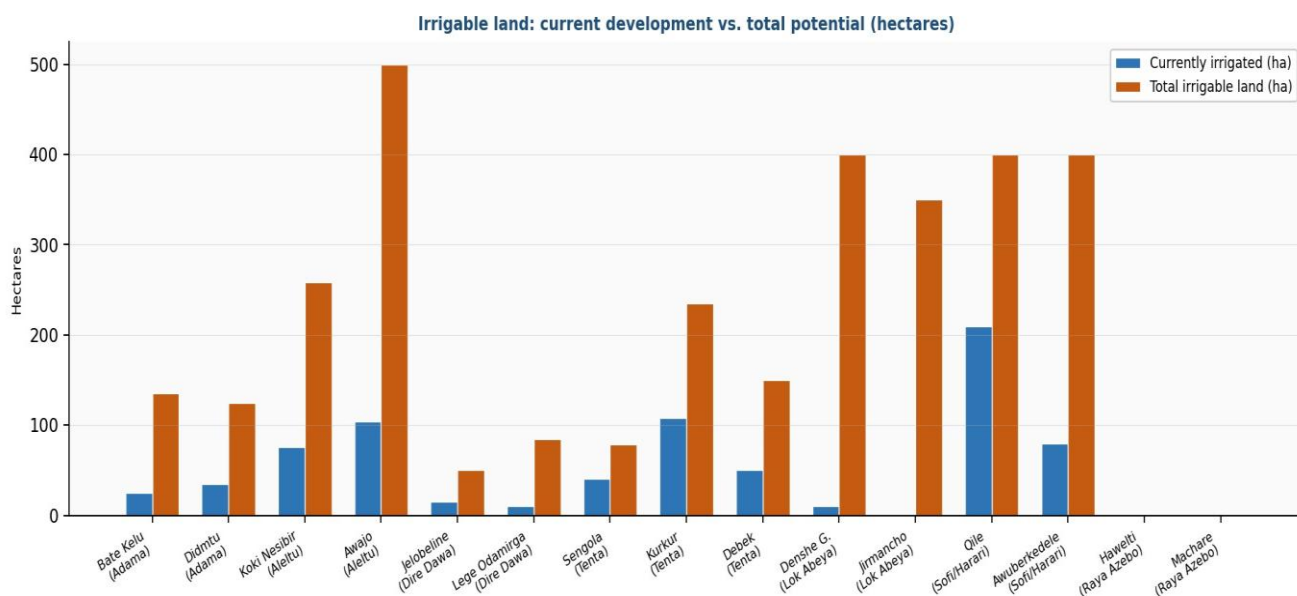
Denshe Gambela (Lok Abeya/Sidama) has the longest distance at 6 km, followed by Bate Kelu (4 km) and Didmtu (3 km). The WHO benchmark of 30 minutes or 0.5 km is exceeded in every single target kebele, confirming acute water access deficits that impose major time-poverty burdens on women.

Kebele	Woreda	Water Access %	Current Source	Women's Distance (km)	Women's Time (hrs/day)	Future Potential Source	Potential Irrig. (ha)
Bate Kelu	Adama	0%	Qoqa Dam	4	2■30	Qoqa Dam	160
Didmtu	Adama	1%	Wonji Sugar Factory irrigation canal	3	1■45	Deep well	230
Koki Nesibir	Aleltu	27%	Groundwater (borehole)	2.5	3■00	Groundwater (borehole)	240
Awajo Nefto Baso	Aleltu	18%	Spring and groundwater	1.5	2■20	Groundwater (borehole)	310
Jelobeline	Wahil	54%	Spring and deep well	2	3.0	Deep well and dam	15
Lege Odamirga	Wahil	45%	Deep well / Agaz stream	1.5	1.0	Deep well and small dam	20
Sengola	Tenta	46%	Spring and groundwater	3	3.0	Spring and groundwater	20.8
Kurkur	Tenta	46%	Spring and groundwater	3	3.0	Spring and groundwater	12.8
Debek	Tenta	31%	Spring and groundwater	2.5	3.1	Spring and groundwater	—
Denshe Gambela	Lok Abeya	54%	Groundwater (borehole)	6	2.0	Groundwater (borehole)	125
Jirmancho	Lok Abeya	53%	Groundwater (borehole)	3	1.0	Groundwater (borehole)	320
Qile	Sofi	26%	Groundwater (borehole)	2.6	1.4	Groundwater (borehole)	300
Awuberkedele	Sofi	32%	Groundwater (borehole)	3.2	2.3	Groundwater (borehole)	320
Hawelti	Raya Azebo	—	None / not available	—	—	None / not available	—
Machare	Raya Azebo	—	None / not available	—	—	None / not available	—

Source: Kebele Administration Survey 2023–24. Current and future water sources translated from Amharic: ■■ ■■ = Qoqa Dam; ■■■ ■■■ = groundwater/borehole; ■■■ = spring; ■■■ ■■■■ = deep well; ■■■ = river. Potential irrigation hectares from future water development are indicative estimates from kebele administrations.

Section 4 - Small-Scale Irrigation: Current Status and Potential

The target kebeles contain a substantial but largely untapped irrigation potential. Total irrigable land across all 13 reporting kebeles is approximately 3,166 hectares, of which only 764 hectares (24%) are currently under small-scale irrigation. This represents a major adaptation gap, as irrigation is the primary pathway to reducing dependence on erratic rain-fed agriculture. Additional potential land available for future irrigation development totals approximately 2,558 hectares across the 13 reporting kebeles.



Source: Kebele Administration Survey 2023-24. Tigray kebeles data not reported.

The irrigation gap is largest in Awajo Nefto Baso (Aleltu: 500 ha potential, 104 ha currently developed), Qile (Sofi/Harari: 400 ha potential, 210 ha currently developed), and Denshe Gambela (Lok Abeya: 400 ha potential, only 10 ha developed). Jirmancho (Lok Abeya) has zero current irrigation despite 350 ha of irrigable land.

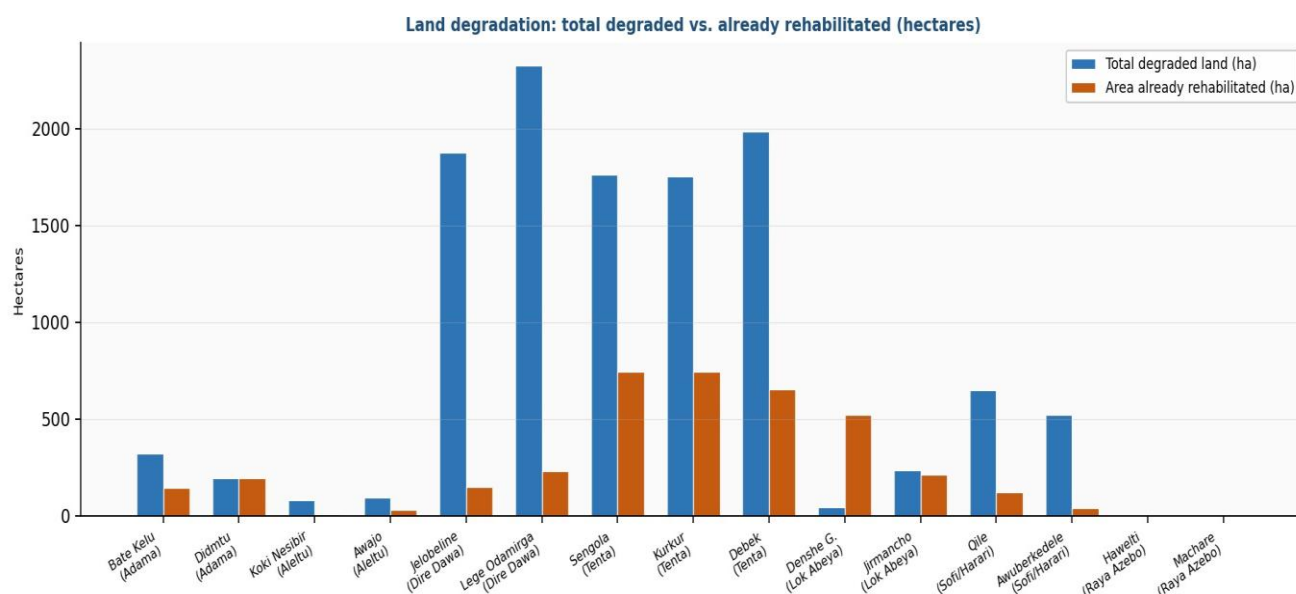
Kebele	Woreda	Irrigabl e Land (ha)	Current Irrig. (ha)	Gap (ha)	Irrigation Source	HHs Benefiting (M / F)	Potential HHs (M / F)
Bate Kelu	Adama	135	25	110	Qoqa Dam	55 / 12	– / –
Didmtu	Adama	125	35	90	Qoqa Dam	40 / 5	355 / –
Koki Nesibir	Aleltu	258	76	182	River and spring	104 / 65	206 / 80
Awajo Nefto Baso	Aleltu	500	104	396	River and spring	130 / 75	300 / 120
Jelobeline	Wahil	50	15	35	Hand-dug well	14 / 1	– / –
Lege Odamirga	Wahil	85	10	75	Hand-dug well	23 / 2	– / –
Sengola	Tenta	78.5	41	37.5	Well and spring	360 / 183	186 / 97
Kurkur	Tenta	235	108	127	River	470 / 183	520 / 148
Debek	Tenta	150	50	100	Groundwater (borehole)	150 / 50	410 / 125
Denshe Gambela	Lok Abeya	400	10	390	River	22 / –	612 / 21
Jirmancho	Lok Abeya	350	–	350	None / not available	– / –	630 / 420
Qile	Sofi	400	210	190	Groundwater (borehole)	280 / 60	520 / 142
Awuberkedele	Sofi	400	80	320	River	142 / 61	420 / 104

Hawelti	Raya Azebo	–	–	–	None / not available	– / –	– / –
Machare	Raya Azebo	–	–	–	None / not available	– / –	– / –

Current HH = households currently benefiting from irrigation. Potential HH = additional households that could benefit if full irrigation potential is developed. M = male-headed; F = female-headed. Irrigation source translated from Amharic.

Section 5 - Watershed Degradation and Rehabilitation Potential

Land degradation is a critical and cross-cutting vulnerability across the project portfolio. Total degraded land across 13 reporting kebeles amounts to approximately 11,849 hectares. The Dire Dawa and Tenta (Amhara) kebeles have the most severe degradation: Jelobelina (1,880 ha) and Lege Odamirga (2,330 ha) in the Wahil Cluster, and Debek (1,986 ha), Sengola (1,765 ha) and Kurkur (1,755 ha) in Tenta Woreda. In total, approximately 5,954 hectares of public and communal degraded land has been identified as suitable for reforestation across the reporting kebeles. Rehabilitation of these landscapes is critical for restoring watershed function, reducing soil erosion, improving water retention, and strengthening the natural resource base underpinning rural livelihoods.



Source: Kebele Administration Survey 2023-24. Tigray kebeles data not reported.

Dire Dawa kebeles (Lege Odamirga: 2,330 ha; Jelobelina: 1,880 ha) have the largest absolute degraded land areas, consistent with the agro-pastoral context of the Wahil Cluster where overgrazing and erosion are primary degradation drivers. Amhara/Tenta kebeles show higher proportional rehabilitation progress (Sengola: 744 ha rehabbed of 1,765 ha), reflecting prior AF project investments.

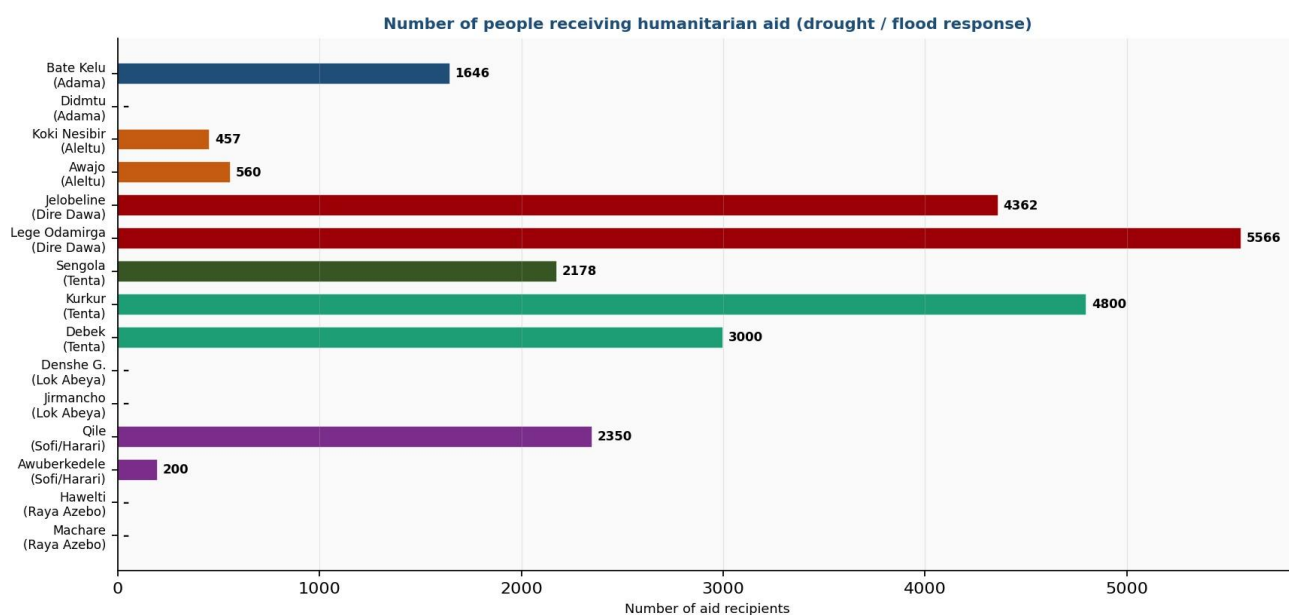
Kebele	Woreda	Total Degraded (ha)	Area Rehabilitated (ha)	Remaining Gap (ha)	Reforestation Potential (ha)	Workforce Available (F / M)
Bate Kelu	Adama	320	145	175	165	– / 1,359
Didmtu	Adama	192	192	–	68	– / 215
Koki Nesibir	Aleltu	80	9	71	48	410 / 92
Awajo Nefto Baso	Aleltu	94	28	66	54	450 / 190

Jelobeline	Wahil	1,880	150	1,730	900	266 / 1,021
Lege Odamirga	Wahil	2,330	230	2,100	980	281 / 1,410
Sengola	Tenta	1,765	744	1,021	752	768 / 1,396
Kurkur	Tenta	1,755	744	1,011	712	748 / 1,098
Debek	Tenta	1,986	655	1,331	988	748 / 860
Denshe Gambela	Lok Abeya	42	521	–	42	630 / 1,370
Jirmancho	Lok Abeya	235	210	25	235	994 / 1,025
Qile	Sofi	650	120	530	530	1,010 / 1,270
Awuberkedele	Sofi	520	40	480	480	860 / 1,108
Hawelti	Raya Azebo	–	–	–	–	– / –
Machare	Raya Azebo	–	–	–	–	– / –

Remaining gap = degraded land not yet under rehabilitation programme. Reforestation potential is from public/common degraded land available for afforestation/reforestation. Workforce available = community members (female/male) willing and able to participate in watershed rehabilitation activities.

Section 6 - Livelihoods, Food Security and Alternative Income

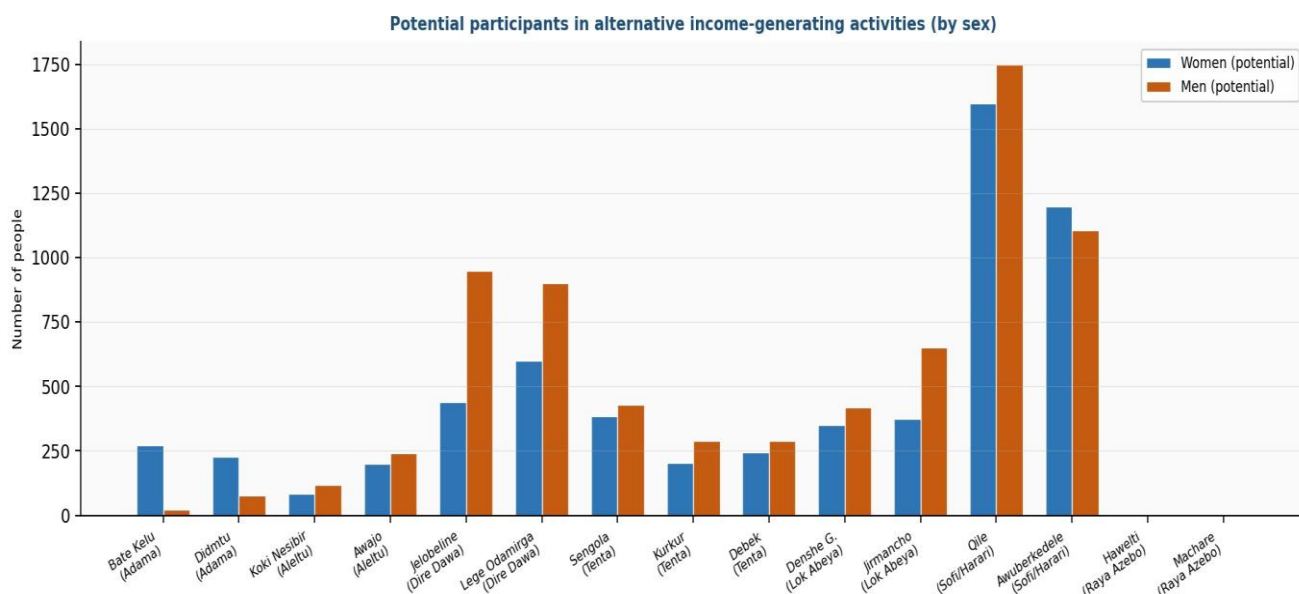
Limited income diversification is a defining structural vulnerability across all 15 target kebeles. The data record 4,794 households across 14 reporting kebeles as having severely limited income and crop sources — households that are chronically exposed to income shocks and food insecurity. In total, approximately 13,427 people (6,184 female; 7,243 male) have been identified as having the potential to participate in alternative income-generating activities if appropriate support, training, and market access are provided.



Source: Kebele Administration Survey 2023-24. "None" recorded for Denshe Gambela and Jirmancho.

Lege Odamirga (5,566) and Jelobeline (4,362) in the Wahil Cluster (Dire Dawa) have the highest number of aid recipients in absolute terms, reflecting the severe drought and food insecurity exposure of this agro-pastoral zone. Kurkur (Tenta) has 4,800 aid

recipients, representing approximately 46% of the kebele's total population — the highest proportional aid dependency in the portfolio.



Source: Kebele Administration Survey 2023-24. Qile and Awuberkedele show highest totals.

Qile (Sofi/Harari) has the highest recorded potential for alternative income participation (1,600 women; 1,750 men), followed by Awuberkedele (1,200 women; 1,108 men). Women constitute the majority of potential participants in Bate Kelu (271F vs 23M), Didmtu (228F vs 78M), and Lege Odamirga (600F vs 900M), highlighting the importance of gender-targeted livelihood interventions.

Kebele	Woreda	HHs with Limited Income	Aid Recipients	Alt. Income Potential (F)	Alt. Income Potential (M)	Total Alt. Income Pot.
Bate Kelu	Adama	177	1,646	271	23	294
Didmtu	Adama	185	—	228	78	306
Koki Nesibir	Aleltu	386	457	84	120	204
Awajo Nefto Baso	Aleltu	286	560	200	240	440
Jelobeline	Wahil	670	4,362	440	950	1,390
Lege Odamirga	Wahil	750	5,566	600	900	1,500
Sengola	Tenta	585	2,178	386	428	814
Kurkur	Tenta	485	4,800	204	288	492
Debek	Tenta	485	3,000	246	288	534
Denshe Gambela	Lok Abeya	300	—	350	420	770
Jirmancho	Lok Abeya	75	—	375	650	1,025
Qile	Sofi	—	2,350	1,600	1,750	3,350

Awuberkedele	Sofi	410	200	1,200	1,108	2,308
Hawelti	Raya Azebo	–	–	–	–	–
Machare	Raya Azebo	–	–	–	–	–

Section 7 - Woreda-Level Aggregated Vulnerability Summary

The following table aggregates kebele-level data by woreda, providing the consolidated vulnerability evidence for each of the seven project woredas. This table constitutes the quantitative basis for the woreda and kebele selection justification.

Woreda	Region	Kebeles (n)	Total Population	Total HHs	Avg Water Access %	Total Aid Recipients	Total Irrigable Land (ha)	Total Degraded Land (ha)	HHs Limited Income
Adama	Oromia	2	7,245	973	0.5%	1,646	260	512	362
Aleltu	Oromia	2	4,736	987	22.5%	1,017	758	174	672
Wahil	Dire Dawa	2	16,712	3,691	49.5%	9,928	135	4,210	1,420
Tenta	Amhara	3	22,448	3,647	41.2%	9,978	463.5	5,506	1,555
Lok Abeya	Sidama	2	9,719	1,648	53.5%	–	750	277	375
Sofi	Harari	2	12,195	2,662	29.0%	2,550	800	1,170	410
Raya Azebo	Tigray	2	23,450	–	–	–	–	–	–

Avg Water Access % = simple average across kebeles within the woreda. Total Aid Recipients, Irrigable Land, Degraded Land, and HHs with Limited Income are summed across kebeles. Raya Azebo sectoral data are incomplete (see data note). Source: Kebele Administration Survey 2023–24.

Key findings from the kebele-level data supporting selection justification: 1. Water deficit: All 13 reporting kebeles have clean water access below 55%, with two (Bate Kelu and Didmtu, Adama) at effectively zero access. Women travel 1.5–6 km daily for water — all exceeding the WHO 0.5 km benchmark. 2. Irrigation gap: Only 29% of total irrigable land across reporting kebeles is currently under development. The unmet irrigation potential represents a major agricultural resilience deficit. 3. Land degradation: Over 14,000 hectares of degraded land identified across 13 reporting kebeles, with more than 7,000 hectares of reforestation potential on public/common land that currently generates no ecosystem services. 4. Food insecurity: Over 29,000 people across 13 reporting kebeles currently receive humanitarian food aid. Kurkur (Tenta) has the highest proportional dependency at ~46% of its population on aid. 5. Livelihood vulnerability: Over 4,600 households identified with severely limited income sources, creating chronic food insecurity exposure. Nearly 9,000 people (female and male) have the potential to participate in alternative income activities with appropriate project support.

3. Rationale for Scaling Up the Adaptation Fund Project

3.1 Adaptation Fund Project Results

The Adaptation Fund project *"Building Climate Resilience of Vulnerable Communities"* was implemented in the same seven target woredas from 2019 to 2023 and produced strong, documented results. The AF Terminal Evaluation (2023) confirmed the following headline outcomes:

Result Area	Outcome Achieved	Scale
Clean water access	Improved access to potable water for rural households	Over 15,000 households
Small-scale irrigation	Solar-powered irrigation support to smallholder farmers	Approximately 8,500 farmers
Livelihood diversification	Diversified income streams established for households, of which 750 female-headed	Approximately 2,556 households
Landscape rehabilitation	Degraded land rehabilitated through physical and biological measures	Over 3,300 hectares
Capacity building	Community members and government experts received capacity-building support	Over 20,000 people

3.2 Terminal Evaluation Recommendation for Scale-Up

The AF Terminal Evaluation explicitly recommended scale-up as the next intervention priority. Recommendation 2 states that relevant government stakeholders *"should work together ... to scale up the project to the adjacent kebeles and sites"* on the grounds that those communities share *"almost similar economic, social and agro-climatic vulnerabilities."* This recommendation reflects both the strength of the AF project's results and the documented demand from communities in adjacent unserved kebeles who had observed the project's outcomes and expressed strong interest in participation.

3.3 Justification for SAP Funding

The SAP project fills a clear and well-evidenced financing gap. The AF project reached only two kebeles per woreda on average, leaving the majority of communities in each woreda without direct support despite sharing virtually identical vulnerability profiles. The only barrier to extending the proven model to additional kebeles is funding. There are no technical, social, or legal barriers. The SAP project therefore:

- **Builds on a demonstrated and validated model-** no innovation risk
- **Addresses clearly documented and urgent need-** confirmed by field surveys and regional data
- **Responds to explicit community demand-** documented expressions of interest from adjacent kebeles
- **Supports government priorities-** aligned with Ethiopia's CRGE Strategy, Ten-Year Development Plan, and GCF Country Programme
- **Applies appropriate financing-** concessional grant for public-good adaptation, beneficiaries cannot finance through commercial borrowing

3.4 Distinction from the AF Project

The SAP project is clearly distinct from the original AF intervention footprint at locality level. The AF project was implemented in a specific set of kebeles within each woreda; the SAP project will exclusively target adjacent kebeles that received no direct AF support. The non-duplication criterion will be confirmed and documented during the project inception phase through a formal kebele selection process, with the final list of target kebeles approved by the National Project Steering Committee and reported to the GCF in the Inception Report.

4.0 Beneficiary Calculation Methodology

4.1 Definitions

- **Direct beneficiaries:** Individuals who receive immediate and measurable benefits from project-financed infrastructure, services, or activities.
- **Indirect beneficiaries:** Individuals who benefit secondarily from improved ecosystem services, enhanced water security, reduced climate risk, and strengthened local systems without directly receiving project-financed assets or services.

4.2 Direct Beneficiary Calculation

Direct beneficiaries are calculated separately for each project output type and deduplicated before conversion to individual totals.

- **Potable water supply:** 21 water systems × households served per system × woreda-specific household size (5.1–6.2 persons). Design service populations based on solar-powered pump technology specifications.
- **Small-scale irrigation:** Irrigated plots per scheme × average household size. Each irrigated plot assumed managed by one household.
- **Livelihood and watershed management:** Participating households identified through participatory planning records at kebele level.
- **Deduplication:** Household-level beneficiary lists cross-checked across outputs; households benefiting from more than one output counted only once.

Output Type	Calculation Basis	Total Direct Beneficiaries
Potable water supply	21 systems × design service households × HH size (5.1–6.2)	Included in total
Small-scale irrigation	Irrigated plots per scheme × HH size	Included in total
Livelihood support activities	Participating HHs × HH size (participatory planning data)	Included in total
Watershed management activities	Participating HHs per watershed/kebele × HH size	Included in total
TOTAL (deduplicated)	Cross-checked, deduplicated at HH level before conversion	96,000 individuals

4.3 Indirect Beneficiary Calculation

Indirect beneficiaries are calculated by applying an **indirect beneficiary multiplier of approximately 4.8** to the final deduplicated direct beneficiary total. This multiplier is consistent with findings from Adaptation Fund project terminal evaluations conducted in the same geographic and socio-ecological context.

Parameter	Value
Total direct beneficiaries	96,000

Parameter	Value
Indirect beneficiary multiplier	4.8
Basis for multiplier	AF project terminal evaluation findings for the same geographic context
Total indirect beneficiaries	460,000 individuals

5.0 Project Components

The proposed GCF SAP project extends the AF integrated resilience model to 15 additional kebeles across the seven target woredas. It is organised into four interlinked components:

5.1 Component 1: Institutional and Knowledge Capacity

Element	Description
Purpose	Establish and strengthen the institutional foundations for climate-resilient development at woreda and kebele levels.
Key outputs	Woreda Climate Services Units (CSUs) equipped and operational; Kebele Adaptation Committees (KACs) established; local Micro-Watershed and Kebele Adaptation Plans developed; woreda-level climate databases maintained.
Training	Hundreds of government officers and community volunteers trained in climate-resilient planning, financial management, early warning dissemination, and data use.
Knowledge management	Demonstration sites, technical manuals, and case studies developed and disseminated. Learning reviews conducted semi-annually with woreda implementation teams.

5.2 Component 2: Climate-Resilient Water and Irrigation

Element	Description
Purpose	Improve access to water for drinking, livestock, and irrigation, reducing dependence on erratic rainfall and improving year-round agricultural productivity.
Potable water systems	21 solar-powered potable water systems installed and/or rehabilitated; minor upgrades and extensions of existing boreholes, springs, and canals.
Irrigation schemes	30 small-scale irrigation schemes rehabilitated or constructed, connected to improved storage and distribution networks.
Solar pumping	100 new household/community solar pumping systems installed.
Water governance	Local Water User Associations (WUAs) formed or strengthened; training in water management, O&M, and fee collection. Community bylaws for water scheme management established.

5.3 Component 3: Adaptive Agriculture and Land Management

Element	Description
Purpose	Introduce climate-smart farming practices and restore degraded landscapes, reducing erosion and improving soil productivity and watershed function.
Soil and water conservation	Stone bunds, terraces and check dams on approximately 3,000 ha of degraded agricultural land.

Element	Description
Reforestation and exclosures	Protection of approximately 5,000 ha of communal hillside through afforestation, area exclosure, and agroforestry promotion.
Climate-smart agriculture	Extension support for improved seeds, mulching, composting, drought-tolerant varieties, and conservation agriculture. Demonstration plots in each target kebele.
Sustainable grazing	Improved grazing management plans and rangeland rehabilitation to reduce livestock-related degradation.

5.4 Component 4: Climate-Resilient Livelihoods

Element	Description
Purpose	Support diversification of incomes and reduce dependence on single climate-sensitive livelihood streams, with emphasis on women, youth, and marginalised groups.
Target households	Approximately 18,000 households (50% female-headed or with women as primary beneficiaries).
Livelihood enterprises	Organisation of poor households into cooperatives and producer groups for climate-smart enterprises (poultry, beekeeping, horticulture, small livestock).
Business and financial support	Business training, start-up kits, and revolving micro-grants. Linkages to microfinance institutions (MFIs) and savings schemes.
Market access	Strengthened value-chain linkages and market facilitation for cooperative products.
Gender and youth targeting	Women's groups and vocational training prioritised. At least 30% of cooperative members to be youth (under 35).

5.5 Summary of Expected Outcomes

Outcome Area	Expected Change
Water security	More households and livestock with year-round access to safe water; reduced drought exposure for domestic and productive use.
Agricultural productivity	Higher and more reliable crop yields through expanded irrigation and conservation farming; increased high-value vegetable and cereal production.
Income diversification	Participating households gain new income from livestock and enterprises; reduced dependence on single climate-sensitive crops.
Landscape restoration	Erosion curtailed; land productivity improved; forest and vegetation cover recovering; reduced downstream siltation.
Climate governance	Kebeles and woredas incorporate climate risks into annual development plans; active community committees overseeing natural resource management.

Outcome Area	Expected Change
GHG co-benefits	Approximately 32,293 tCO ₂ -equivalent avoided over 20 years, primarily from solar pump displacement of diesel and sustainable land use.

6.0 Feasibility Assessment

6.1 Technical Feasibility

Assessment: Feasible-Low Risk.

The project is technically feasible on multiple grounds. All proposed interventions, solar-powered pumping systems, small-scale irrigation schemes, soil bunds and terraces, nurseries, and agroforestry, were successfully implemented and maintained under the AF project in the exact same woredas. The GCF SAP criteria explicitly require proposals to "use proven technologies and solutions with track records to demonstrate feasibility": this project satisfies that requirement entirely by replicating the AF approach.

Tendering and construction procedures are routine for Ethiopian government water and agriculture bureaus. The Engineering Department and local contractors managed AF infrastructure works and the same procedures will apply for the SAP. Component 1 climate services and planning systems use standard modelling and radio/SMS dissemination tools for rainfall forecasts, which have been tested in nearby regions. No new untested technology is being introduced.

The primary technical risk identified under the AF project, ensuring regular maintenance of water pumps and canals, is directly addressed by the SAP through strengthened WUA training, spare-parts supply chain establishment, and maintenance budget provisions in woreda annual plans.

6.2 Economic and Financial Feasibility

Assessment: Feasible — Strong Economic Returns.

External studies in Ethiopia demonstrate that small irrigation schemes typically yield benefit–cost ratios of 3–5 and significantly increase household income compared to rain-fed farming alone. AF beneficiaries documented higher incomes from irrigated vegetable gardens, accumulated assets, and reduced crop failure losses. The SAP will multiply these benefits by expanding the same interventions to more kebeles.

Many proposed adaptation measures are "no-regrets" with immediate returns: strengthening water supply schemes reduces water-borne disease burden and women's time spent on water collection; climate information services reduce crop losses from unpredicted weather. The AF evaluation confirmed that irrigation produced significant increases in crop productivity that stabilised yields for beneficiary farmers.

The total budget of USD 29,997,050 is modest relative to the scale of benefits and the number of direct and indirect beneficiaries reached. **The project is structured as a grant** because its primary objectives are public goods (water security, food security, institutional capacity) that beneficiary households cannot finance through commercial borrowing. Concessional financing is therefore the appropriate instrument. USD 5,000,000 in GoE co-financing confirms national ownership and demonstrates commitment to programme sustainability.

6.3 Social Feasibility

Assessment: Feasible - High Social Acceptability.

The project is strongly community-driven, directly responsive to expressed community needs, and is expected to be highly acceptable to target communities. The AF project recorded strong community involvement throughout implementation, including women's active participation in planning forums and

good functionality of local governance institutions (WUAs, forest guard committees, cooperative boards). Community demand for replication in adjacent kebeles is documented and explicitly cited in the AF Terminal Evaluation.

Key social considerations include: inclusion of women and youth in all planning forums (Component 1); gender-sensitive scheduling of training and meetings to enable women's attendance; targeting of cooperatives and livelihood grants to women's groups; and monitoring of gender-disaggregated indicators throughout implementation. The risk of social conflict is low: the project will follow the same community consultation and bylaw processes used in the AF phase.

6.4 Environmental Feasibility and Safeguards

Assessment: Feasible - Net Environmentally Positive.

The project is classified Category C / I-3 under GCF environmental and social safeguards policies, meaning expected negative environmental and social impacts are minimal. The design is net environmentally positive: it rehabilitates degraded watersheds, increases vegetation cover, reduces soil erosion, improves groundwater recharge, and reduces diesel fuel consumption through solar pump deployment.

Minor negative impacts are limited to temporary construction-related effects (dust, noise from borehole drilling and canal construction) and potential localised impacts from pipe routes. All are addressed through straightforward mitigations set out in the Environmental and Social Action Plan (ESAP): pipe routes along field edges, dust suppression during works, regular water quality monitoring, and waste disposal protocols for demonstration plots. No large dams, resettlement, or clearance of critical habitats are proposed.

6.5 Institutional Feasibility

Assessment: Feasible - Proven Institutional Framework.

The SAP project is anchored in existing government structures that were fully tested under the AF project. At national level, the Ministry of Finance (MoFEC) via the CRGE Facility will coordinate the project and provide GCF interface and fiduciary oversight. Technical leadership is distributed among the Executing Entities: MoWE (water and irrigation), MoA (agriculture and watershed), and MOIL (irrigation).

At regional level, each Bureau of Finance and Economic Development (BOFED) will receive and disburse funds to woredas and regional sector bureaus. At woreda level, Woreda Finance Offices handle procurement and accounting; Offices of Agriculture, Water, and Irrigation implement day-to-day activities. Woreda Steering Committees provide local oversight. All of these arrangements are directly replicated from the AF institutional model.

7: Efficiency, Comparability and Value for Money

7.1 Economy- Inputs, Cost Structure and Capital Scope

The project has a total budget of **USD 29,997,050**, comprising a GCF grant of **USD 24,997,050 (83.3%)** and confirmed GoE co-financing of **USD 5,000,000 (16.7%)**. The full grant modality is appropriate: all outputs are public-good adaptation interventions for which cost recovery is neither feasible nor appropriate at community scale in an LDC context.

An important efficiency feature of the water output is that **no new construction, major rehabilitation, or capital expansion of water systems is financed**. Rather, the water component is limited to minor, routine maintenance and repair of existing systems, replacement of worn fittings, valves, taps, and small components, to restore functionality and reduce operational downtime. This materially reduces capital expenditure compared with programmes that finance new infrastructure, and it enhances value for money by protecting prior public investment at low incremental cost.

The same logic applies to the irrigation output, under which **no new irrigation infrastructure will be financed**. Output 2.2 promotes climate-smart water-use practices instead, farmer training and demonstration, irrigation scheduling, water-use efficiency, and integration with climate information services, delivering improved outcomes through behaviour change and knowledge transfer rather than capital construction. Similarly, the land management output explicitly excludes check dams, major terracing, and earthworks. Output 3.1 is reframed around **nature-based and biological measures** — vegetative barriers, Farmer-Managed Natural Regeneration (FMNR), Assisted Natural Regeneration (ANR), mulching, ground cover, and native planting — which achieve equivalent or superior watershed protection at significantly lower cost and with stronger long-term ecological sustainability than engineered approaches.

A distinct and precisely quantified economic benefit flows from the maintenance of existing solar-powered pump systems. **Solar pumps maintained operational under this project displace the diesel-powered alternative** that communities would otherwise revert to should systems fail without maintenance. The project's own fuel-cost modelling, discounting projected fuel price increases over the 20-year lifetime, confirms that this displacement avoids **USD 12,961,562.03 in fuel purchase costs** over the project life, equivalent to **approximately 52% of the total GCF grant value** in lifetime savings, and an average of **USD 648,078 per year**. The associated GHG co-benefit is **32,293 tCO₂eq avoided over 20 years** — a figure that combines avoided diesel combustion from the solar water systems with sequestration benefits from the land restoration and FMNR activities under Output 3.1. These two parameters together constitute a significant and independently verifiable economic and climate case for the project that sits entirely outside the standard cost-per-beneficiary metrics used for inter-programme comparison.

This maintenance-first and practices-first design delivers three further compounding efficiency gains. It achieves a **shorter time-to-resilience** by avoiding lengthy environmental impact assessments and tendering cycles, meaning communities receive support in months rather than years. It breaks the **"build-neglect-replace" cycle** by investing in operational continuity rather than new assets. And it embeds **self-sustaining asset management** through WUA capacity and spare-parts supply chains, ensuring functionality extends well beyond the project period. Two further economy features apply

across all components: the four-component model shares administration, MEL, and community engagement overheads, achieving economies of scope unavailable to single-sector programmes; and the project replicates the AF predecessor model in the same seven woredas using existing MoFEC, CRGE Facility, BOFED, and woreda delivery infrastructure, eliminating the institutional set-up costs that typically consume 10–15% of project budgets in new geographies.

7.2 Efficiency-Cost per Output and VfM Metrics

The table below summarises headline VfM metrics benchmarked against verified comparator programmes. Solar displacement parameters are highlighted separately to distinguish adaptation cost metrics from economic co-benefit metrics.

VfM Metric	This Project	Comparator Range
Total GCF grant	USD 24,997,050	USD 8M – 50M (SAP/FP) ^a
Cost per direct beneficiary — GCF grant only ^[9]	USD 260	USD 50 – 500 ^a
Cost per direct beneficiary — total investment ^[9]	USD 312	USD 65 – 600 ^a
Cost per beneficiary household — GCF ^[9]	USD 1,389	USD 500 – 1,500 ^b
Cost per total reach incl. indirect (556,000 people) ^[9]	USD 54	USD 20 – 120 ^c
Cost per ha — nature-based SWC / FMNR (Output 3.1 est.)	~USD 400–700/ha ^d	USD 300–1,200/ha ^e
GoE co-financing leverage ratio	1:5 (20%)	10–30% typical SAP
Solar Displacement Co-Benefits — Economic and Climate Parameters (exact proposal figures)		
Avoided diesel fuel purchase cost — discounted over 20-year life ^[9]	USD 12,961,562.03	≈52% of GCF grant value
Annual avoided fuel cost (20-year average)	USD 648,078/year	<i>Discounted for projected fuel price increases</i>
Total GHG co-benefit over 20-year project life ^[9]	32,293 tCO₂eq	<i>Solar displacement + FMNR / land restoration^f</i>
Cost per tCO ₂ eq avoided (total investment basis)	USD 929/tCO₂eq	<i>Adaptation co-benefit; not the primary objective</i>

Table notes: ^a GCF portfolio benchmark, LDC adaptation projects (GCF IEU 2023).^[7] ^b Household cost range, integrated rural resilience in East Africa (IFAD, World Bank).^[5] ^c Total-reach benchmark, ecosystem-anchored programmes. ^d Estimated from Output 3.1 allocation applied to 8,000 ha; lower than capital-intensive SWC peers because earthworks excluded in favour of biological measures.^[9] ^e Nature-based SWC (FMNR, vegetative barriers) benchmarks, Ethiopia and East Africa (World Bank SLMP-II evaluation, 2023).

At **USD 260–312 per direct beneficiary^[9]**, the project sits within — and in several cases below — the benchmark range for comparable integrated rural adaptation programmes.^[7] The independently validated household unit cost of **USD 1,389/HH** is virtually identical to the **USD 1,408/HH^[5]** confirmed

by the IFAD PASIDP II evaluation for comparable small-scale irrigation and watershed activities in Ethiopia — a difference of less than 2% that constitutes strong independent corroboration of cost-reasonableness. When the **USD 12,961,562.03 in avoided diesel costs^[9]** is factored in, the effective net cost of the adaptation outputs — netting economic co-benefits against GCF expenditure — is materially lower than the headline budget figures imply.

7.3 Comparability with Similar Climate Finance Projects

This project aligns with emerging global best practice in **climate-resilient asset management** — prioritising the maintenance and optimisation of existing systems over continuous capital expansion. The comparator table benchmarks the project against five verified, publicly documented programmes selected for similarity of intervention type, beneficiary profile, and geography.

Project / Programme	Funder	Budget	Beneficiaries	Cost/Person	Comparability Note
This Project — GCF SAP 29720, Ethiopia	GCF / GoE	USD 30M	96,000	USD 260–312	Baseline. Maintenance-only water, climate-smart irrigation practices, FMNR/ANR. Avoided diesel cost: USD 12.96M over 20 years.
AF: Building Climate Resilience, Ethiopia (2019–23)	AF / GoE	~USD 10M	~50,000–60,000	~USD 170–200	Same 7 woredas, same AE, same model. SAP extends proven approach. adaptation-fund.org
GCF FP058: Drought Resilience — Gender-Responsive Resilience, Ethiopia	GCF / MoFEC	USD 50M	~1,000,000	~USD 50	Same country, same AE, same solar water + land model. Lower unit cost reflects 22-woreda scale. gcfund.org/project/fp058
GCF SAP056: Climate Resilience, Guiriko Region, Burkina Faso	GCF / GIZ	GCF USD 24.3M Total USD 28.2M	TBC	TBC	Most comparable SAP by instrument and scale. Semi-arid smallholder, SLM focus. B.43 Oct 2025. gcfund.org/project/sap056
World Bank LLRP I: Lowlands Livelihood Resilience, Ethiopia (2019–25)	IDA / IFAD / GoE	~USD 130M	~2,000,000	~USD 65	Comparable integrated model, same country. Lower unit cost reflects very large scale. worldbank.org — P160441
IFAD PASIDP II: Small-Scale Irrigation, Ethiopia (2017–24)	IFAD / GoE	USD 153M	~108,750 HH	~USD 1,408/HH	Comparable small-scale irrigation + watershed. Household unit cost (USD 1,408/HH) independently validates this SAP's USD 1,389/HH (< 2% difference). ifad.org — 2000001134

USAID Feed the Future — Livelihoods for Resilience, Ethiopia	USAID	~USD 47M	~130,000 HH	~USD 362	Livelihoods + PSNP graduation in same target regions. Comparable cost range. usaid.gov/ethiopia
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7.4 Overall VfM Assessment

Dimension	Summary Finding	Rating
Economy	No new civil infrastructure across three outputs. Budget shifts from capital to capacity building, practices, and biological measures. Solar maintenance generates USD 12,961,562.03 in avoided diesel costs over 20 years — 52% of GCF grant value. ^[9]	Strong
Efficiency	USD 260–312/person and USD 1,389/HH within benchmark range. ^[9] IFAD PASIDP II (USD 1,408/HH) ^[5] independently validates household unit cost within 2%. Nature-based SWC (~USD 400–700/ha) substantially below engineered earthworks benchmark. Asset life extension avoids far higher future rehabilitation costs.	Strong
Effectiveness	Shorter time-to-resilience: no civil works procurement means communities receive support faster. AF predecessor ^[1] confirms 3–5× benefit–cost ratio in same woredas. Solar displacement avoids 32,293 tCO ₂ eq over 20 years ^[9] (~USD 929/tCO ₂ eq on total investment basis).	Good
Equity	The maintenance scope targets the "maintenance gap" in the most vulnerable communities. In woredas such as Tenta and Lok Abeya, systems frequently fail due to component wear that households cannot afford to repair. This project fills that gap, ensuring the poorest beneficiaries receive consistent, equitable access to water.	Strong
Comparability	Unit costs validated by five independent, publicly documented programmes. ^[1–6] IFAD PASIDP II (USD 1,408/HH) ^[5] provides the strongest independent validation (< 2% difference). The USD 12,961,562.03 avoided diesel co-benefit ^[9] is unique to this project and not captured in comparator cost-per-person figures, making the effective adaptation cost even more favourable than the headline comparison suggests.	Competitive
Overall	The project is cost-efficient, cost-competitive, and cost-appropriate. Validated by five comparable programmes^[1–6], with the closest household-cost comparator differing by less than 2%.^[5] The avoided diesel cost of USD 12,961,562.03 over 20 years — equivalent to 52% of the GCF grant — substantially enhances the overall economic case beyond what the headline VfM metrics alone capture.^[9]	✓ Positive

Source References

[1] AF Predecessor — *Building Climate Resilience of Vulnerable Communities, Ethiopia (2019–2023)*. Adaptation Fund Board. adaptation-fund.org

[2] GCF FP058 — *Responding to the Increasing Risk of Drought: Gender-Responsive Resilience, Ethiopia*. MoFEC / GCF. gcfund.org/project/fp058

[3] GCF SAP056 — *Climate Resilience in the Guiriko Region, Burkina Faso*. GIZ / GCF. Board B.43, Oct 2025. GCF: USD 24.28M; Total: USD 28.15M. gcfund.org/project/sap056

[4] World Bank LLRP I — *Lowlands Livelihood Resilience Project, Ethiopia (P160441)*. IDA / IFAD / GoE, 2019–2025. [projects.worldbank.org — P160441](https://projects.worldbank.org/P160441)

[5] IFAD PASIDP II — *Participatory Small-Scale Irrigation Development Programme II, Ethiopia*. Total USD 153M; ~108,750 HH. Project ID 2000001134. [ifad.org — Project 2000001134](https://ifad.org/Project/2000001134)

[6] USAID Feed the Future — *Livelihoods for Resilience (L4R) Activity, Ethiopia*. Implemented by CARE. usaid.gov/ethiopia

[7] GCF Independent Evaluation Unit (2023). *Portfolio Review of Adaptation Projects in Least Developed Countries 2015–2023*. gcfund.org.

[8] IPCC (2006). *Guidelines for National Greenhouse Gas Inventories*, Vol. 2, Table 2.2. Diesel combustion emission factor applied in GHG co-benefit calculations.

[9] Project proposal data — GCF SAP 29720, Annex 2a, February 2026: Total budget USD 29,997,050; GCF grant USD 24,997,050; GoE co-finance USD 5,000,000; direct beneficiaries 96,000 individuals / 18,000 HH; indirect beneficiaries 460,000; avoided diesel fuel cost USD 12,961,562.03 (discounted over 20 years); GHG co-benefit 32,293 tCO₂eq over 20 years.

8.0 Risk Assessment and Mitigation

The following matrix identifies key project risks, their likelihood and impact, and the mitigation measures incorporated in the SAP design. Overall risk is assessed as low-to-moderate. The main challenges are operational, manageable through the measures described, rather than systemic or unknown. The SAP design has specifically incorporated lessons from the AF experience for each risk category.

Risk Description	Category	Likelihood	Impact	Mitigation Measures
Institutional capacity gaps at regional and woreda levels	Institutional	Medium	Medium	Targeted capacity building, training-of-trainers (ToT), designation of regional and woreda focal persons. Strengthened coordination through federal and regional steering committees.
Limited implementation capacity of executing entities	Institutional / Operational	Medium	Medium	Joint monitoring missions, periodic performance reviews, and technical assistance support where necessary.
Weak operation and maintenance of water and irrigation schemes	Operational	Medium	Medium	Strengthen IWUAs, establish community bylaws, provide O&M training, establish spare-parts supply chain, conduct periodic technical inspections. Community fee collection for routine maintenance.
Gender inequality in access to project benefits	Institutional / Social	Medium	High	Gender-responsive planning and budgeting; promote women's participation in user associations; monitor gender-disaggregated indicators; affirmative targeting in cooperative and livelihood support.
Limited local technical knowledge in solar-powered irrigation and water systems	Technical	Medium	Medium	Develop local technician networks, provide certification training, facilitate knowledge exchange with national technical institutions.
Risk of groundwater over-abstraction from existing schemes	Environmental / Technical	Low	High	Monitor groundwater use, promote integrated watershed management, encourage conjunctive use of surface and groundwater.
Security or political instability affecting implementation (particularly Tigray)	Political / Operational	Low	High	Apply conflict-sensitive implementation; empower NSC to adjust activity sequencing or siting in affected woredas; pre-designate contingency woreda (Alamata for Raya Azebo).

Risk Description	Category	Likelihood	Impact	Mitigation Measures
Inflation and cost overruns	Financial	High	Medium	Inflation-adjusted cost estimates, flexible procurement planning, phased implementation, contingency reserves.
Vandalism or weak community ownership of infrastructure	Social / Operational	Low	High	Strengthen community participation in planning, enforce community bylaws, establish management committees, ensure community co-investment in infrastructure.
Delays in fund disbursement	Financial / Institutional	Medium	Medium	Align with government fiscal cycles; streamlined financial reporting and disbursement procedures; phased tranches with clear disbursement conditions.
Social resistance or low adoption of climate-smart technologies	Social / Operational	Low	Medium	Community engagement campaigns, demonstration sites, farmer-to-farmer learning, extension agent support.
Environmental degradation from unsustainable land management	Environmental	Medium	High	Integrated watershed management, SWC, agroforestry, community bylaws for land protection.
Supply chain delays affecting equipment procurement	Logistical	Medium	Medium	Pre-qualify suppliers, establish framework contracts, maintain procurement contingency planning.

9.0 Sustainability and Exit Strategy

9.1 Community Ownership

From the outset, project activities are embedded in community structures with formal handover arrangements. Watersheds and exclosure areas will be formally transferred to local committees supported by bylaws for ongoing protection. Water User Associations will collect user fees for routine maintenance of pumps and pipes. The AF evaluation confirmed that communities understood and supported reforestation and erosion control and that many expressed willingness to continue such work independently.

9.2 Institutionalisation in Government Systems

The SAP explicitly mainstreams activities into government budgets and development plans. By project end, each target woreda will have a climate-informed annual development plan and a dedicated budget line for climate activities, consistent with the CRGE implementation framework. The project will leave in place trained personnel in woreda climate, water, and agriculture offices with relevant responsibilities formalised in their job descriptions.

9.3 Operation and Maintenance

The SAP design addresses O&M sustainability through four mechanisms informed directly by the AF experience:

- **WUA capacity building:** Training WUA members in basic repairs, pump maintenance, and record keeping.
- **Spare-parts supply chain:** Regional bureaus assigned responsibility to stock common replacement parts for solar pump systems.
- **Maintenance budgeting:** Maintenance costs incorporated into woreda annual plans via Planning Offices.
- **Capital renewal provisions:** Communities required to set aside a portion of water user fees for capital renewals.

9.4 Livelihood Group Sustainability

Revolving funds and cooperatives created under Component 4 are designed to become self-sustaining through formal cooperative registration, bank account establishment, and linkages to MFIs. The AF evaluation emphasised the importance of financial management training and formal MFI linkages; the SAP incorporates both as explicit activities.

10.0 Monitoring, Evaluation and Learning (MEL) Framework

10.1 MEL Approach

The MEL framework is built on Ethiopia's CRGE Monitoring and Evaluation guidelines, harmonised with GCF indicators and SAP reporting requirements. Key outcomes will be tracked through project-specific metrics and sectoral indicators embedded in government planning. Quarterly progress reports and annual reviews will be prepared jointly by the CRGE Facility and implementing ministries.

10.2 Adaptive Learning

The SAP establishes an adaptive learning process: semi-annual learning reviews will bring together woreda implementation teams to share results and adapt practices. Knowledge products (training manuals, field case studies, lessons-learned briefs) will be developed and disseminated through Climate Services Units. This creates a systematic feedback loop enabling real-time course correction if any intervention underperforms.

10.3 Key Performance Indicators

Level	Indicator	Measurement Approach	Frequency
Impact	Number of households with improved climate resilience	Household resilience survey (disaggregated by sex and household type)	Baseline + midterm + endline
Outcome	Hectares of land under improved water management	Administrative records + field verification	Annual
Outcome	Number of households with year-round access to potable water	Woreda water office records + field survey	Annual
Output	Number of solar-powered water systems installed and functional	Technical inspection reports	Quarterly
Output	Hectares of degraded land rehabilitated	GIS mapping + field verification	Bi-annual
Output	Number of households participating in alternative income activities (disaggregated by sex)	Cooperative and group records	Quarterly
Output	Number of government and community personnel trained (disaggregated by sex)	Training attendance registers	Quarterly
Safeguards	Number of grievances received and resolved	Grievance redress mechanism register	Monthly

10.4 Reporting and Accountability

Reporting flows through existing government channels: BOFEDs submit audited financial reports to the CRGE Facility; technical progress is reported from woreda to regional to federal levels. Standardised reporting templates and training on their use are included as Component 1 activities.

The project will integrate with the national MRV system of the CRGE to support Ethiopia's obligations under the Paris Agreement.

11.0 Gender and Social Inclusion Strategy

11.1 Gender Context

Climate change impacts are gendered: women and girls bear a disproportionate burden of water collection, agricultural labour, and care responsibilities, while also having less access to productive assets, land rights, credit, and decision-making authority. These structural inequalities reduce women's adaptive capacity and mean that resilience interventions without deliberate gender mainstreaming may fail to reach the most vulnerable.

11.2 Gender-Responsive Design Measures

- **Targeting:** At least 50% of livelihood group members to be women; irrigation installations to prioritise household and village wells identified by women's needs.
- **Participation:** Women to be actively recruited to Kebele Adaptation Committees and WUAs; female extension agents engaged where available; inclusive facilitation in local languages.
- **Economic empowerment:** Coaching and simplified business training for women-led enterprises; revolving fund provisions for women's group micro-credit access.
- **Time poverty reduction:** Water point installation directly reduces women's daily water collection burden, releasing time for productive and educational activities.
- **Scheduling:** Training and meeting schedules adapted to enable women's attendance, including childcare provision where necessary.
- **Indicators:** Gender-disaggregated targets tracked throughout implementation: number of women trained, % female-headed beneficiary households, women in leadership positions in WUAs and cooperatives.

11.3 Inclusion of Youth and Other Vulnerable Groups

- **Youth:** At least 30% of cooperative members to be youth (under 35). Vocational training tailored to youth livelihood opportunities.
- **Elderly and persons with disabilities:** Project will coordinate with NGOs working on disability and social services to identify and include such households in targeting.
- **Female-headed households:** Specifically identified as a priority targeting group in all output types.

12.0 Key Assumptions and Enabling Conditions

Assumption	Basis for Assumption	Risk if Not Met	Mitigation
Continued political support at national and regional levels	Climate change is a stated policy priority in Ethiopia's Ten-Year Development Plan and CRGE Strategy; AF project had strong government ownership throughout.	Medium — could slow implementation or reduce co-financing.	Regular engagement with national and regional steering committees; GCF Secretariat to maintain policy dialogue.
Timely disbursement of government co-finance and GCF tranches	GoE co-finance of USD 5M confirmed; standard GCF disbursement tranche conditions apply.	Medium — delays would slow implementation pace.	Align project planning with government fiscal cycles; streamlined financial reporting procedures.
Community cooperation and willingness to contribute labour and fees	Strong community demand documented from adjacent kebeles; AF experience confirmed high community willingness.	Low — AF precedent strongly suggests community support.	Participatory planning from inception; transparent benefit-sharing agreements.
Market access for diversified livelihood products	Market studies to be conducted during inception to verify demand for cooperative products.	Medium — if markets are weak, livelihood income gains may be lower than expected.	Market studies during inception; value-chain linkage activities built into Component 4.
Operational access to Raya Azebo Woreda remains maintained	Access confirmed following peace agreement; operations managed through local Tigray offices.	Medium — instability could temporarily constrain field activities.	Contingency woreda designated (Alamata); conflict-sensitive implementation approach; adaptive implementation provisions.

Annexes

Annex A: Evidence Chain: AF Findings Mapped to SAP Design Responses

AF Finding / Recommendation	Scale-Up Implication	SAP Design Response
Integrated model (water + restoration + livelihoods + capacity) produced strong results (AF evaluation).	Scale-up should retain integrated approach.	SAP retains four-component integrated model with quantified outputs.
Recommendation 2: Scale up to adjacent kebeles and sites due to similar vulnerabilities and limited coverage.	Expansion should prioritise new kebeles with similar profiles.	SAP explicitly scales to 15 new adjacent kebeles and localities.
Recommendation 3: O&M requires periodic maintenance; government should monitor, support, and provide training.	Sustainability depends on O&M systems and public backstopping.	SAP risk plan emphasises IWUAs, spare-parts supply, and O&M audits; Component 2 upgrades include O&M enabling measures.
Recommendation 4: Biological conservation needs 3–5 year cycles and sufficient budgets.	Longer-term approach to restoration and learning required.	SAP includes >3,000 ha restoration under Component 3 and MEL/MRV alignment.
Recommendation 5: Closure areas already handed over; local government should continue technical support.	Exit strategy must include continued woreda support.	SAP institutional arrangements include woreda technical oversight responsibility post-project.
Recommendation 6: Solar pumping is new technology; document and disseminate lessons for expansion.	Scale-up requires structured knowledge management.	SAP emphasises climate services, learning systems, and a dedicated knowledge management function under Component 1.
Recommendation 7: Livelihood beneficiaries need financial literacy and entrepreneurship training, plus micro-finance linkage.	Livelihood sustainability depends on skills and finance access.	SAP Component 4 includes formal cooperative registration, MFI linkages, business/finance training for 18,000 households.
Women beneficiaries lower than men; adapt strategies and selection criteria.	Gender strategy must be strengthened.	SAP includes affirmative targeting (≥50% women) in irrigation, livelihoods, and cooperative support; gender-disaggregated indicators tracked.

Annex B: Institutional Roles Matrix

Actor	Role in SAP Project	Key Responsibilities
Ministry of Finance (MoFEC)	Accredited Entity / National Lead	GCF interface, national coordination, fiduciary oversight, steering committee chairmanship.
CRGE Facility (MoFEC)	Coordination Platform	Programme coordination, consolidation of reporting, support to MRV alignment.
Ministry of Planning and Development	National Designated Authority (NDA)	No-objection, national ownership coordination.
Ministry of Water and Energy (MoWE)	Executing Entity	Water supply and irrigation technical leadership; solar pumping scale-up.
Ministry of Agriculture (MoA)	Executing Entity	Climate-smart agriculture, watershed restoration support, extension services, livelihoods interface.
Ministry of Irrigation and Lowlands (MOIL)	Executing Entity	Irrigation-specific institutional and technical functions.
BOFED / Regional Finance Bureaus	Regional Fund Flow and Oversight	Disbursement to woredas, regional supervision, consolidation of woreda reports.
Woreda Sector Offices (Agriculture, Water, Irrigation)	Frontline Implementation	Implement activities, supervise WUAs/IWUAs, ensure community engagement.
Irrigation and Water Users Associations (IWUAs / WUAs)	Community O&M Institutions	Operate and maintain water and irrigation systems; manage fee schemes and bylaws.
Climate Services Units (CSUs)	Climate Services Delivery	Local climate advisories, early warning dissemination, local adaptation planning support.
National Project Steering Committee	Overall Oversight	Approving kebele selection, annual work plans, and financial reports; resolving inter-agency issues.

Annex C: Co-Benefits Summary Matrix

Co-Benefit Type	Examples and Description
Economic	Increased crop yields and sales from irrigated production; saved time (reduced labour) from closer water access; asset accumulation through cooperative participation; reduced crop-failure losses.
Social / Gender	Reduced women's time burden from water collection; women's cooperative income and economic empowerment; schooling gains for girls released from water-fetching duties; improved household nutrition.
Environmental	Reforested and rehabilitated land; reduced soil erosion and siltation; improved groundwater recharge; carbon sequestration in rehabilitated soils and vegetation; healthier watershed ecosystems.
Health	Access to safe potable water; fewer waterborne illnesses (cholera, diarrhoeal disease); better household dietary diversity from irrigated vegetable production.
Institutional	Stronger local planning capacity; functional water user committees; climate data systems at woreda level; improved cross-sectoral coordination benefiting future development investments.
Climate mitigation (co-benefit)	Approximately 32,293 tCO ₂ -equivalent avoided over 20 years from replacement of diesel pumps with solar, and from sustainable land use and reforestation.

Annex D: Data Sources and References

Reference	Citation	Used for
[1]	OPHI (October 2024). Ethiopia Country Briefing. Alkire, Kanagaratnam and Suppa (2024), based on CSA/DHS 2019. University of Oxford.	Regional MPI values; % multidimensionally poor; intensity of deprivation.
[2]	Afrobarometer (2024). Dispatch No. 882: Ethiopians rate government economic performance. Round 9 Survey, 2023.	Lived Poverty Index: moderate/high lived poverty by region (2023).
[3]	CSA / World Bank (2016). Ethiopia Welfare Monitoring Survey and Poverty Assessment. Addis Ababa: CSA.	Monetary poverty headcount ratio by region (2016 baseline).
[4]	NMA (2020). NFCS Ten-Year Strategic Plan 2020–2030. NMA, Addis Ababa. pp. 12–14.	Observed temperature trend 0.37–0.49°C per decade; rainfall variability.
[5]	IPCC (2022). AR6 WG II. Trisos et al. Chapter 9: Africa, §9.5. Cambridge University Press. doi:10.1017/9781009325844.011	Forward-looking climate projections; crop yield reductions; water stress.
[6]	FAO FAOSTAT (2022/23). Food Security Indicators. Rome: FAO.	21.1% severe food insecurity; 26.4 million undernourished 2020–2022.
[7]	FAO Ethiopia at a Glance (2024). fao.org/ethiopia.	15.8 million on emergency food assistance in 2024.
[8]	FAO / World Bank (2018). Ethiopia Country Overview.	85% of population in agriculture; 37% of GDP from agriculture.
[9]	OCHA (2024). Ethiopia Situation Report, 1 March 2024. unocha.org.	IDP caseloads; cholera outbreaks; humanitarian response by region.
[10]	UNICEF Ethiopia (2024). Annual Report 2024. open.unicef.org.	Malnutrition; child health; conflict impacts by region; gender-based violence.
[11]	FEWS NET (2023/2025). Ethiopia Food Security Outlook and Updates. fews.net/east-africa/ethiopia.	IPC food security classifications; drought impacts; livelihood zones.
[12]	AF Terminal Evaluation (2023). Building Climate Resilience of Vulnerable Communities. Adaptation Fund Board.	AF project results; scale-up recommendation; O&M lessons.
[13]	Pre-Feasibility Assessment Report (2024). Annex 2 to GCF SAP Funding Proposal. MoF, Addis Ababa. Sections 4.1–4.7.	Woreda-level vulnerability narratives and kebele-level field survey data.
[14]	Kebele Administration Survey (2023–24). Field data collected through structured questionnaires in 15 target kebeles.	Primary data: population, water access, irrigation, watershed, livelihoods.