ADAPTATION FUND

CONCEPT NOTE PROPOSAL FOR SINGLE COUNTRY

PART I: PROJECT/PROGRAMME INFORMATION

Title of Project:	Strengthening resilience to extreme weather events - drought and flooding - for smallholder farmers in the rural regions of Burundi
Country:	Burundi
Thematic Focal Area[1]:	Agriculture, Food security, Forests, Nature-based solutions, and Ecosystem-based adaptation
Type of Implementing Entity:	Regional Implementing Entity
Implementing Entity:	Sahara and Sahel Observatory (OSS)
Executing Entities :	Africa Apiculture Consortium (AAC) Office Burundais pour la Protection de l'Environnement (OBPE)
Amount of Financing Requested:	10,000,000 in U.S Dollars Equivalent
Project Formulation Grant Request:	Yes ☒ No ☐
Amount of Requested financing for PFG:	150,000 in U.S Dollars Equivalent
Letter of Endorsement (LOE) signed:	Yes ☒ No ☐

NOTE: LOEs should be signed by the Designated Authority (DA). The signatory DA must be on file with the Adaptation Fund. To find the DA currently on file check this page: https://www.adaptation-fund.org/apply-funding/designated-authorities

Stage of Submission:

☒ This proposal has been submitted before including at a different stage (pre-concept, concept, fully-developed proposal)

☐This is the first submission ever of the proposal at any stage

In case of a resubmission, please indicate the last submission date: July 20 , 2026

Please note that concept note documents should not exceed 50 pages, including annexes.

[1] Thematic areas are: Agriculture, Coastal Zone Management, Disaster risk reduction, Food security, Forests, Human health, Innovative climate finance, Marine and Fisheries, Nature-based solutions and ecosystem-based adaptation, Protection and enhancement of cultural heritage, Social innovation, Rural development, Urban adaptation, Water management, Wildfire Management.

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Acronyms

AAC	Africa Apiculture Consortium
ACRE Africa	Agriculture and Climate Risk Enterprise
AF	Adaptation Fund
AfDB	African Development Bank
AFOLU	Agriculture, Forestry and Other Land Uses
AHDI	Action Humanitaire pour le Développement Intégré
Alliance Bioversity-CIAT	Alliance of Bioversity International and the International Center for Tropical Agriculture (CIAT)
ApiVent	Apiculture Ventures
APRN	Association Protection des Ressources Naturelles pour le Bien-Etre de la Population au Burundi
AYII	Area Yield Index Insurance
B2B	Business-to-Business
CA	Climate Action
CbA	Community-based Adaptation
CBO	Community Based Organization
CBT	Commodity Based Trade
CC	Climate Change
CGIAR	Alliance of Biodiversity
CIAT	International Center for Tropical Agriculture
CN	Concept Note
CSA	Climate Smart Agriculture
CSO	Civil Society Organization
DA	Designated Authority
EbA	Ecosystem-based Adaptation
EIA	Environmental Impact Assessment
ESP	Environmental and Social Management Plan
FAO	Food and Agriculture Organization of the United Nations
FEWSNET	Famine Early Warning Systems Network
FGDs	Focus Group Discussions
FIs	Finance Institutions
FP	Full Proposal
GAPs	Good Agricultural Practices
GDP	Gross Domestic Product
GESI	Gender Equity and Social Inclusion
GHG	Greenhouse gases
GIS	Geographic Information Systems
GoB	Government of Burundi
GP	Gender Policy
HDI	Human Development Index
IA	Intersectional Approach
IFAD	International Fund for Agricultural Development
IPCC	Intergovernmental Panel on Climate Change
ISABU	Institute of Agronomic Sciences of Burundi
KPI	Key Performance Indicators
MoAE	Ministry of Agriculture and Environment Burundi
NAPA	National Adaptation Programme of Action
ND-GAIN	Notre Dame Global Adaptation Initiative
NDA	National Designated Authority
NDC	Nationally Determined Contributions
NRM	Natural Disaster Risk Management
OBPE	Office Burundais pour la Protection de l'Environnement
OSS	Sahara and Sahel Observatory
PPP	Public-Private Partnership
RCPs	Representative Concentration Pathways
SDGs	Sustainable Development Goals
SES	Social and Environmental Safeguards
SLMPs	Sustainable Land Management Practice
SMEs	Small and Medium-sized Enterprises
SPS	Sanitary and Phytosanitary
SSC	SME-Support Centre
STFC	Science and Technology Facilities Council
T-Labs	Transformation Labs
TAP	Technology Action Plan
TNA	Technology Needs Assessment
TNCCC	Third national communication on climate change
TOT	Trainer of Trainers
TSP	The Source Plus
UB	Université du Burundi
UNEP	United Nations Environment Programme
UNFCCC	United Nations Framework Convention on Climate Change
USD	United States Dollar
VA	Vulnerability Assessment
WHO	World Health Organization
WIBI	Weather Index-Based Insurance
ZEP-RE	PTA Reinsurance Company

A. Project Background and Context

1. Geographic Context

1. Burundi, a landlocked country in East Africa, lies between meridians 29°00'–30°25' East and parallels 2°20'–4°25' South. It shares borders with Tanzania, Rwanda, and the Democratic Republic of Congo. With an estimated population of 11.6 million in 2020 and an annual growth rate of 3.34%[2], Burundi covers an area of approximately 27,834 square kilometres, making it one of Africa's smallest countries[3]. Characterized by five geomorphological zones, it has a typical relief of countries in the East African Great Rift Region. The Nile and Congo Basins provide ample forest resources, but these are vulnerable due to climatic conditions and unequal rainfall distribution. Environmental challenges include soil degradation, deforestation, and sanitation, exacerbated by high population density and extreme events[4].
2. Burundi's geography, topography, and climate significantly impact its economy, society, and environment. Agriculture, the backbone of the economy, faces challenges from natural disasters like flooding and droughts. Diverse ecosystems, including forests, wetlands, and savannas, support flora and fauna, but natural resources are threatened by deforestation, soil erosion, and pollution. Climate change exacerbates these issues. Burundi's social context is diverse, with three main ethnic groups: Hutu, Tutsi, and Twa. The largest ethnic group, Hutu, accounts for about 85% of the population. Kirundi, French, and Swahili are the official languages, and literacy rates are around 73%, with higher rates among men[5]. Poverty is a major challenge, with about 75% of the population living below the poverty line. Political instability and conflict have hindered development, but recent efforts have focused on stability, economic growth, and development.

2. Economic Context

3. Burundi is one of the poorest countries in the world, with a gross domestic product (GDP) per capita of only $216 in 2020 (World Bank, 2023[6]). Agriculture is the mainstay of the Burundian economy, employing over 90% of the population and accounting for over 32% of GDP (Agriculture in Burundi, n.d[7], FAO, 2021[8]). However, smallholder farmers, who constitute the majority of the agricultural sector, face numerous challenges such as inadequate access to finance, limited access to markets, and insufficient infrastructure (IFAD, 2019[9]), which hinder their ability to increase productivity and improve their livelihoods (USAID, 2021[10]).

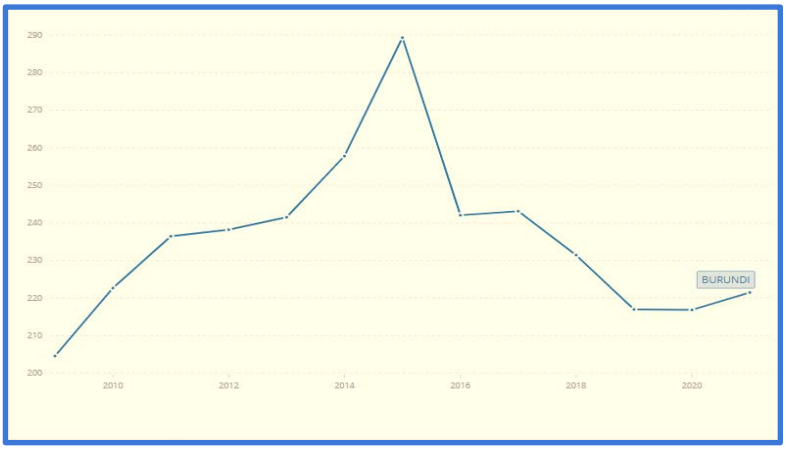


Figure 1: Burundi's GDP per capita trend from 2010 to 2020 (World Bank, 2021).

4. This context underscores the need for climate-risk management and climate-resilient financial services that help smallholder farmers protect productive assets, absorb drought and flood shocks, reduce distress sales, and invest in adaptation measures that can be sustained over time. Burundi's financial sector is small and not well developed, and access to finance is a major obstacle for companies in the formal and informal sectors. Credit is concentrated in the trade and equipment sectors, which attract more than 61.1% of the total. Credit is generally short-term (53.5% of the total). The banking market is dominated by three banks, which share 63.7% of sector assets, 60.7% of the credit portfolio, and 66.2% of

[2] World Bank. (2021). Burundi: https://data.worldbank.org/country/burundi
[3] CIA World Factbook. (2022). Burundi: https://www.cia.gov/the-world-factbook/countries/burundi/
[4] Burundi, Third National Communication for climate Change, 2019.
[5] UNESCO. (2022). Burundi: http://uis.unesco.org/en/country/bi
[6] "Burundi." The World Bank,2023. https://data.worldbank.org/country/burundi
[7] Agriculture in Burundi. (n.d.). The Embassy of the Republic of Burundi in Japan: http://burundiembassy-jp.com/agriculture-in-burundi/
[8] FAO. (2021). Burundi: http://www.fao.org/burundi/en/
[9] IFAD. (2019). Investing in rural people in Burundi: https://www.ifad.org/en/web/operations/project/id/1600002044
[10] USAID. (2021). Burundi: https://www.usaid.gov/burundi

deposits. Vulnerability in the banking sector has been aggravated by the rise in domestic debt resulting in the steady decline of credit to the private sector. Furthermore, given the country's past fragility such as the 2015 post-election chaos, investors consider Burundi a risky place for investments. The banking sector in Burundi remains unaware of the climate-related opportunities and access to climate funds. In 2008, a study carried out by World Bank, indicated that Burundi's business environment continued to be constrained by 1) limited access to and high cost of financing which is a result of the country's underdeveloped financial system 2) high level of concentration of economic assets in public enterprises which according to the report experience difficult financial conditions and are burdened by governance challenges such as overstaffing and poor management 3) cumbersome regulatory framework for SMEs and lack of effective dialogue mechanisms between the government and private enterprises . This was further confirmed in 2018 in World Bank's Implementation Completion and Results Report of Burundi - Financial & Private Sector Development (Fig.1) which highlighted that the 3 aspects still hamper Burundi's business environment.

a. Social Context

5. Burundi is one of the most densely populated country in Africa with approximately 11.89 million habitants and a density of 470 inhabitants/km^2 (Fig.2) with average household size of 4.8 (World Bank estimate[11]). The Burundi population has been growing at the alarming rate of over 3.3% per year over the past 20 years[12]. This situation leads to a growing pressure on natural resources. Burundi is characterized by a slow urbanization rate of around 10.4%, with over 90% of the population living in rural areas[13]. Agriculture is the mainstay of the economy with 90% of the 9.85 million inhabitants depending on it for their livelihood and employing 85% of the population but represented only 28.1% of the GDP in 2017[14]. In 2015, the Human Development Index of Burundi listed the country as 187th out of 191 countries. Burundi is a Least Developed Country (LDC).

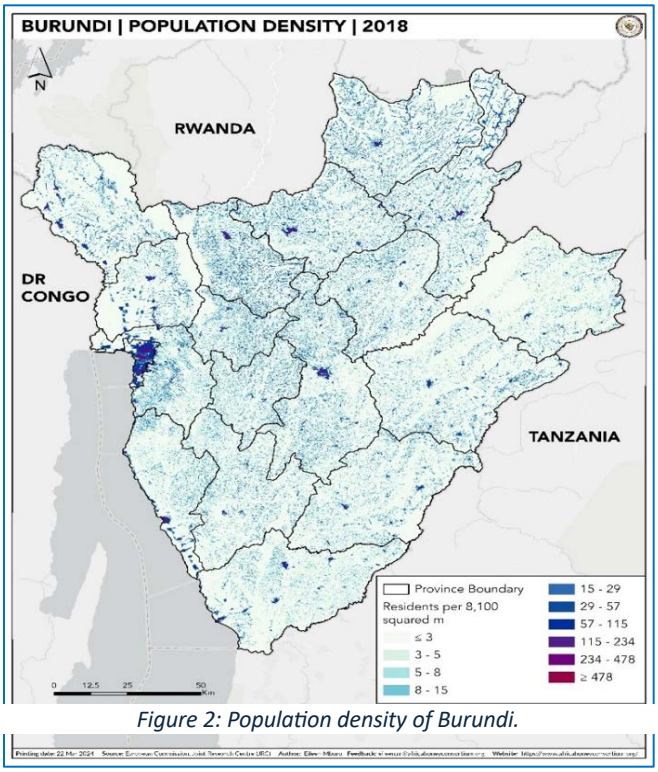


Figure 2: Population density of Burundi.

6. Smallholder farmers in Burundi are typically poor and vulnerable, with limited access to education, health care, and other social services (IFAD, 201915). Women and youth are particularly vulnerable, as they often face barriers to accessing resources and decision-making processes in the agricultural sector (FAO, 202116). By providing education and training on sustainable farming practices and facilitating access to finance, the project can help empower women and youth farmers and contribute to more equitable and inclusive development.

b.Development Context

7. Burundi is classified as a low-income country by the World Bank, its GDP per capita in 2020 stood at $216.8 USD, 89% of the population lived in rural areas, and female agricultural labor force participation rate was 92.3% (World Bank, 2020). With a human development index (HDI) of 0.417, indicating low levels of development (UNDP, 2020[17]). The country faces numerous development challenges, including poverty, food insecurity,

[11] http://data.un.org/en/iso/bi.html
[12] Report of SDG contextualization in Burundi, Mars 2017
[13] Report of SDG contextualisation in Burundi, Mars 2017
[14] Study on the cost of inaction in Burundi
[15] IFAD. (2019). Burundi country profile: https://www.ifad.org/en/web/operations/country/id/burundi
[16] FAO. (2021). Burundi: http://www.fao.org/burundi/en/
[17] UNDP. (2020). Human Development Report 2020: http://hdr.undp.org/en/content/2020-human-development-index-ranking

fragile health system and high rates of malnutrition (IFAD, 2019[18]). The country is also highly vulnerable to climate change, with extreme weather events such as floods and droughts becoming more frequent and intense (UNDP, 2020[19]). In addition, Burundi is vulnerable to the impacts of climate change, with increasing temperatures, erratic rainfall, and more frequent and severe droughts and floods (World Bank, 2019[20]).

3. Climate and Environmental Context

8. Burundi is characterized by a diverse range of ecosystems, including tropical rainforests, wetlands, and savannahs (UNEP-WCMC, 2021)[21]. It is a biodiversity hotspot, with rich ecosystems that provide important services such as water regulation, soil fertility, and pollination (WWF, 2021)[22]. However, Climate change is exacerbating these environmental challenges, with increasing temperatures and changing rainfall patterns affecting agricultural productivity and livelihoods (World Bank, 2019)[23]. Burundi, like many other countries in the East African region, is particularly vulnerable to the impacts of climate change. According to the World Bank, the country is experiencing an increase in temperature, with projections indicating a rise of up to 1.5°C by 2050. This increase is likely to lead to changes in precipitation patterns, which could result in both droughts and floods, both of which can have significant impacts on agriculture, which is the mainstay of the economy and the livelihood of many Burundians (World Bank, 2018)[24]. In recent years, the country has experienced a number of climate-related disasters, including floods, landslides, and droughts, which have had severe impacts on food security and livelihoods. The 2015-2016 El Niño-induced drought, for example, affected over 1.6 million people in Burundi, with more than 25,000 hectares of crops destroyed (FAO, 2016)[25]. To address these challenges, the government of Burundi has developed a National Adaptation Programme of Action (NAPA)[26] that seeks to address the country's priority adaptation needs and enhancing the resilience of vulnerable communities to the climate change impacts. These climate trends directly align with findings from Burundi's Third National Communication on Climate Change (2019), which identifies agriculture as the most vulnerable sector to climate variability, with smallholder farmers facing the greatest adaptation challenges due to their dependence on rain-fed agriculture and limited adaptive capacity (TNCCC, 2019). The communication emphasizes that temperature increases of 0.8°C observed between 1930-2000 have accelerated since 2000, corroborating current meteorological data and validating the urgent need for climate-smart agricultural interventions proposed in this project. Burundi's updated Nationally Determined Contribution (NDC, 2021) specifically prioritizes adaptation in the agricultural sector, identifying the need for "climate-resilient agricultural practices, improved water management, and enhanced early warning systems", all directly addressed through this project's block chain traceability, parametric insurance, and syntropic agroforestry components (Republic of Burundi NDC, 2021).

i). Land Degradation

9. According to MESA (2014), 38% of Burundi land are highly degraded or extremely degraded[27]. The most degraded lands are in the South, Centre, Centre East, and along the western border of the country. Six of the poorest regions of the country (Muyinga, Bururi, Gitega, Kayanza, Karusi and Rutana), are also amongst the most degraded ones. According to the United Nations Environment Programme (UNEP), over 75% of agricultural lands are degraded and resulting production loss are evaluated at UDS $400 million/ year[28]. Land degradation in Burundi is characterized by soil erosion in agricultural land, with a loss of soil evaluated at

[18] IFAD. (2019). Burundi Country Report: https://www.ifad.org/en/web/ioe/ppe?mode=search&keywords=Burundi
[19] UNDP. (2020). Human Development Report 2020. The Next Frontier: Human Development and the Anthropocene: http://hdr.undp.org/sites/default/files/hdr2020.pdf
[20] World Bank. (2019). Climate Change Knowledge Portal: Burundi: https://climateknowledgeportal.worldbank.org/country/burundi
[21] United Nations Environment Programme World Conservation Monitoring Centre (UNEP-WCMC). (2021). Burundi: https://www.protectedplanet.net/country/BDI
[22] World Wildlife Fund (WWF). (2021). Burundi: https://www.worldwildlife.org/places/burundi
[23] World Bank. (2019). Burundi: https://www.worldbank.org/en/country/burundi/overview
[24] World Bank. (2018). Climate Change Knowledge Portal: Burundi. https://climateknowledgeportal.worldbank.org/country/burundi
[25] FAO. (2016). El Niño 2015-2016 in East Africa: Impacts and Outlook. Food and Agriculture Organization of the United Nations. http://www.fao.org/emergencies/resources/documents/resources-detail/en/c/409754/
[26] Government of Burundi. (2010). National Adaptation Programme of Action (NAPA) to Climate Change. http://unfccc.int/resource/docs/napa/bur01.pdf
[27] Data and results from the spatial analysis available to the public on the map portal: Risk management in Burundi
[28] http://documents1.worldbank.org/curated/en/244311510936931800/pdf/121464-CEA-P156727-PUBLIC-BurundiCEAFrenchWebFinal.pdf

37,921,100 tons every year[29]. Further to affecting agricultural land fertility, large scale erosion disturbs the water cycle and proper function of forests and waterways, through downstream sedimentation (and the siltation of swampy areas and rural lands). Anti-erosion measures implemented at national scale are limited, with difficulties in developing land management approaches: (i) at the level of national, provincial and local authorities in charge of urban and municipal planning; and (ii) at the lawmaker level, whose role is to prescribe the regulations relating to land tenure and land use[30]. In the country, three out of four plots are not equipped with land degradation solution information/knowledge. Many stakeholders are committed to degradation fighting at national level (National Anti-Erosion Fight Program managed by the Ministry of Environment, National Program for Territory Restoration of the Government, World Bank, IFAD and FAO programs dedicated to erosion fighting, etc.). where good practices for land degradation have been funded under as presented in table 4 in the country and in the sub-region[31], however, the main challenge remains the adoption of practices and their replication at a local scale. The economic implications of this land degradation are staggering, with total annual costs estimated at USD $847 million, equivalent to 23% of Burundi's GDP (World Bank Country Environmental Analysis, 2024)[32]. Province-specific erosion rates reveal critical variations across project target areas: Kirundo experiences 45 tonnes per hectare annually, Karuzi faces 38 tonnes/ha/year, and Rutana confronts 42 tonnes/ha/year, all far exceeding sustainable thresholds of 3-5 tonnes per hectare (UNEP, 2023)[33]. Agricultural productivity losses alone account for USD $312 million annually, while watershed service degradation costs an additional USD $156 million per year through reduced water regulation, increased flooding, and diminished groundwater recharge (TEEB East Africa, 2023[34]). The degradation of soil organic matter has fallen below 2% in 67% of cropland, approaching the critical threshold below which soil fertility becomes irreversibly compromised (Global Soil Partnership, 2023)[35]. Indeed, populations recruited for the implementation of these practices are attracted first and foremost by the daily pay offered by the projects, and in the areas where there is lack of awareness and works are conducted without financial compensation (for example when organized in community works frameworks).

Table 1: Economic Valuation of Environmental Degradation by Sector (Annual Costs)

Degradation Category	Economic Cost (USD millions)	% of Agricultural GDP	Primary Causes	Affected Population
Soil Erosion	312.4	18.7%	Deforestation, poor farming practices	8.2 million
Watershed Degradation	156.8	9.4%	Forest loss, overgrazing	6.8 million
Biodiversity Loss	89.3	5.3%	Habitat destruction, climate change	4.1 million
Infrastructure Damage	289.7	17.3%	Flooding, landslides	3.7 million
Total Annual Cost	847.2	50.7%	Multiple factors	9.8 million

Sources: World Bank Country Environmental Analysis (2024); Ministry of Environment Burundi (2024); UNEP Economic Assessment (2023)

10. This is a common problem with addressing land degradation and the solution is often complex, requiring a detailed understanding of the localized incentive structure surrounding land management activities and crafting a suitable enabling environment to promote their uptake: the key challenge is to identify mechanisms enabling the perpetuation of the approach, in order to truly enable the development of progressive solutions, and the registration of these techniques into local planning (at the hill level through the Community Development Comities , and at the community level through the Consultative community Development comities. Land

[29] World Bank, Country Environmental Analysis, 2017

[30] MEEATU 2011.

[31] Inventory of the SLM practices in the Kagera watershed, FAO 2017

[32] World Bank Country Environmental Analysis. (2024). Economic costs of environmental degradation in Burundi. Policy Research Report WB-CEA-2024-BDI. Washington DC: World Bank Group.

[33] UNEP. (2023). Global Environment Outlook for Central Africa. Regional Assessment Report GEO-CA-2023. Nairobi: United Nations Environment Programme.

[34] TEEB Central Africa. (2023). The economics of ecosystems and biodiversity: Central Africa regional assessment. Assessment Report TEEB-CA-2023. Nairobi: United Nations Environment Programme.

[35] Global Soil Partnership. (2023). Soil health assessment for sub-Saharan Africa: Burundi country profile. Technical Report GSP-2023-BDI. Rome: FAO Global Soil Partnership.

degradation in Burundi is a comprehensive process that can be attributed to a number of factors. The often-steep topography combined with the high population means that cultivation often takes place in areas with steeper slopes than would normally be recommended. In natural conditions the land would be largely covered in forest. In many places this has now been cleared, either for agriculture or for fuel and timber. With a lack of low-priced alternative fuels, charcoal burning is big business in Burundi, both for domestic use and for sale to the cities, contributing significantly to deforestation. Small farm sizes mean that there is no possibility of soil being left uncultivated to recover between cropping cycles. Over time poor land management practices mean that soil nutrients are effectively mined. Poor farmers may not be able to afford the fertilizers to replace the nutrients removed by successive cropping. The soil structure breaks down with this chemical depletion as well as a reduction in the vegetable matter that would be there under the natural forest cover. This makes the soil less resilient to erosion. Under agriculture, soil may also be left bare after harvest and exposed to the more intense rainfall that is one feature of climate change. The proposed activities take into account the linked issues of deforestation, over-grazing, degradation of soil structure and nutrients and the exposed soil surfaces under agriculture that lead to land degradation and, siltation of rivers and flooding. The impacts of climate change, together with these unsustainable land management techniques together pose a significant challenge to agricultural production itself in Burundi. Agriculture is not just a contributory cause of the land degradation problems but also the part of the economy that suffers the most from them.

ii). Vulnerability to climate change and impacts

11. Globally Burundi has the lowest per capita GHG emissions, ranking 188 out of 188 countries and contributing only 0.01% to global emissions. On climate vulnerability, Burundi ranks 173 out of 191 countries in the Notre Dame Global Adaptation Initiative (ND-GAIN) index for climate vulnerability. It is the 18th most vulnerable country and the 19th least ready country, meaning it is extremely vulnerable to, yet very unready to combat climate change effects[36]. Climate change is projected to create a large number of risks associated with the following phenomena: (i) season creep; (ii) flooding of swamps and lowlands; (iii) land degradation and loss of soil fertility; (iv) shortage of groundwater resources; (v) extreme weather events (hail, violent showers, heavy winds, etc.); (vi) changes to the growing seasons of crops and forests; and (vii) unpredictable movements of pests.
12. There is a great need for investment and innovations to reduce vulnerabilities and improve readiness and a great urgency for action. Burundi is the 18th most vulnerable country and the 19th least ready country based on this index[37]. A study on the integrated vulnerability analysis in Burundi conducted by GIZ[38], focuses on land degradation as one of the three vulnerability factors most impacted by climate change, and locates vulnerability hotspots in the North-Western and Northern area of the country. Over the past 60 years, Burundi has been affected by a decennial alternance of flooding[39] and drought cycles (under the effect of El-Nino[40]/La Nina), as well as an increase in average temperatures and an extension of the dry season[41]. Estimation of annual losses resulting from extreme weather events due to climate change range from 5 to 17% of the GDP[42]. Between 1995 and 2005, yields/hectare have decreased for almost all food- crops, and wheat production has experienced a large decline. Nationwide, Burundi has alternatively experienced severe droughts, resulting in crop failure and a 35% livestock mortality (1998-2005). The Third National Communication on Climate Change (TNCCC, 2019)[43] validates these projections, reporting that "climate change impacts on agriculture include reduced crop yields, increased pest and disease pressure, and greater frequency of extreme weather events," precisely the challenges this project addresses through integrated ecosystem-based adaptation approaches.

[36] ND-GAIN Country Index 2018 - Burundi
[37] ND-GAIN, 2018.
[38] https://www.preventionweb.net/publications/view/44118
[39] Floods represent 60.6% of natural risks in Burundi are not only more frequent, but also deadlier. Alone, extreme drought and flooding events reduce the long-term growth of GDP in the region by 2.4% every year. Severe floods, with similar effects (2006-2007).
[40] Burundi has been particularly affected by the 2015-2016 El-Nino cycle with torrential rains provoking landslides and flooding, followed by droughts.
[41] World Bank, 2017
[42] Country Environmental Analysis, World Bank, 2017
43 Republic of Burundi. (2019). Third National Communication on Climate Change to the United Nations Framework Convention on Climate Change. National Report TNCCC-2019. Bujumbura: Office Burundais pour la Protection de l'Environnement

The TNCCC specifically recommends "strengthening institutional capacity for climate risk management, promoting climate-smart agriculture, and developing innovative financing mechanisms for adaptation"—all core components of the proposed intervention (TNCCC, 2019). Burundi's 2021 NDC builds on these recommendations by committing to "reduce climate vulnerability in the agricultural sector by 20% by 2030 through adoption of climate-resilient practices and improved access to climate information," establishing clear national targets that this project directly supports through its 24,000 farmer beneficiary target and comprehensive climate information systems (Republic of Burundi NDC, 2021)[44].

13. Multi-scenario climate projections reveal escalating challenges under different emission pathways that directly threaten the agricultural systems targeted by this project. Under the moderate RCP 4.5 scenario—considered most likely given current global emission trajectories—Burundi faces additional warming of 1.5-2.1°C by 2050, translating to 45 additional extreme heat days annually and a 40% increase in crop heat stress frequency (IPCC AR6, 2023)[45]. The high-emissions RCP 8.5 scenario projects even more severe impacts, with 2.3-3.1°C additional warming leading to 65 extra extreme heat days and an 80% increase in crop heat stress events that could fundamentally threaten national food security (World Bank Climate Change Knowledge Portal, 2024)[46]. Precipitation projections reveal concerning seasonal redistribution, with the critical March-May long rainy season experiencing 15-25% reduction in total precipitation, while extreme rainfall events increase in intensity by 60% and frequency by 40%.

Table 2: Province-Specific Climate Baseline Changes (1961-2024)

Province	Annual Temp Change (°C)	Rainfall Change (%)	Drought Frequency	Extreme Heat Days (+)	Agricultural Impact Score*
Bubanza	+1.1	-6	Every 5 years	+18	6.8/10
Bururi	+0.9	-4	Every 7 years	+12	5.2/10
Karuzi	+1.4	-12	Every 3 years	+25	8.4/10
Ruyigi	+1.3	-10	Every 4 years	+22	7.9/10
Rutana	+1.2	-8	Every 4 years	+20	7.1/10
Kirundo	+1.5	-15	Every 3 years	+28	9.1/10

**Agricultural Impact Score based on temperature change, precipitation variability, drought frequency, and crop yield trends (10 = most severe impact)*

Sources: Burundi National Meteorological Service (2024); ISABU Agricultural Statistics (2024)

14. Small-scale farmers in Burundi face a host of agricultural challenges, and climate change exacerbates these issues. Climate change directly affects agriculture by causing shorter vegetative growth periods, shifting crop seasons, and reducing biomass growth. This leads to degraded arable land, increased water stress, and a decline in surface water volume. These changes, coupled with production deficits, pose a threat to food security for populations relying on local farming. The mismatch between weather calendars and crop seasons further complicates agricultural production.

15. Additionally, there is an increased risk of famine, extending the hunger gap and forcing seasonal displacement of farmers in search of more favorable areas. The impact is evident in crop losses due to climate-induced calamities such as floods, droughts, and bushfires. Drought alone affects 85.4% of the population annually, rising to 7.9% with population growth. Rising temperatures and altered rainfall patterns also contribute to pest and disease infestations, with banana, a vital crop, experiencing up to 60% yield losses due to diseases such as cassava brown streak disease[47]. Climate change is manifesting in Burundi through reduced rainfall, shorter rainy seasons, increased temperatures, and various ecological challenges. In the Kuruzi and Kirundo Commune, threats include decreased precipitation, heatwaves, and soil degradation, impacting agriculture significantly. The Bururi Commune faces similar risks but with a smaller decline in rainfall. The Vyanda Commune experiences lower precipitation, land degradation, and reduced soil fertility, affecting agricultural productivity to a lesser extent than the north. The Musigati, and Rugazi Communes encounters shifting wet

44 Republic of Burundi. (2021). Updated Nationally Determined Contribution (NDC) 2021-2030. Policy Document NDC-2021. Bujumbura: Ministry of Environment, Agriculture and Livestock.

45 IPCC. (2023). Climate Change 2023: Synthesis Report. Contribution of Working Groups I, II and III to the Sixth Assessment Report. Geneva: Intergovernmental Panel on Climate Change.

46 World Bank Climate Change Knowledge Portal. (2024). Burundi climate projections and risk assessment. Country Climate Profile 2024. Washington DC: World Bank Group.

47 https://dicf.unepgrid.ch/burundi/climate-change

seasons, reduced river flow, and erosion.

16. Burundi's food security is at risk, with the United Nations Development Program reporting that 57% of the population is food-insecure, directly linked to the impact of climate change. Agriculture accounts for 90% of employment in Burundi, primarily involving small-scale farmers. Climate change projections by the Intergovernmental Panel on Climate Change (IPCC) predict a future with more frequent and prolonged droughts and increased rainfall variability in East Africa, including Burundi. Addressing these issues necessitates the adoption of climate-resilient farming practices, investment in irrigation infrastructure, and improved post-harvest handling. International support and local policy changes are also critical to help Burundi's small-scale farmers adapt to a changing climate and secure their livelihoods[48]. Comprehensive crop vulnerability assessments reveal that climate impacts have already significantly reduced productivity across all major staple crops in the project target areas. Banana cultivation has experienced the most severe decline at 31% yield loss since 2000, followed by maize at 23% and beans at 18%, despite increased fertilizer use and improved varieties, indicating that climate stress is overwhelming technological improvements (ISABU Agricultural Research, 2024)[49]. Heat stress has emerged as a primary constraint, with crops now experiencing 25-52 additional days of heat stress per growing season compared to the 1990s, fundamentally altering plant physiology and reproductive success (Climate Smart Agriculture Research Burundi, 2023)[50]. Climate-induced pest and disease pressure creates additional challenges, with 12 new invasive pest species established since 2010 and disease outbreak frequency increasing by 150%, forcing farmers to increase pesticide use by 340% while experiencing declining effectiveness.

Table 3:Crop-Specific Climate Vulnerability Assessment (2000-2024)

Crop	Yield Loss (%)	Heat Stress Days (+)	Drought Vulnerability	Pest Pressure (+%)	Adaptation Priority	Project Relevance
Banana	-31	+52	High	+89 (Black sigatoka)	Very High	Agroforestry integration
Maize	-23	+45	Very High	+78 (Armyworm)	High	Climate-smart varieties
Beans	-18	+32	Very High	+45 (Pod borer)	High	Drought-tolerant varieties
Cassava	-12	+28	Medium	+67 (Mosaic virus)	Medium	Climate-resilient processing
Sweet Potato	-15	+25	Medium	+34 (Weevil)	Medium	Value addition potential
Sorghum	-8	+38	Low	+23 (Shoot fly)	Low	Drought adaptation model

Sources: ISABU Agricultural Research (2024); Plant Protection Service Burundi (2024); Climate Smart Agriculture Initiative (2023)

17. These crop vulnerability patterns align precisely with priorities identified in the National Agriculture Strategy 2018-2027, which emphasizes "enhancing productivity and resilience of priority crops including banana, maize, and beans through climate-smart practices and integrated pest management" (Ministry of Agriculture and Livestock, 2018)[51]. The strategy specifically calls for "diversification of agricultural production systems, promotion of agroforestry, and development of value chains for high-value crops," directly supporting this project's focus on beekeeping integration, syntropic agroforestry, and block chain traceability for market access. The Agriculture Strategy's objective to "increase agricultural productivity by 30% while building climate resilience" provides the national policy framework within which this project's interventions will contribute to broader sectoral transformation (NAS, 2018-2027).
18. Climate projections indicate a precipitation increase of up to 10%, that will be particularly important in the

[48] https://www.wfp.org/stories/africa-day-how-wfp-helps-families-struck-climate-change-burundi

49 ISABU Agricultural Research. (2024). Crop yield trends and climate impact analysis 2000-2024. Research Bulletin ISABU-2024-05. Gitega: Institute of Agronomic Sciences of Burundi.

50 Climate Smart Agriculture Research Burundi. (2023). Heat stress impacts on crop production systems. Research Publication CSA-2023-08. Gitega: Institute of Agronomic Sciences of Burundi.

51 Ministry of Agriculture and Livestock, Burundi. (2018). National Agriculture Strategy 2018-2027: Building resilient and productive agricultural systems. Strategic Document NAS-2018-2027. Bujumbura: Ministry of Agriculture and Livestock.

Congo-Nile mountains, the Plateau Central and Western Trough. These changes result in a modification of rainfall patterns, with more torrential rains that caused massive flooding throughout the 20th century for Burundi, especially in the 1960's when the level of Lake Tanganyika increased by 4 meters causing districts in Bujumbura and Gatumba to flood[52]. And in 2002, floods caused by heavy rain forced many people from their homes (under the effect of El-Nino[53]/La Nina). and a reduction of rains during critical periods (increase droughts periods), impacting yields and presenting particular risks for the exploitation of marginal areas (steep slopes, deforested ridges, etc.) already very exposed to degradation of land.

iii). Droughts

19. Droughts repeatedly strike Burundi accounting for 67.8% of the distribution of natural hazards that occur in the country. They have devastating impacts on key economic sectors and can affect a large proportion of the population like the one that struck in 2004 and affected over 2 million Burundians. Storms have affected thousands of people in the first decade of the 21st century with 25,500 people being affected in 2004 alone. While the rainy season seems to be decreasing in the northeastern regions of Burundi, they have experienced torrential rains, lightning, and thunder during the rainy season, increasing their vulnerability to loss of livestock, food insufficiency, decreased agricultural output, bush fires, and loss of human life. Changes in the duration of wet and dry seasons have recently been observed. Total precipitation has declined, the long-wet season ends sooner (often in April) while the short-wet season starts later (in October). This means that the 'long dry season' is further prolonged and can now be considered to last from May to September as seen in figure 3. Moreover, an increase in average temperature of 0.8°C has been observed between 1930 and 2000. This intensification of dry and wet seasons results in more severe droughts and floods. Projections for future changes in temperature due to climate change estimate an increase of 0.4°C per decade and a 1.9°C increase by 2050. Mean annual rainfall is projected to increase over Burundi by mid and late 21st century

iv). Protection and Restoration of Forests and Watersheds

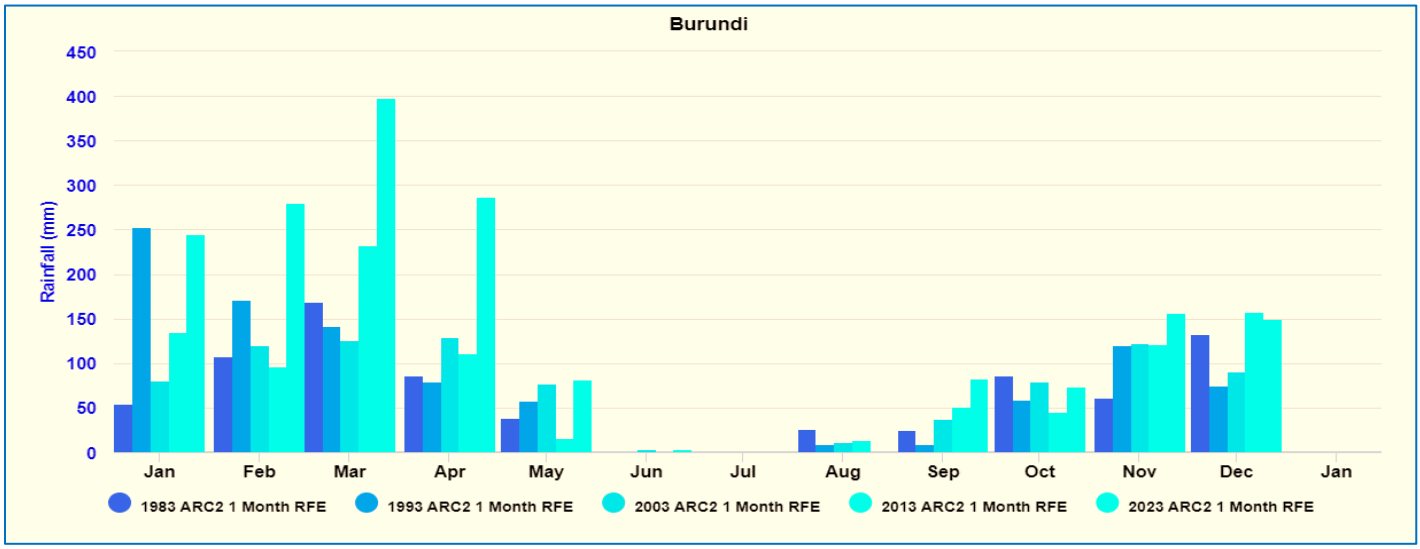


Figure 3: Changes in Rainfall Pattern in Burundi

20. The interconnected ecosystems of forests and watersheds play a crucial role in sustaining the well-being of Burundian communities. The ecological integrity of these systems is paramount for community livelihoods, and any compromise in their health poses a significant threat. Recognizing the vital role of forests and associated water bodies in enhancing Burundi's climate resilience, it becomes imperative to address the threats posed by both natural and human-induced factors to these ecosystems. Burundi faces challenges such as large-scale deforestation, ecosystem loss from fires, pests, diseases, and inadequate management practices. Burundi's

[52] Floods represent 60.6% of natural risks in Burundi are not only more frequent, but also more deadly. Alone, extreme drought and flooding events reduce the long-term growth of GDP in the region by 2.4% every year. Severe floods, with similar effects (2006-2007).

[53] Burundi has been particularly affected by the 2015-2016 El-Nino cycle with torrential rains provoking landslides and flooding, followed by droughts.

environment faces critical challenges, with an annual deforestation rate of approximately 5.5% from 2010 to 2015 (FAO, 2015). This alarming trend jeopardizes the country's approximately 50 distinct watersheds (World Resources Institute), which play a pivotal role in water provision and climate regulation.

21. Notably, Lake Tanganyika, shared by Burundi with other nations, is a significant source of freshwater but is under threat due to increasing sedimentation and pollution. The consequences of these challenges extend beyond environmental concerns to impacting the economy and communities in profound ways. The country's ability to adapt to a changing climate is intricately linked to the preservation of key ecosystems. Therefore, implementing concrete adaptive measures to restore lost ecosystems and safeguard those under threat is crucial for effectively addressing the impacts of climate change. The economic value of lost ecosystem services from forest degradation totals USD $413 million annually, representing one of the highest per-capita ecosystem service losses in sub-Saharan Africa (TEEB Central Africa, 2023). Carbon sequestration services alone account for USD $67 million in annual losses, while water regulation services, critical for drought resilience represent USD $123 million in lost natural infrastructure value (Natural Capital Accounting Burundi, 2024). Pollination services, essential for the agricultural crops targeted by this project, account for USD $45 million in annual losses, while soil formation and fertility services worth USD $178 million per year are being degraded through reduced organic matter inputs and increased erosion on deforested slopes (Burundi Ecosystem Services Assessment, 2023). Groundwater systems are experiencing unprecedented stress, with aquifer levels declining by 2-4 meters per decade in northern provinces, while spring discharge has reduced by 35% over the past two decades, forcing communities to access water from increasingly deep and often contaminated sources (Burundi National Water Authority, 2024).
22. Forests and water bodies within watersheds collaborate to protect and supply essential water resources to the nation. Burundi boasts over 20 watersheds, with many originating within the Congo Basin, including a few transboundary ones like Rusizi. Given the vital role of water in sustaining life and communities, protecting it from the adverse effects of climate change is of utmost importance. The changing climate poses threats to water availability through alterations in precipitation patterns and the hydrological cycle. More frequent droughts reduce the quantity and quality of water accessible to communities, including those relying on underground aquifers. Economic impacts are profound, as approximately 90% of Burundi’s workforce is employed by agriculture, a sector heavily reliant on ecosystem services from forests and watersheds (World Bank, 2020). With agriculture contributing around 40% of the Gross Domestic Product (GDP), the degradation of these ecosystems could have a severe economic impact (World Bank, 2020). Climate change also brings about increased storms and rainfall, contributing to the flooding of water bodies. This, in turn, diminishes the availability of clean water as sediments saturate water sources. The ecological integrity of watersheds is further jeopardized by deforestation and degradation, leading to a reduction in their functionality. This, in turn, diminishes the supporting and provisioning services provided by forested systems and watersheds. Deforestation poses an additional threat to biodiversity by altering the natural environment and habitat of key species. Anthropogenic activities such as agriculture and improper waste disposal further exacerbate the challenges, introducing health hazards and deform water quality.

v). Future Extremes

23. Based on the Representative Concentration Pathways (RCPs) 4.5 scenario, Burundi's average annual temperature is likely to increase by 0.75°C for 2021-2050 compared to 1991-2020 period (Fig. 4). Rainfall will become increasingly variable with more extremes and increase by about 10% in the southern part of the country (Fig. 5). Temperature variability in 2021-2050 compared to 1991-2020 period: +23.8%. Precipitation variability in 2021-2050 compared to 1991-2020 period: +22.7%. Climate projections also indicate that rainfall tends to decrease in March / April and August / September by 10 to 25% prolonging the dry periods and increasing drought risk significantly. As a consequence, high intensity rainfall during the short-wet season will increase. These climate changes will engender a number of increased risks associated with: (i) season creep and changes to the growing seasons of crops and forests; (ii) episodic flooding of swamps and lowlands; (iii) land degradation from deforestation and loss of soil fertility from more frequent and intense runoff events and (iv) more frequent extreme weather events (hail, violent showers, heavy winds, etc.). The changes in precipitation, in particular, will put at risk several Government's investments that were made to improve the livelihood of its citizens, rehabilitate irrigation schemes and increase food security.
24. As depicted in Fig. 4 and Fig. 5, increasing temperatures and changing rainfall patterns are contributing to ecosystem degradation, poor animal condition, disease outbreaks, and market exclusion – creating a vicious cycle of degradation, increased agricultural emissions, reduced habitat sequestration potential, and reduced

livelihoods for the most vulnerable populations in Burundi living in last-mile communities. The climate-induced degradation of ecosystems also drives increased wildlife poaching, encroachment into conservation areas through agriculture and by cattle which affects natural wildlife movements, and increased trapping, poisoning, and hunting of predators that negatively affect biodiversity and extend threats to ecotourism activities in the country. This cycle must be broken through a paradigm shift to collective management of natural rural land resources, implemented in a context-driven, gender responsive way that reflects the needs and capacities of

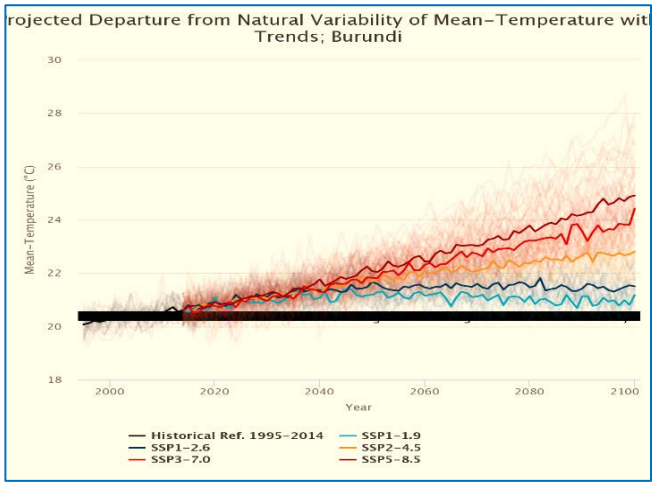


Figure 4: Mean temperature changes in Burundi

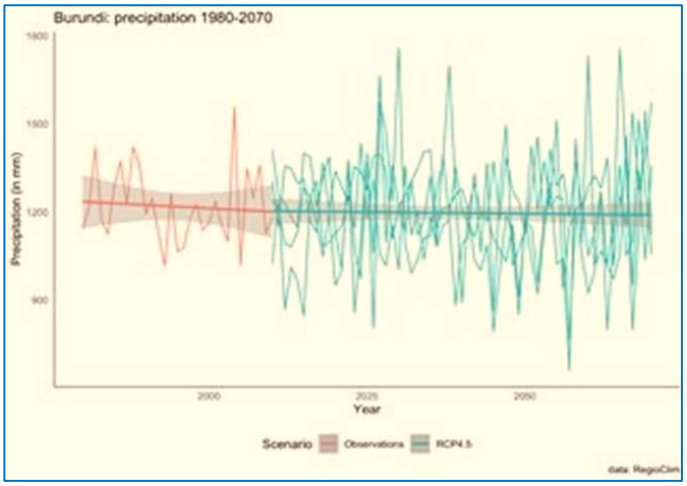


Figure 5:Precipitation changes in Burundi

all stakeholders.

25. Gender-differentiated climate and environmental impacts reveal disproportionate vulnerabilities that must be addressed through the proposed project's targeted interventions. Women bear 67% greater impact from livestock mortality during climate extremes compared to male-headed households, while their daily workload increases by an average of 3.2 hours during drought periods for water and fuel collection as sources become more distant and scarce (Gender Climate Impact Assessment Burundi, 2024)[54]. Climate-induced displacement events correlate with 28% increases in gender-based violence, while girls experience 34% higher school dropout rates during climate shocks as families prioritize boys' education and require girls' labor for increased domestic work. These gender-specific vulnerabilities are particularly pronounced in the project's target provinces, where patriarchal land tenure systems mean that women control only 22% of agricultural land despite providing 60% of agricultural labor, limiting their ability to implement climate adaptation measures or access formal financial services for resilience building. This paradigm shift is critical for people and nature in Burundi and throughout Africa.

26. The cumulative economic impact of climate inaction threatens to reverse decades of development progress, with business-as-usual scenarios projecting USD $23.4 billion in total losses between 2025-2050, representing a 2.8% average annual GDP growth reduction and forcing an additional 2.3 million people below the poverty line (World Bank Climate Change Knowledge Portal, 2024). Critical environmental thresholds are approaching across multiple domains, with 12% of remaining forests at risk of savannization due to reduced rainfall and increased fire frequency, while 8 of Burundi's 50 major watersheds have reached severely degraded status where restoration may no longer be possible without massive intervention (Ecosystem Resilience Assessment Burundi, 2023). Soil fertility has reached critical thresholds in 23% of agricultural land, where organic matter content below 2% makes soil restoration extremely difficult and expensive, potentially requiring decades of intensive management to recover productivity (Global Soil Partnership Assessment, 2024). These tipping point risks create an urgent timeframe for intervention, validating the proposed project's emphasis on ecosystem-based adaptation through beekeeping, syntropic agroforestry, and integrated landscape management approaches that can reverse degradation trends while providing immediate livelihood benefits for vulnerable farming communities. These critical thresholds and economic projections align with strategic priorities outlined in Burundi's most recent policy frameworks. The National Agriculture Strategy 2018-2027 recognizes that "without immediate intervention to address land degradation and climate vulnerability, agricultural productivity

54 Gender Climate Impact Assessment Burundi. (2024). Gender-differentiated impacts of climate change on rural livelihoods. Assessment Report GCIA-2024-01. Bujumbura: Ministry of Gender and Human Rights.

will continue to decline, threatening national food security and economic stability" (Ministry of Agriculture and Livestock, 2018). The strategy's emphasis on "innovative financing mechanisms, technology adoption, and private sector engagement" directly supports this project's block chain and parametric insurance innovations. Burundi's 2021 NDC acknowledges the USD $400 million annual cost of environmental degradation cited in national assessments and commits to "mobilize climate finance for adaptation investments that generate economic returns while building resilience" (Republic of Burundi NDC, 2021). The Third National Communication emphasizes that "delaying climate action will exponentially increase future costs and reduce adaptation options," providing strong policy justification for the immediate implementation of this comprehensive adaptation project (TNCCC, 2019).

a. Project Area

27. The project will work in 12 communes located in 6 provinces across the country (fig 6): 2 communes in Bubanza province: Gihanga, and Bubanza communes; 3 communes in Bururi province: Bururi, Vyanda and Rutovu communes; 2 communes in Karuzi province: Bugenyuzi and Buhiga commune; 2 communes in Ruyigi province: Butezi and Ruyigi commune; 2 communes in Rutana province: Musongati and Giharo commune; and 1 commune in Kirundo province: Kirundo commune. These communes are amongst the most vulnerable to climate change and poorest ones in the country.
28. The above twelve communes in the six provinces (Bubanza, Bururi, Karuzi, Ruyigi, Rutana and Kirundo) were primarily selected based on the social and climate vulnerability assessment carried out by the design team and on the following criteria:
    (i) the presence of unsustainable and under functioning agriculture activities *(Vulnerability of agricultural production systems),*
    (ii) environmental degradation and climate vulnerability *(Vulnerability of natural resources),*
    (iii) the prevalence and severity of poverty *(Vulnerability of humans),* and
    (iv) the potential for leveraging resources and achieving operational synergies with the project.
29. Collectively, the areas cover 3,922km^2 of the country and have an average population density of 328 inhabitants/km^2. In the communal lands of the six provinces, poverty levels exceed 70%, with socio-economic conditions largely attributed to the effects of drought on traditional agriculture, limited alternative economic opportunities in rural areas, and lack of access to formal markets.

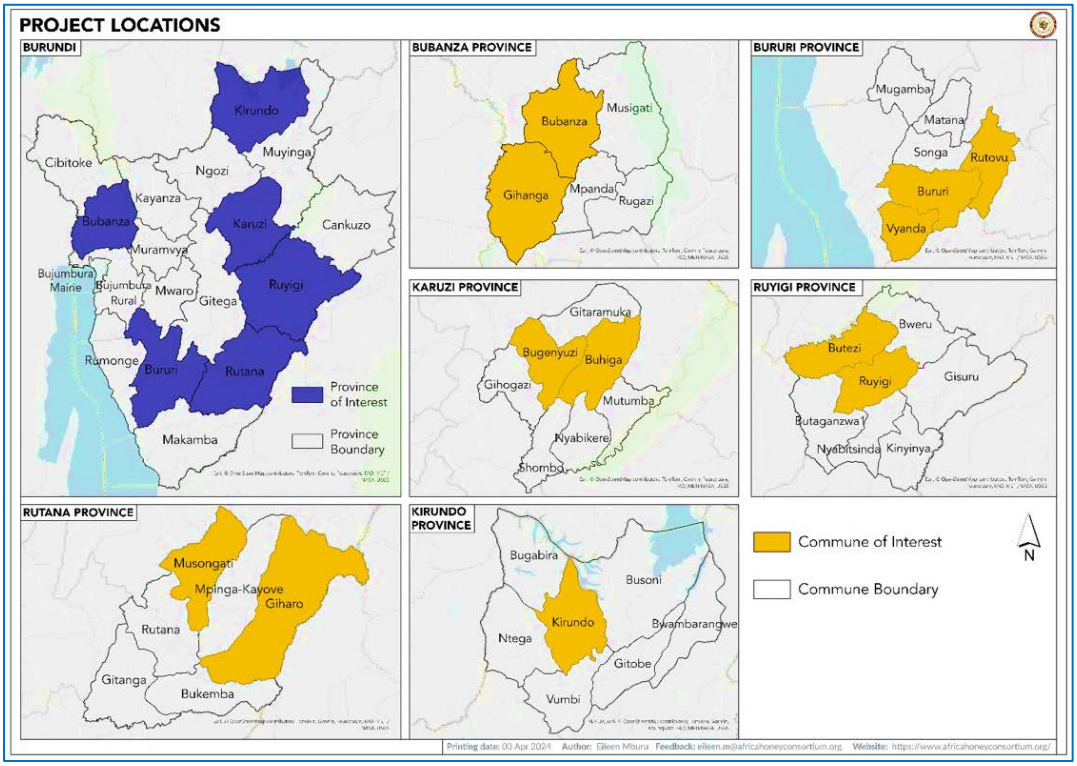


Figure 6: Project Locations

a. Project Impacts

30. The project's impacts are multifaceted and will lead to more robust and empowered rural communities in

Burundi. These communities will be better prepared to address the challenges presented by climate change and land degradation, ultimately improving their quality of life and prospects for the future. By focusing on building adaptive capacity and resilience, the project will help communities better withstand and respond to the negative impacts of climate change and land degradation. Some of the potential impacts include: -

(a) **Enhanced Agricultural Productivity and Ecosystem Health:** Through the integration of beekeeping with agroforestry practices, the project is set to significantly increase agricultural productivity. This holistic approach will not only improve the yield and quality of agricultural produce but also contribute to the health of ecosystems by promoting biodiversity and enhancing soil stability through conservation and restoration of critical ecosystems such as forests and watersheds. This integration is fundamental to creating a sustainable agricultural system that is resilient to the changing climate.

(b) **Economic Diversification and Improved Livelihoods:** By focusing on value-added and improving market access for crop and livestock value chains, the project aims to enhance economic diversification for smallholder farmers. This is crucial for building resilience against economic shocks and stresses, including those induced by climate change. Improving livelihoods through these means can lead to reduced poverty levels and better food security for the rural population.

(c) **Improved Resilience to Climate Variability and Extreme Weather Events:** The project will strengthen resilience to droughts, floods, and climate-related production losses by combining climate information services, risk-transfer mechanisms, traceability support, and post-harvest stabilization tools that help farmers make climate-informed decisions, reduce avoidable losses, and recover more rapidly aftershocks. These measures are not stand-alone commercial innovations; they are practical mechanisms to protect adaptation gains generated through ecosystem restoration, resilient production systems, and livelihood diversification.

(d) **Strengthening Climate-Responsive Policy Advocacy and Governance:** By developing and adopting enabling policies, strategies, and legal frameworks, the project will ensure its sustainability and the replication of its successes across other regions. Strengthened governance frameworks will facilitate community adaptation to climate change, ensuring that the benefits of the project are durable and far-reaching. Strengthened governance frameworks and multi-stakeholder platforms will facilitate community adaptation efforts, ensuring long-term project sustainability and scalability.

Table 4: Project Area in km square

Areas in km^2				
Commune of Interest	**Project Area**	**Cropland**	**Forested Land**	**Rangeland**
Bubanza Commune	224.80	17.67	48.36	143.28
Gihanga Commune	287.30	89.53	45.21	106.22
Rutovu Commune	286.30	24.85	24.47	224.26
Bururi Commune	391.60	21.95	99.58	247.68
Vyanda Commune	226.50	5.65	73.81	138.17
Bugenyuzi Commune	234.60	29.47	19.66	167.28
Buhiga Commune	275.40	46.11	21.95	186.26
Butezi Commune	334.10	12.67	61.40	233.22
Ruyigi Commune	289.10	26.28	16.11	216.67
Musongati Commune	274.20	10.43	12.73	218.58
Giharo Commune	585.90	36.37	63.70	439.49
Kirundo Commune	207.30	93.72	14.56	64.70
TOTAL	**3,617.10**	**414.69**	**501.55**	**2,385.82**

31. Over the 5 years implementation period, the Project is expected to directly increase the climate change resilience of 24,000 small scale farmers (65.69% of the Project area population), directly impacting 143,040

(average household size in Burundi is 5.96[55]) and indirectly 572,160 people in the 6 provinces and improve the management of 3,617.10 km^2 of land and natural ecosystems (Table 1). The Project has the long-term potential to indirectly increase the climate change resilience of the entire national population of Burundi (~12.71M people) and improve the condition of 6,235 km² of natural ecosystems and associated mitigation impacts.

B. Project Objectives

32. The overall goal of the project is to enhance the adaptive capacity and climate resilience of rural smallholder farmers and vulnerable communities in Burundi by combining ecosystem-based adaptation, climate-risk management, resilient livelihood diversification, and institutional support into one integrated adaptation system. The project is designed to *reduce the physical and economic vulnerability of last-mile communities to droughts, flooding, land degradation, and climate-related production losses, while strengthening the long-term sustainability of adaptation gains*. The project aims to achieve its goals through the following five objectives:

1. **Strengthen Community Resilience**: Enhance the resilience of rural communities in Burundi to the adverse effects of climate change by integrating climate-smart practices that improve ecosystem health and agricultural productivity.
2. **Promote Resilient Livelihood Diversification:** Strengthen diversified and climate-resilient income opportunities for smallholder farmers so that households can better withstand climate shocks, reduce distress coping strategies, and sustain adaptation investments over time."
3. **Build Resilience to Climate Risks**: Increase resilience to climate variability and extreme weather events for small-scale farmers and communities by improving access to climate information, risk-transfer mechanisms, post-harvest protection, and other practical tools that reduce losses and support faster recovery after droughts and floods.
4. **Foster Enabling Policies**: Support the development and implementation of policies, strategies, and governance frameworks that promote climate-resilient agriculture and community adaptation, ensuring long-term sustainability and environmental conservation.
5. **Enhance Stakeholder Capacities**: Strengthen the capacities of stakeholders in climate risk management and mobilization of climate finance to support adaptation and resilience-building initiatives.

33. The project approach is centered on enhancing adaptation, with a primary focus on capacity building at various levels to improve climate resilience. This approach emphasizes cohesive and intensive interventions that foster connections between individuals, communities, and institutions. It aims to create an informed network that shares experiences, tools, and a common language, ultimately enhancing the collective ability to respond effectively to climate-related challenges. Taken together, these interventions are designed as a single climate adaptation system in which ecosystem restoration, climate-risk management, resilient livelihoods, and institutional support reinforce one another to reduce vulnerability to drought and flooding in rural Burundi.

1.1. Current Paradigm

34. The current paradigm in Burundi is characterized by a series of climate-related and structural challenges that continue to limit effective adaptation by rural communities and increase their vulnerability to droughts, floods, land degradation, and associated livelihood losses.The contemporary agricultural practices employed by rural communities in Burundi, is characterized by unsustainable methods such as slash-and-burn cropping, indiscriminate use of chemicals, and cultivation near water sources or on slopes, are leading to heightened soil erosion and degradation of both forested and adjacent farmland landscapes. It's reported that agricultural practices near water sources have escalated sedimentation in water bodies by approximately 15%, impairing aquatic ecosystems (Ministry of Environment, Burundi, 2020[56]). This scenario is compounded by the cultivation on slopes without proper terracing or conservation measures, which exacerbates land degradation and loss of arable land, estimated at around 10% over the past two decades (UNEP, 2022[57]). These practices, marked by low productivity, leading to detrimental impacts on soil fertility, causing soil erosion rates to increase as high

[55] Global Data Lab: https://globaldatalab.org/areadata/table/hhsize/BDI/
[56] Ministry of Environment, Burundi. (2020). National Report on the State of the Environment.
[57] United Nations Environment Programme (UNEP). (2022). Global Environment Outlook.

as 30 tonnes per hectare per year in some regions (FAO, 2021[58]).

35. The indiscriminate use of agrochemicals has further contributed to soil and water contamination, reducing the availability of clean water resources by up to 20% (WHO, 2018[59]), thus posing significant challenges to the sustenance of rural livelihoods. Compounding these issues are the escalating impacts of climate change, it has intensified these issues, causing disruptions in farming cycles due to unpredictable rainfall patterns with some regions experiencing variations in the start of the rainy season by more than a month (WMO, 2022[60]). Increased storm intensity has led to a rise in flood events by about 25% and subsequent destruction of cropland and infrastructure (Burundi Meteorological Service, 2023[61]). Moreover, climate change is linked to a 20% increase in pest and disease outbreaks, further threatening crop yields and food security (IPPC, 2021[62]). The combination of unpredictable rainfall and rising temperatures contributes to more severe droughts and an upsurge in pest and disease occurrences. As communities find it increasingly challenging to maintain their livelihoods, they resort to exploiting forest resources for essentials like wood for cooking, leading to the unsustainable harvesting of non-forest products and conversion of forested land for agriculture. This unsustainable resource use significantly impacts the ecosystem services provided by forests, threatening the community's resilience to climate change impacts.
36. Several barriers hinder communities in maintaining their agricultural-based livelihoods amid climate change. These include a lack of technical capacity in sustainable agriculture, a scarcity of alternative livelihood opportunities, and limited awareness of how these issues connect to community sustainability and climate change resilience. To address these challenges, community capacity building is essential. According to the FAO (2020[63]), expansion of training in sustainable agriculture techniques can increase productivity by up to 79% while reducing environmental impacts. Furthermore, sustainable landscape-based enterprises have the potential to increase household incomes by up to 50%, offering an alternative to traditional agricultural practices (World Bank, 2019[64]). This involves building awareness of how landscape management choices affect ecosystem services and sustainability, providing training in building regenerative agricultural systems that enhance soil health and biodiversity, and offering coaching in establishing sustainable landscape-based agricultural systems. These strategies not only promote landscape regeneration but also enhance livelihoods, thereby bolstering community economic resilience.
37. The Food and Agriculture Organization of the United Nations (FAO) defines "sustainable diets" as those with low environmental impacts that contribute to food and nutrition security, respecting biodiversity and ecosystems, culturally acceptable, economically fair, and affordable. Transforming current food production systems using regenerative ecological principles, optimizing production diversity, eliminating harmful inputs, and leveraging beneficial biotic relationships can result in safer, nutrient-rich foods that contribute to the health of present and future generations. The transition to regenerative ecological principles can enhance food safety and nutrition, potentially reducing diet-related health issues by up to 20% (Lancet, 2022[65]). The pursuit of economic resilience translates into economic stability for participants. Many economic losses incurred by participants stem from natural disasters like droughts, floods, and diseases.
38. It is estimated that a 10% investment in preventive climate adaptation measures could reduce potential future losses by as much as 40% (Global Commission on Adaptation, 2021[66]). Strengthening capacity in developing and implementing livelihood strategies resilient to climate change not only improves the economic well-being of participants but also contributes to the restoration of soils and essential ecosystem services, leading to a 10-20% improvement in water quality and air purification (Nature Conservancy, 2022[67]).

[58] Food and Agriculture Organization of the United Nations (FAO). (2021). Soil Erosion: The Greatest Challenge to Sustainable Soil Management.
[59] World Health Organization (WHO). (2018). Emerging Issues of Environmental Concern
[60] World Meteorological Organization. (2022). State of the Global Climate Report.
[61] Burundi Meteorological Service. (2023). Annual Climate Variability and Trends.
[62] International Plant Protection Convention. (2021). Pest and Disease Climate Adaptation Framework.
[63] Food and Agriculture Organization of the United Nations (FAO). (2020). Increasing Productivity and Advancing Sustainable Food Systems.
[64] World Bank. (2019). Climate-Smart Agriculture: An Opportunity for Sustainable Development.
[65] Lancet. (2022). Food in the Anthropocene: the EAT–Lancet Commission on healthy diets from sustainable food systems.
[66] Global Commission on Adaptation. (2021). Report on Adaptation to Climate Change and Agriculture.
[67] Nature Conservancy. (2022). The Benefits of Regenerative Agriculture: Restoring Health to Land, Water, and Air.

i). Food Insecurity and Climate Risk

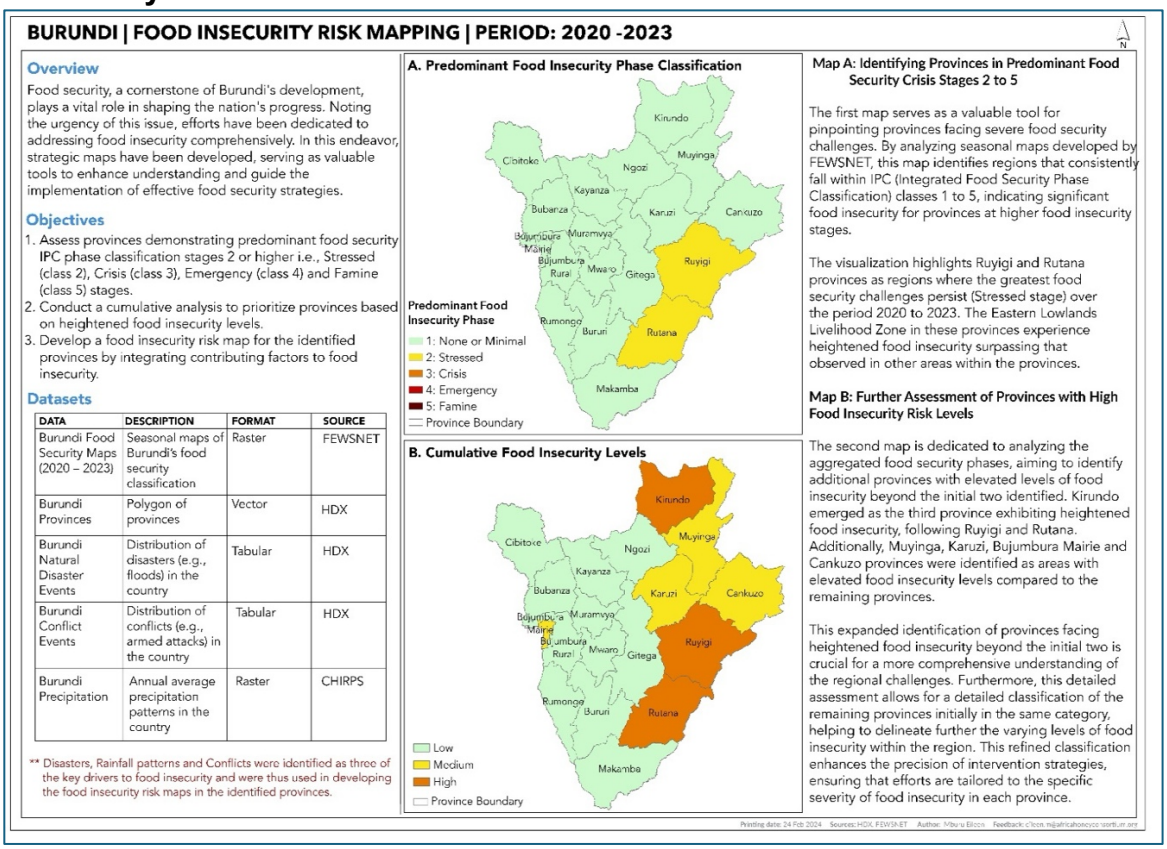


Figure 7:Burundi Food Insecurity Mapping

39. Agriculture remains the linchpin of Burundi's economy, engaging about 80% of the population in farming activities that serve as their primary source of food and income (WFP, 2020). This widespread dependence on agriculture underscores the sector's critical role in underpinning food security and economic resilience. Despite the central role of agriculture, several systemic challenges severely undermine the sector's productivity and sustainability. These include entrenched poverty, accelerated population growth rates, heightened susceptibility to climate-induced shocks, constrained access to clean water resources, and diminishing access to essential social services like healthcare and education (UNDP, 2020)[68].
40. Economic constraints are starkly evident as households are compelled to allocate up to two-thirds of their income to food, an unsustainable situation exacerbated by volatile food prices (WFP, 2020). This disproportionate expenditure on food leaves little room for other critical needs, such as healthcare and education, further entrenching the cycle of poverty and food insecurity. Furthermore, the aggregate food production in Burundi falls significantly short of meeting the populace's demands (Fig. 7). The World Food Program highlights that the total food output in the country suffices for only about 55 days of consumption annually per capita, a stark indicator of the inadequacy of food production to sustain the population (WFP, 2020)[69].
41. The challenges facing Burundi's agricultural sector and food security landscape are further compounded by the adverse effects of climate change. Increasing temperatures and erratic rainfall patterns disrupt traditional farming cycles, leading to reduced crop yields and heightened food insecurity. The vulnerability of the agricultural sector to climate-related shocks is a pressing concern that necessitates urgent and comprehensive interventions (FAO, 2019)[70]. Addressing these challenges requires an integrated approach that not only

[68] United Nations Development Program (UNDP). (2020). Human Development Report: Burundi.
[69] World Food Program (WFP). (2020). The State of Food Security in Burundi.
[70] Food and Agriculture Organization of the United Nations (FAO). (2019). FAO in Burundi: Strengthening Resilience for Food Security and Nutrition

focuses on increasing agricultural productivity but also on building resilience against climate change and enhancing social services. Strategies such as promoting sustainable farming practices, investing in irrigation and water management infrastructure, and implementing social protection programs can play a pivotal role in mitigating food insecurity. Moreover, policy interventions aimed at stabilizing food prices, supporting smallholder farmers, and investing in agricultural research and development are crucial for fostering a resilient agricultural sector (The World Bank, 2021)[71].

ii). Adoption of Climate-Resilient Agricultural Practices and Technologies

42. Despite various programs and training initiatives aimed at enhancing the knowledge and utilization of climate-resilient agricultural methods and technologies across Burundi, stakeholders have indicated a pervasive lack of deep understanding in many regions of the country. Particularly, rural women face significant challenges in accessing climate-resilient agricultural technologies, information, training, and inputs, largely due to the lack of gender-sensitive interventions. Regional disparities exist within Burundi, with higher levels of women's participation in agriculture observed in the Southwestern and Southern eastern regions compared to the Northern districts (World Bank, 2023)[72].
43. Cultural and religious factors also influence agricultural practices in Burundi. For instance, some farmers refrain from using pesticides for religious or spiritual reasons. In a recent case of armyworm infestation affecting maize crops in certain districts of Burundi, farmers opted not to utilize available pesticides (UNEP, 2022)[73]. While such beliefs may pose barriers to conventional agriculture, they could potentially foster the adoption of organic production practices if accompanied by sustained support and effective inputs. However, the development and dissemination of improved organic fertilizers and biopesticides in Burundi have been inadequate thus far (FAO, 2022)[74].

iii). Rural Finance for Climate-Resilient Livelihoods

44. Access to rural finance in Burundi is generally inadequate to meet the needs of smallholder farmers, with women facing particularly acute challenges. Despite efforts by financial institutions to provide equal and non-preferential treatment, as well as government initiatives to promote financial inclusion through priority sector lending, rural women continue to experience limited access to finance. This constraint can be attributed to various factors, including the lack of sufficient collateral, limited decision-making power, complex loan procedures, and loans that do not align with their needs (WFP, 2022)[75].
45. Although there are numerous savings and credit schemes available, they primarily cater to commercial ventures and entrepreneurship, providing insufficient support to subsistence farmers looking to transition into more commercial activities. Moreover, there is a lack of rural women-targeted schemes specifically designed to enhance the adaptability and resilience of smallholder farmers to climate change in Burundi (IMF, 2022[76]). While indemnity insurance for crops exists in Burundi, it is primarily accessible to larger commercial farmers and relies on time-consuming and resource-intensive inspections of damages for each insured household. This limits its effectiveness in providing financial protection to smallholder farmers, particularly rural women (UNEP, 2021). These challenges have significant implications for the well-being of rural communities, the sustainability of land ecosystems, and the overall economic resilience of the region (WFP, 2021)[77], World Bank, 2022)[78].

1.2. Desired paradigm

46. The project's desired paradigm is a shift from reactive and fragmented responses to an integrated climate adaptation approach that strengthens the resilience of rural landscapes and vulnerable households in Burundi. The focus is on reducing climate vulnerability through ecosystem-based adaptation, improved management of

[71] The World Bank. (2021). Burundi Economic Update.
[72] https://blogs.worldbank.org/en/africacan/burundi-scaling-climate-resilience-land-3000-hills
[73] https://www.unep.org/news-and-stories/story/farmers-adapt-climate-crisis-burundis-precarious-hillsides
[74] Reducing climate vulnerabilities of the agriculture sector: baselines and informed priority actions, FAO, 2022: https://www.fao.org/3/cc3359en/cc3359en.pdf
[75] Africa Day: How WFP helps families struck by climate change in Burundi, 2022: https://www.wfp.org/stories/africa-day-how-wfp-helps-families-struck-climate-change-burundi
[76] Economic Growth, Fragility, and non-price competitiveness, 2022: https://www.elibrary.imf.org/view/journals/002/2022/258/article-A001-en.xml
[77] Burundi: Critical Corporate Initiative: Climate Response Analysis for Adaptation (December 2021)
[78] Diagnosing Drivers of Climate and Environmental Fragility in Burundi's Colline Landscapes: Towards a Multi-Sector Investment Plan to Scale up Climate Resilience: https://documents1.worldbank.org/curated/en/099930006302237433/pdf/P17682007885e00780b1cc093a09277df1a.pdf

climate-related risks, and livelihood systems that enable smallholder farmers to better withstand droughts, floods, and land degradation.

47. The project's primary goals is to strengthen the adaptive capacity of vulnerable rural households while improving land and agricultural management under increasing climate stress. This requires a practical combination of climate-resilient production systems, risk reduction measures, and supportive local institutions so that adaptation benefits can be sustained over time. In this way, the project links improved ecosystem health, reduced climate losses, and more secure livelihoods within one coherent adaptation pathway.
48. To achieve these goals, the project combines four mutually reinforcing adaptation functions. First, it improves governance, climate information, and local decision-making so that communities can plan and respond more effectively to climate risks. Second, it promotes adaptive management of communal agricultural production systems through practices that improve soil health, water retention, crop performance, and ecosystem stability. Third, it reduces the losses that follow climate shocks by linking farmers to practical risk-management tools, including storage, traceability, and financial protection mechanisms. Fourth, it supports livelihood diversification and market incentives that help households maintain climate-resilient practices rather than reverting to unsustainable coping strategies.
49. In transitioning Burundi towards a climate-resilient, low-emission sustainable development paradigm, the project envisions the following outcomes: a) Aligned Programs and Policies: The desired paradigm envisions a Burundi where the government's commitments to the Sustainable Development Goals (SDGs) and the United Nations Framework Convention on Climate Change (UNFCCC) translate into aligned programs and policies. These policies will empower community-level governance structures to develop and enforce climate-resilient communal farming and land management strategies, with a focus on adaptation; b) Training and Employment of Marginalized Rural People: The project will empower marginalized rural populations by providing training and employment opportunities as professional restoration workers. These individuals will draw on indigenous knowledge systems and utilize new technologies to restore and maintain rural land ecosystems and farm health. This approach also improves farm management for record-keeping and offtake; c) Reduced Losses and Improved Farm Management: By implementing parametric insurance innovation and farm management practices, the project aims to help farmers, and their communities experience fewer losses of their economic assets due to climate stresses. These practices enhance the resilience of agricultural systems and rural livelihoods. They will benefit from new land and farm management practices designed for adaptation; and c) Market Access and Climate-Resilience Protocols: The desired paradigm involves the creation of new market access channels and climate-resilience protocols. These initiatives will build value-chain partnerships and promote local-level enterprise development, which may encompass activities such as natural honey development, micro-finance institutions, restoration enterprises, veterinary enterprises, organic fertilizer production, and syntropic forestry operations.
50. Additionally, increasing droughts, floods, rainfall variability, erosion, and pest pressures in Burundi expose smallholder farmers to recurrent production losses, post-harvest damage, asset depletion, and unstable incomes. Because vulnerable rural households have limited savings, weak storage systems, low access to climate-risk finance, and degraded production landscapes, these hazards translate into high climate vulnerability and low recovery capacity. The project responds by combining ecosystem-based adaptation, soil and water conservation, climate-risk management tools, climate-resilient storage, adaptive market access, and knowledge and policy support. Together, these interventions improve water retention, reduce erosion, protect productive assets, lower post-harvest loss, strengthen access to climate-responsive services, and stabilize incomes aftershocks. As a result, households will be better able to anticipate, absorb, recover from, and adapt to recurrent droughts and floods. This will lead to stronger livelihood resilience, more climate-resilient local production systems, and a sustained reduction in climate vulnerability in rural Burundi. The theory of change presented in Annex 3 is therefore as follows: if vulnerable rural communities in Burundi are supported to restore productive ecosystems, adopt climate-resilient agricultural practices, access practical tools that reduce losses from climate shocks, and benefit from stronger local knowledge and policy systems, then their capacity to adapt to droughts, floods, and land degradation will be strengthened. This is because they will be better able to protect their assets, sustain their livelihoods, manage climate risks, and make informed decisions that

reinforce long-term resilience and food security.

C. Project Components and Financing

Project Components	Expected Outcomes	Expected Outputs	Amount (US$)
1. Establishment and strengthening of tools for the sustainable management of extreme weather events.	1.1: Improved resilience to climate variability and extreme weather events through access to climate information and insurance products.	1.1.1: block chain -Based Traceability System for Livestock developed implemented	379,500
		1.1.2: National Warehouse Receipt System for Crop Value Chain	450,000
		1.1.3: National Parametric Insurance Scheme for Climate Resilience in Agriculture developed.	200,000
		1.1.4: Farmers trained on using climate information and understanding insurance products.	200,000
	1.2: Enhanced capacity of farmers and government to manage climate-related risks in agriculture.	1.2.1: Mobile applications and web platforms for real-time climate information developed.	200,000
		1.2.2: Community-based workshops on risk management and financial planning conducted	200,000
		1.2.3: An adaptation-oriented partnership with financial institutions to facilitate access to credit and insurance established.	570,500
Sub-total Comp 1			**2,200,000**
2. Enhance the resilience of ecosystems and the most vulnerable populations to the impacts of climate change through concrete adaptation measures	2.1: Increased agricultural productivity and ecosystem health through integrated beekeeping and Syntropic agroforestry practices.	2.1.1: Strategies and guidelines on Syntropic agroforestry and apiculture practices developed and enhanced.	250,000
		2.1.2: Demonstration sites showcasing effective integration of apiculture with syntropic agroforestry techniques developed.	700,000
	2.2: Improved soil stability and water catchment health in agricultural lands.	2.2.1: Soil and water conservation techniques and farmers capacity enhanced through syntropic agroforestry practices.	3,000,000
Sub-total Comp 2			**3,950,000**
3. Develop and promote value-added products to expand income opportunities and improve market access for economic resilience and stability.	3.1: Enhanced income diversification for smallholder farmers through value-added livestock and crop food value chains products.	3.1.1: Farmers trained on processing and value addition of bee and forestry food products.	400,000
		3.1.2: Community crop nurseries are established for producing genetically diverse and climate resilient crop planting material.	400,000
		3.1.3: Certification, SPS framework and quality assurance for bee and forestry food products established.	200,000
		3.1.4: Market linkages for bee and agroforestry food products established locally, regionally and internationally.	100,000
	3.2: Increased market access and fair-trade opportunities for crop and livestock value chains.	3.2.1: 24 Farmer cooperatives or associations established for better market negotiation	250,000
		3.2.2: Enhanced visibility and market presence of bee products through participation in trade fairs and engagement with online market platforms	200,000
		3.2.3: Comprehensive workshops delivered on marketing strategies and brand development specifically tailored for bee and agroforestry products	100,000
Sub-total Comp 3			**1,650,000**
4. Enhancing knowledge	4.1: Enabling policies, strategies,	4.1.1: Policy advocacy campaigns and stakeholder engagement meetings conducted.	125,000

Management, awareness creation and information sharing.	and legal frameworks developed and adopted, enhancing project sustainability.	4.1.2: Policy briefs and recommendations based on project findings developed.	125,000
		4.1.3: Workshops and forums with policymakers, community leaders, and stakeholders on sustainable practices and climate adaptation conducted.	100,000
	4.2: Strengthened knowledge management systems aid community adaptation to climate change.	4.2.1: Multi-stakeholder platforms for knowledge exchange and coordination established based on strengthened extension services/Lead farmers program (ToT Model)	350,000
Sub-total Comp 4			**700,000**
Total for Sub-total Component (1,2,3,4)			**8,500,000**
Project Execution Costs			**731,000**
Total Project Cost (A)			**9,231,000**
Project Cycle Management Fee charged by the Implementing Entity (B)			**769,000**
Amount of Financing Requested (A+B)			**10,000,000**

D. Projected Calendar

Milestones	Expected Dates
Start of Project Implementation	2028.10.01
Mid-term Review (if planned)	2030.05.01
Project Closing	2031.12.01
Terminal Evaluation	2032.03.01

PART II: PROJECT JUSTIFICATION

A. Description of the project components

51. The project is organized into four distinct components, but interdependent components that together form a single adaptation strategy. Component 2 provides the foundation of physical resilience by restoring ecosystem functions, reducing erosion, improving water retention, and strengthening the climate resilience of production systems. Component 1 then protects these adaptation gains by reducing post-harvest and asset-related losses, improving access to climate-risk management tools, and enabling faster recovery after drought and flood shocks. Component 3 stabilizes and monetizes these resilience gains through climate-resilient market access, value addition, and reduced distress sales, while Component 4 captures lessons, strengthens adaptive capacity, and supports policy uptake and long-term replication. Their sequencing is intentional: ecosystem restoration and soil-water conservation first reduce the physical sensitivity of farming systems; climate-risk management and climate-resilient storage then protect those gains against drought, flooding, and post-harvest deterioration; market access and value addition provide the economic incentive to maintain resilient production practices; and knowledge management and policy support ensure that lessons from implementation feed back into local adaptation planning, institutional coordination, and long-term scale-up. In this way, each component both depends on and reinforces the others. Together, the components create a continuous pathway from climate-risk reduction to livelihood stabilization and long-term resilience. Taken together, the project is expected to deliver measurable adaptation results, including a 30% reduction in soil erosion across targeted cropland, a 20–25% improvement in water retention and groundwater recharge, a 25–30% reduction in post-harvest losses, the addition of 5,000 MT of climate-controlled storage capacity, the establishment of 20 demonstration sites and 60 community nurseries, and direct resilience benefits for 24,000 smallholder farmers, 57% of whom are women. These results are intended to reduce physical vulnerability, stabilize incomes after climate shocks, protect productive assets, and strengthen long-term adaptive capacity in the target provinces.
52. The key actors and key adaptation activities of the program are illustrated in the graphic below (Figure 8):

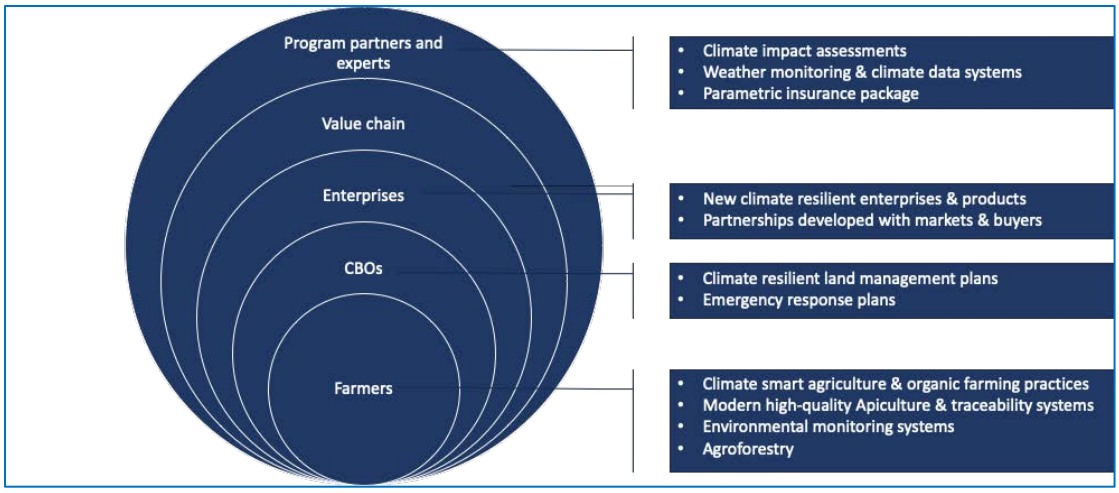


Figure 8: Project stakeholder ecosystem.

Component 1: Establishment and strengthening of tools for the sustainable management of extreme weather events.

Objective: *Enhance agricultural resilience to climate variability and promote risk-informed decision-making through advanced technologies*

53. This component focuses on using innovative solutions, such as block chain -based smart contracts and parametric insurance models, to improve communities' preparedness for climate-related disasters. Upgraded climate data infrastructure operated by the Institut Géographique du Burundi (IGEBU) and the Burundi Meteorological Service and advanced parametric insurance schemes will create a system that triggers automatic financial disbursements when predefined conditions are met, providing timely support. Training will familiarize communities with insurance mechanisms, including triggers, compensation processes, and climate data usage. Disaster risk reduction will also be integrated into local planning, strengthening both financial and community resilience. A community-led warehouse receipt system and block chain traceability mechanisms will establish platforms for knowledge exchange and collective responses to climate risks. This comprehensive approach aims to enhance climate resilience and reduce vulnerability.
54. Drawing on ACRE Africa's expertise, the project will implement index-based micro insurance, compensating farmers for climate-induced losses through weather index-based insurance (WIBI) and Area Yield Index Insurance (AYII). WIBI uses weather anomalies as triggers, while AYII bases pay-outs on regional crop yields, ensuring transparent, cost-effective compensation mechanisms. The Africa Apiculture Consortium's block chain traceability and price-protected warehouse systems will stabilize market prices for farmers, reducing risks and improving access to credit. A pre-feasibility study conducted in six project locations in Burundi highlights opportunities and barriers, including financial service access, agricultural risk insurance demand, and regulatory frameworks. ACRE Africa will serve as a technical advisory partner in the steering committee providing specialized expertise in parametric insurance product design, actuarial modelling, and risk assessment based on their extensive experience across 13 African countries. Their role will be limited to: (1) providing technical guidance on insurance product development and actuarial calculations; (2) sharing methodologies and lessons learned from similar implementations in Kenya, Tanzania, and Uganda; and (3) offering training support for local insurance providers and financial institutions.
55. Formal Memoranda of Understanding with IGEBU are currently under negotiation, with draft agreements already reviewed and finalization during the full proposal development or the project inception phase. Since OBPE (the executing entity) and IGEBU both operate under the Ministry of Environment, Agriculture and Livestock (MINEAGRIE), institutional coordination is streamlined through existing ministerial frameworks, reducing bureaucratic barriers to data access agreements. IGEBU serves as Burundi's National Hydromet Service (incorporating meteorological services) and UNFCCC focal point, making collaboration essential for climate data integration.
56. The project will utilize existing climate national data centers / collection infrastructure operated by IGEBU. The block chain component will operate as a software layer deployed on existing cloud infrastructure and local

servers already maintained by partner institutions. Specifically: the block chain system will be hosted on existing government IT infrastructure through a partnership with the National Data Center; smart contracts and distributed ledger technology will run on existing computational resources; mobile applications for farmers will leverage existing telecommunications infrastructure.

57. The study emphasizes integrating block chain traceability and insurance systems to improve credit access and adoption of climate adaptation strategies. Findings reveal gaps in financial inclusion and agricultural insurance but strong farmer interest in micro insurance and traceability products. Capacity building for financial institutions, insurance providers, and regulators remains critical. Two insurance models—WIBI and AYII—offer transparency and reduced costs but cater to different needs: WIBI addresses weather-related risks, while AYII covers broader risks, including pests and diseases, though with higher administrative demands.
58. The project will tailor multi-peril WIBI and AYII products to Burundi's diverse agricultural zones, focusing on climate-resilient crops and livestock such as bananas, cassava, coffee, and avocados. These crops were prioritized based on productivity, vulnerability to climate risks, and adaptability. Preliminary evaluations favoured bananas, cassava, and sweet potatoes in the east; avocados, palm oil, and coffee in the west; and organic farming nationwide. This initiative, under Outputs 1.1.1 to 1.2.3, will align insurance schemes with local environmental conditions, strengthening agricultural value chains and enhancing community resilience. Further crop and vulnerability assessments during the FP phase will refine insurance products and address data quality gaps, ensuring the initiative's sustainability and scalability.

Outcome 1.1: Improved resilience to climate variability and extreme weather events through access to climate information and insurance products.

Output 1.1.1: block chain -Based Traceability System for Livestock developed implemented

59. The block chain -enabled traceability system is included as a risk-management tool that helps vulnerable producers secure verified records for climate-related insurance, maintain market confidence after shocks, and reduce disputes that delay recovery support. In this proposal, the technology is not presented as an end in itself, but as an enabling mechanism that strengthens the reliability of climate-risk response, protects adaptation-linked income streams, and improves the credibility of records needed for payouts, traceability, and post-shock stabilization. Its role is therefore to support resilience and recovery in climate-exposed value chains rather than to introduce digital technology for its own sake. This is particularly important where recurrent drought, flooding, and disease pressures can rapidly erode household assets and where verified records can accelerate insurance response, reduce transaction disputes, and help producers recover more quickly after climate-related shocks. This system, meticulously designed, will introduce a new level of transparency and trust in the supply chain. It will meticulously document every product's journey from the farm to the end consumer. The development of a specialized digital platform for these products will guarantee their authenticity, significantly enhancing market access for farmers. By certifying products as sustainably produced, it encourages the adoption of environmentally beneficial practices, such as reduced chemical usage, habitat preservation, and biodiversity maintenance. These practices are crucial for enhancing the ecosystem's resilience to climate change, contributing to broader adaptation efforts. Farmers receive immediate financial incentives: 15-25% premium prices for traced livestock paid within 24 hours via mobile money, creating direct motivation for accurate data entry. A tiered verification system ensures data quality: RFID tags auto-capture basic data (location, movement), trained community animal health workers conduct weekly verification visits, and farmers maintaining >95% accuracy receive annual bonus payments equivalent to 5% of livestock value. Digital literacy barriers are addressed through graduated adoption starting with voice-based data entry using basic phones, progressing to simplified smartphone apps with Kirundi voice prompts and offline capability. Target species: Cattle (8,500 head in target areas, $5.0 RFID tags, $280 average annual revenue increase), Goats (15,200 head, $5.0 RFID tags, primarily managed by women), Pigs (batch-level tracking for breeding groups, $85 annual income increase), and Beehives (QR code tracking, $120 annual honey/wax revenue increase per hive). Target farmers typically manage 2-4 cattle, 5-8 goats, 2-3 pigs, and 3-5 beehives, generating 65% income from livestock. Digital capacity: 78% own basic phones, 23% have smartphones, 34% use mobile money. Education levels: 45% primary, 28% secondary, 27% no formal education. Women own 43% of livestock but control only 31% of sales decisions.

60. The specific activities under this output are:
    - Activity 1.1.1.1: Undertake a capacity needs assessment and stakeholder engagement to understand the specific requirements of livestock farmers, traders, and consumers
    - Activity 1.1.1.2: Design and develop the block chain -based traceability system in collaboration with technology providers and stakeholders.
    - Activity 1.1.1.3: Train livestock producers, processors, and stakeholders on using the block chain system, including data entry, monitoring, and maintaining traceability records to ensure effective adoption and utilization.
    - Activity 1.1.1.4: Acquire, distribute and implement livestock identification tools, such as RFID tags, QR codes, or biometric identifiers for digital tagging and data collection.

Output 1.1.2: National Warehouse Receipt System for Crop Value Chain

61. The warehouse receipt system is proposed as climate-risk management infrastructure (CR-CSRS) for smallholder farmers exposed to erratic rainfall, flooding, humidity-related storage losses, and post-shock distress sales. Its primary adaptation function is to protect climate-stressed households from being forced to sell immediately after drought or flood events, when prices are lowest and liquidity needs are highest. By preserving commodity quality under increasingly erratic rainfall and humidity conditions and by creating a buffer between harvest and sale, the system helps households retain productive assets, stabilize income, and sustain investment in climate-resilient production practices. By enabling safe storage, quality preservation, delayed sales, and access to short-term liquidity, the system allows households to avoid forced sales after climate shocks, retain productive assets, and sustain ongoing adaptation investments in climate-resilient production systems. By enhancing both efficiency and financial security, the system improves market access and supports better financial planning for farmers, ultimately strengthening the overall crop value chain and enabling more stable and profitable agricultural practices. In the context of Burundi, this system is proposed not only as a market-access tool but as a climate adaptation measure because droughts, heavy rainfall, and irregular seasonal conditions increase post-harvest losses, undermine household income, and force distress sales that erode recovery capacity. Climate-resilient storage, quality preservation, and delayed sale options help households manage climate shocks more effectively by reducing spoilage, protecting harvest value, and creating time to sell under less adverse conditions. The warehouse receipt system is therefore designed to function as climate-shock buffering infrastructure that complements ecosystem-based adaptation and protects the value of climate-resilient production.
62. The system will initially focus on non-perishable staple foods including dried beans, maize, and processed cassava flour, which require basic storage with moisture control (12-14% maximum humidity) and pest management but not complex temperature regulation. For bee products like honey and beeswax requiring minimal storage infrastructure, simple warehouses with proper ventilation and basic quality control measures are sufficient. Primary Products (85% of capacity): - Dried Beans (40%): Storage requirements include moisture control below 14%, ambient temperature 15-25°C, hermetic storage costing $45/MT annually. Market analysis shows $680-820/MT prices with 35% seasonal volatility. Export opportunities to DRC/Tanzania offer 20-30% premiums for quality-certified beans. Quality standards require visual inspection, moisture testing, and aflatoxin screening ($12/batch). Regulatory alignment with EAC standards enables cross-border trade. Maize (25%): Requires grain moisture below 13.5%, fumigation capacity, storage cost $38/MT annually. Seasonal price swings from $420-480/MT (harvest) to $580-650/MT (lean season) create 45% volatility. Government procurement guarantees minimum $450/MT under national reserve policies. - Processed Cassava Flour (20%): Needs moisture control below 12%, pest-proof containers, $28/MT storage cost. 8-12 months' shelf life requires rapid turnover. Urban/institutional buyers pay 25-40% premiums above farm gate prices. Specialized Products (15% of capacity): - Honey: Simple storage with moisture below 18%, $22/MT cost. High-value product ($4,500-6,200/MT export) with 60-80% profit margins. Beeswax: Basic storage requirements, $18/MT cost, $2,800-3,500/MT market value.
63. The project will establish warehouse receipt operations through a formalized tripartite governance structure already under preliminary discussions with the following stakeholders: Farmer Cooperatives: Two lead cooperatives (in Bururi and Ruyigi have shown intent and potential capacity to own and operate the initial warehouses). Private Sector Technical Partners: The Africa Apiculture Consortium has committed to provide

quality control protocols and post-harvest handling equipment for bee products; Leading Agro-experts in Burundi will be sort to manage grain quality testing and certification services. Government: The Ministry of Environment, Agriculture and Livestock (OPBE) has confirmed readiness to integrate the system within its Programme National de Réserve Alimentaire (The National Food Reserve Program) and to provide regulatory oversight for commodity grading, warehouse licensing, and cross-border certification. Financial Institutions: Banque de Crédit Agricole du Burundi and INKINZO are in discussion to provide credit and insurance facilities backed by warehouse receipts, with draft MoUs under negotiation. For partners not yet formally contracted, the full proposal will include signed MoUs with defined deliverables, performance metrics, and co-financing commitments. A national steering committee chaired by OPBE will meet quarterly to coordinate activities, review audit reports, and ensure policy alignment. To ensure that the system does not create a barrier to entry for marginalized and vulnerable farmers, participation will be organized primarily through farmer cooperatives and aggregated group deposits, rather than requiring each smallholder to meet costly individual transaction thresholds. There will be no separate registration or platform-entry fee for smallholders, and storage, testing, transaction, and insurance charges will be recovered only at the point of sale or loan settlement, rather than as upfront cash payments at delivery. The project will also apply a targeted introductory support mechanism for women-headed households, youth, and the most vulnerable farmers during the initial roll-out phase so that first-time participation is not constrained by liquidity limitations. This approach reflects evidence from African warehouse systems showing that smallholders participate most effectively through group-based models that reduce unit costs and simplify access.

64. In this light, warehouses will operate under a hybrid public-private-cooperative model where farmer cooperatives own the facilities and supported by Africa Apiculture Consortium (financed through project grants and member contributions), private sector partners provide technical management and quality assurance services, and government provides regulatory oversight and certification. Each warehouse will be managed by elected and registered cooperative committees with trained warehouse operators, ensuring accountability through transparent record-keeping systems, regular audits, and performance-based management contracts with measurable targets for storage quality and farmer satisfaction. To avert the governance and trust deficits that have undermined similar schemes elsewhere, the project adopts a community-ownership model under which each warehouse is legally vested in a registered cooperative of at least 150 farmers; equity shares are proportional to storage use, aligning incentives for prudent management. All financial transactions—storage fees, receipt issues, price settlements are recorded on an immutable block chain ledger that every member can inspect in real time via mobile phone. Quarterly audits by independent accountants, monthly SMS statements and publicly posted balance sheets guarantee transparency, while annual general meetings provide a forum for democratic oversight. Comprehensive risk-management cover blends parametric weather insurance, facility insurance against fire or theft, and quality-guarantee insurance that compensates farmers if poor storage compromises product integrity, with claims triggered automatically by block chain -verified quality data. By safeguarding verified harvest and livestock records, the system preserves eligibility for insurance, finance, and market access even when climate shocks disrupt normal transactions.

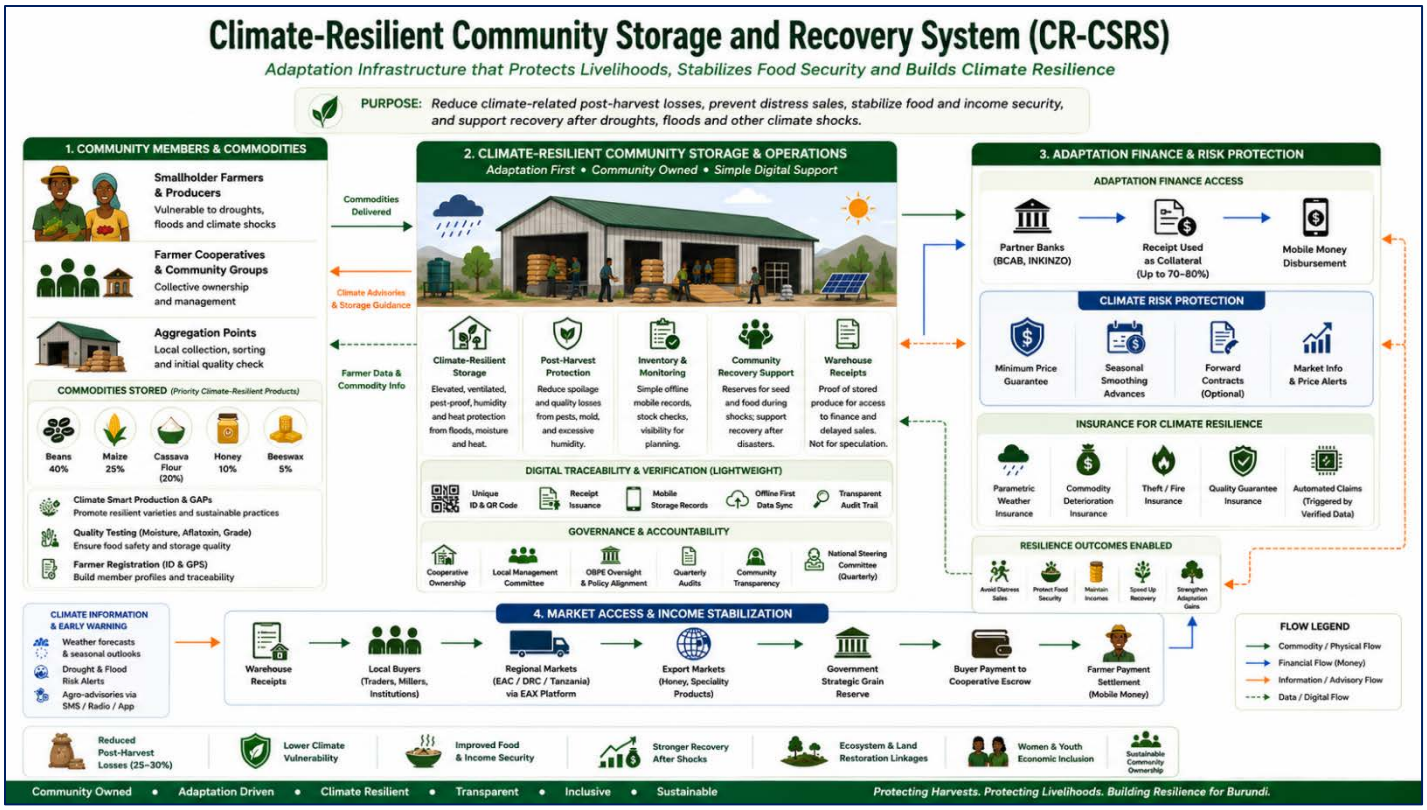
65. Professional managers certified in post-harvest handling run day-to-day operations under the supervision of elected farmer committees trained in finance and quality control; agricultural-university partners supply continuous technical backstopping, and a mentorship network pairs established cooperatives with new sites. A graduated roll-out begins with pilot warehouses in Bururi and Ruyigi Provinces; early adopters receive enhanced technical support, cooperative-based lot aggregation, and introductory fee support for eligible vulnerable farmers, while lessons from the pilot phase will be used to confirm that participation costs remain proportionate to farmer benefits before wider scale-up.

Finally, the system employs a three-part pricing and market-integration engine. A dynamic reference price formula updates daily, weighting regional spot quotations (40 percent), export-parity values net of logistics costs (35 percent) and a cost-plus margin that preserves minimum farm profitability (25 percent). Against this benchmark, the cooperative offers a menu of risk tools: (i) a minimum price guarantee set at 75 percent of the rolling average to shield against extreme downturns; (ii) a seasonal smoothing option that advances 60 percent of expected lean-season prices at deposit time, with final settlement on sale; and (iii) quality premiums of 10–

20 percent for lots that surpass agreed standards. On the demand side, the warehouse links directly to institutional buyers that pay at least 15 percent above spot, to regional trading firms that open cross-border outlets, and to the project's block chain -enabled digital marketplace, allowing farmers to trade receipts remotely and take advantage of arbitrage without moving the physical stock until a confirmed sale dictates dispatch.

66. The warehouse receipt system operates through a comprehensive eight-stage process with clearly defined actor roles and financial flows, as illustrated in the operational flow diagrams (Figures 1-3):

- Stage 1-2: Delivery and Quality Certification Farmers transport commodities to cooperative-owned warehouses where EAGC-certified quality assessors conduct standardized testing (moisture content, grade classification, pest inspection). Digital and physical warehouse receipts are issued through block chain -integrated systems with unique identification codes linked to MINAGRIE's national database. Failed quality assessments result in commodity return to farmers with improvement recommendations.
- Stage 3-4: Storage and Receipt Processing Accepted commodities enter climate-controlled storage facilities (temperature 15-20°C, humidity 60-65%) with professional pest management and security systems. Negotiable warehouse receipts serve as legal title to stored commodities, backed by comprehensive insurance coverage and integrated with national commodity tracking systems.
- Stage 5-6: Market Access and Credit Options Receipt holders access dual pathways: (i) Direct market sales through linked buyer networks including urban wholesalers (Bujumbura/Gitega markets), regional EAX electronic trading platform, and international specialty buyers (EU honey importers); (ii) Credit collateralization with BCAB and INKINZO providing 70-80% commodity value in immediate loans at preferential rates.
- Stage 7-8: Settlement and Receipt Redemption Transaction settlements follow an automated sequence inclusive sequence designed to avoid upfront cash barriers for smallholders: buyer payments deposited in cooperative escrow accounts, outstanding loan recovery (where applicable), and approved warehouse fee service charges are deducted only at settlement (3-5% of commodity value), and insurance premium collection (1-2%), after which net farmer payment is transferred through mobile money or cooperative payment channels within 48 hours, receipt redemption completing the cycle. For smallholder participants, especially women and vulnerable households participating through cooperative aggregation, the system is designed so that charges are recovered from completed transactions rather than requiring advance payment at warehouse entry, thereby reducing exclusion risks linked to low post-harvest liquidity.
- Financial Sustainability Framework: Revenue streams ensure operational sustainability while maintaining inclusion of vulnerable farmers: (i) Storage fees scaled by duration and commodity (USD 8-12/MT/month) but applied on an aggregated cooperative basis for smallholder deposits wherever feasible; (ii) Quality testing charges (USD 3-7/MT) will be minimized through group-based intake and standardized testing procedures; (iii) Transaction commissions (1.5-2% of sale value) will be deducted only upon sale completion; (iv) Insurance service fees (1% of commodity value) will be linked to actual coverage provided and not charged as a stand-alone entry fee. Cooperative governance requires 20% surplus reinvestment in facility maintenance and expansion, with independent annual audits and quarterly financial reporting to the National Steering Committee. To prevent exclusion of marginalized farmers, no fixed membership or platform-access fee will be imposed on individual smallholders, introductory support will be provided during the early implementation phase, and the wider participation of traders and other warehouse users will help build volumes and reduce unit costs across the system.
- Risk Management and Insurance Integration: Comprehensive coverage includes commodity deterioration protection (up to 100% replacement value), price volatility hedging through Strategic Grain Reserve partnerships, quality guarantee insurance ensuring buyer confidence, and digital monitoring systems providing real-time alerts for temperature, humidity, and pest management with automated notifications to insurance providers and government oversight agencies.



67. The warehouse receipt system is fully aligned with Burundi's Strategic Grain Reserve policy (Decree No. 100/78 of 2018) and complements the National Agriculture Strategy 2018–2027 by: Expanding Reserve Capacity, adding an estimated 5,000 MT of secure, climate-controlled storage to the national network, expected to reduce post-harvest losses by 25–30%. Stabilizing Markets, enabling farmers to store grain during peak supply periods and sell during lean seasons, supporting national price stabilization objectives.
68. Ensuring Quality Compliance, applying East African Community (EAC) and Burundi Bureau of Standards (BBN) grading protocols, prerequisites for government procurement under the grain reserve program. Facilitating Emergency Response, allowing government-triggered stock releases for humanitarian aid during drought or flood events, with compensation to farmers at pre-agreed floor prices. This integrated approach embeds the warehouse system within existing national food security and agricultural development frameworks, ensuring policy continuity, market stability, and institutional support. Accordingly, the warehouse receipt system is presented as climate-risk management infrastructure that protects harvests from climate-related deterioration, reduces post-harvest losses during increasingly erratic seasons, supports safer storage after droughts and heavy rainfall, and helps households maintain food and income security instead of resorting to distress sales immediately after climate shocks.
69. Formal agreements with Ministry of Agriculture enable participation in national strategic grain reserves. Coordination with buffer stock policies ensures compatibility with government food security initiatives. EAC trade standards compliance facilitates cross-border market access. Phytosanitary certification processes established for export requirements. Graduated implementation addressing common system failures: parametric insurance covers weather-related crop losses, facility insurance protects against fire/theft, quality guarantee insurance compensates for storage-related losses. Professional management combines community ownership with technical expertise. Mentorship programs connect successful cooperatives with new facilities for knowledge transfer. The specific activities under this output are:
    - Activity 1.1.2.1: Undertake assessment and upgrade/establish warehouses to meet standards for secure crop storage, including proper ventilation, pest control, and temperature regulation.
    - Activity 1.1.2.2: Design and develop the warehouse receipt system in collaboration with stakeholders to create a standardized system for storing and managing crop products, including receipt issuance and

verification.

- Activity 1.1.2.3: Develop a Warehouse Receipt System (WRS) framework with a digital platform and pilot the receipt system with selected crop producers
- Activity 1.1.2.4: Provide training to warehouse operators, farmers, and other stakeholders on the use of the warehouse receipt system, including how to handle receipts, storage procedures, and quality assurance.
- Activity 1.1.2.5: Develop and implement price risk management tools, such as forward contracts or crop insurance, linked to the WRS to protect farmers from price volatility.

Output 1.1.3: National Parametric Insurance Scheme for Climate Resilience in Agriculture developed.

70. The project aims to develop and implement a parametric insurance product to enhance the agricultural sector's resilience to climate-related risks. This strategic shift focuses on enhancing the agricultural sector's adaptive capacity to climate variability and extreme weather events. Through detailed feasibility studies, the project identifies prevalent climate threats like droughts, excessive rainfall, and temperature fluctuations. Based on these assessments, parametric insurance products are designed to provide timely payouts triggered by predefined weather conditions, rather than relying on traditional loss assessments. This innovative approach offers farmers a reliable financial safety net, mitigating their vulnerability to climate shocks and supporting continuous agricultural production. The initiative involves collaboration with insurance companies to ensure the products are affordable and tailored to specific regional climatic challenges.

- Activity 1.1.3.1: Conduct risk assessments and actuarial studies to design parametric insurance products tailored to the climate and environmental risks faced by livestock and crop producers.
- Activity 1.1.3.2: Develop a national insurance scheme in collaboration with government agencies, insurance companies, and financial institutions to ensure comprehensive, affordable and accessible parametric insurance coverage across the country.
- Activity 1.1.3.3: Organize training and awareness programs for farmers and livestock producers on the benefits, purchase process, and claims procedure for parametric insurance products.
- Activity 1.1.3.4: Establish/update policy and regulatory frameworks for parametric insurance schemes.

Output 1.1.4: Farmers trained on using climate information and understanding insurance products.

71. To address the pressing need for climate risk management education among farmers, the project will develop and disseminate educational materials to empower farmers with the knowledge and tools required to effectively utilize climate information and comprehend the intricacies of insurance products designed to mitigate climate risks. This initiative aims to equip farmers with the skills to effectively utilize climate information and grasp parametric insurance products as means of mitigating climate risks. The project will create and distribute educational materials that cover various climate risks, insurance mechanisms, and the process of integrating climate data into agricultural planning. Community workshops will serve as interactive platforms where farmers can engage with experts in climate science and risk management, facilitating knowledge exchange. Furthermore, a mobile app or SMS service will provide real-time climate information and insurance updates, enabling farmers to make timely decisions to reduce their vulnerability to adverse weather events. Training sessions will ensure that farmers are proficient in utilizing these digital tools, establishing a comprehensive support system for navigating climate variability.

- Activity 1.1.4.1: Develop training modules on climate information, covering key topics such as interpreting weather forecasts, climate trends… tailored for smallholder farmers.
- Activity 1.1.4.2: Organize workshops and training sessions in collaboration with local extension services to educate farmers on how to apply climate data.
- Activity 1.1.4.3: Provide hands-on training for farmers on understanding parametric insurance products, including how to assess coverage, make claims, and integrate these products into their risk management strategies.
- Activity 1.1.4.4: Develop Information, Education and Communication (IEC) materials Create easy-to-understand informational materials (e.g., brochures, mobile apps, radio programs) to raise awareness and improve farmers' knowledge about climate information services and insurance products, especially targeting rural and underserved communities.

Outcome 1.2: Enhanced capacity of farmers and government to manage climate-related risks in agriculture.

Output 1.2.1: Mobile applications and web platforms for real-time climate information developed.

72. The initiative to develop mobile apps and web platforms empowers farmers with real-time climate data, forecasts, and agricultural advice. By bridging the information gap, it enables informed decisions based on weather conditions. The mobile app provides tailored advice to small-scale farmers, while the web platform offers in-depth analysis, educational resources, and knowledge exchange. Integrating these platforms with the block chain traceability system strengthens market access and encourages climate-resilient farming practices, enhancing farmers' resilience to climate variability and change.

- Activity 1.2.1.1: Develop and test mobile applications and web platforms in collaboration with climate experts, agricultural scientists, and software developers to ensure accurate, real-time delivery of climate data, forecasts, and tailored agricultural advice for diverse agro-ecological zones.
- Activity 1.2.1.2: Conduct user training and outreach programs to familiarize farmers with the mobile app and web platform, providing hands-on demonstrations on how to access climate data, interpret forecasts, and apply this information to improve their farming practices.
- Activity 1.2.1.3: Integrate the mobile and web platforms with existing agricultural systems, including the block chain traceability system (from Output 1.1.1), to create a seamless flow of information that connects real-time climate data with market access, traceability, and sustainable farming practices.

Output 1.2.2: Community-based workshops on risk management and financial planning conducted.

73. The project's strategy to enhance climate resilience in agriculture involves community-based workshops that integrate climate risk into planning and financial management. These workshops educate farmers on the importance of climate-risk-informed farming and financial processes. Peer learning sessions facilitate knowledge exchange and case studies of successful risk management. The project will focus on small-scale farmers to foster proactive risk management. Collaboration with local agricultural extension services and NGOs will ensure relevant content. Topics include climate-informed decision-making, financial planning, and income diversification which will be distributed through toolkits developed thus empowering farmers to secure livelihoods and build resilient communities safeguards food security, strengthens livelihoods, and advances sustainable development.

- Activity 1.2.2.1: Design and deliver tailored workshops in collaboration with agricultural extension services, NGOs, and local experts, focusing on integrating climate risk into agricultural and financial planning.
- Activity 1.2.2.2: Facilitate peer learning and develop case study materials that highlight successful examples of climate risk management in agriculture
  Activity 1.2.2.3: Develop, translate and distribute climate risk and financial planning toolkits (Climate-informed crop calendars, planting techniques…)

Output 1.2.3: An adaptation-oriented partnership with financial institutions to facilitate access to credit and insurance established.

74. Engaging microfinance institutions, banks, and insurance companies to develop tailored financial products for smallholder farmers vulnerable to climate risks is crucial for economic resilience. This initiative aims to create financial products for farmers who face climate variability. A guarantee fund will mitigate risks for financial institutions, facilitating access to credit and insurance for small-scale farmers, especially women and youths. The project will also support local governments in developing financial inclusion policies. This partnership-driven approach empowers farmers to invest in climate-resilient practices and recover from losses, securing their livelihoods and contributing to agricultural sector stability. By involving key financial stakeholders, the project bridges the gap between the financial sector and smallholder farmers, ensuring comprehensive understanding and addressing of climate risks in financial product development. A supportive financial ecosystem enhances farmers' adaptive capacity, positioning them to thrive in the face of climate change.

- Activity 1.2.3.1: Establish partnerships with microfinance institutions, banks, and insurance companies to develop and offer financial products specifically tailored for smallholder farmers facing climate risks.
- Activity 1.2.3.2: Implement a guarantee fund in collaboration with local governments and financial institutions to reduce lending risks for financial providers.
- Activity 1.2.3.3: Coordinate with local governments to support policy frameworks that promote financial inclusion of farmers, focusing on creating an enabling environment for farmers to access credit, insurance, and other financial services necessary for climate risk management.

Component 2: Enhance the resilience of ecosystems and the most vulnerable populations to the impacts of climate change through concrete adaptation measures

Objective: *Leverage sustainable land practices (beekeeping and syntropic agroforestry) as integrated approaches for improving agricultural productivity, enhancing ecosystem health, and increasing climate resilience.*

75. This component promotes Ecosystem-based Adaptation (EbA) in rural Burundi. EbA harnesses biodiversity and ecosystem services to help communities adapt to climate change. It's holistic, restoring, managing, and conserving ecosystems while providing socioeconomic benefits. In this project, EbA is integrated with beekeeping and syntropic agroforestry, enhancing resilience, productivity, and livelihoods. Targeted interventions focus on rural, isolated farmers and communities.
76. The integrated approach aims to address climate change impacts by enhancing ecosystem services, revitalizing value chains, and mitigating adverse effects. It focuses on key agricultural sectors like bananas, palm oil, macadamia, cashew, mango, avocados, tea, coffee, oranges, cassava, cotton, and chilies. Rainwater dependence in Burundi's agriculture underscores the need to address extreme weather events like floods, droughts, and climate-induced diseases. Variable and fluctuating climate conditions reduce productivity. This component focuses on enhancing stakeholder capacity and knowledge in occupational safety and health, particularly the health impacts of climate change and environmental degradation on food production and processing. Adaptation and resilience activities empower farmers to respond effectively to future climate shocks or changes, mitigating their negative impacts through planning, preparedness, and effective management[79].
77. A key pillar of this component is promoting Sustainable Land Management practices (SLMP) via syntropic agroforestry to improve water catchment areas and soil health in Burundi's rural areas. These practices mitigate climate change vulnerability, contribute to capacity development in adaptation, and reduce socio-economic inequalities, including gender disparities. SLMPs also counteract the impacts of rising temperatures, water stress, and potential water crises, enhancing resilience in disaster-prone areas. Integrating climate-resilient agriculture techniques like beekeeping with agroforestry into forest buffer zones prevents deforestation and encroachment. Beekeeping also protects wildlife by limiting poaching and promotes biodiversity through pollination, benefiting crops and wild plants.
78. Apiculture as a watershed management intervention maintains healthy ecosystems with low human pressure, supported by environmental policies and practices in Component 4. Initial SLMP promotion includes agroecological production, pasture management with forest curtains via beekeeping, nursery plant production, and sustainable native forest management through beekeeping as alternative livelihoods. These practices strengthen sustainable food forest management and enhance adaptive management focused on forage evaluation and water harvesting in dry areas. Through these efforts, Component 2 lays the foundation for concrete climate adaptation by reducing erosion, improving water retention, protecting productive land, and strengthening resilient livelihoods for vulnerable farmers in the target communes. Activities for this component are highlighted under outcomes 2.1 and 2.2 in outputs 2.1.1, 2.1.2, and 2.2.1.

Outcome 2.1: Increased agricultural productivity and ecosystem health through integrated beekeeping and Syntropic agroforestry practices.

Output 2.1.1: Strategies and Guidelines on syntropic agroforestry and apiculture practices developed and enhanced.

79. Under this output, integrated strategies and technical guidelines will be developed to promote the synergy between syntropic agroforestry and sustainable apiculture (beekeeping). These guidelines will serve as a practical foundation for improving ecosystem productivity, enhancing biodiversity, and supporting climate-resilient livelihoods. The development process will be informed by field-level assessments and tailored to reflect the agro-ecological diversity of the target regions. Expert validation and stakeholder engagement will ensure that the guidelines are scientifically robust, locally relevant, and practically applicable. The specific activities under this output are, with the USD 250,000 allocation distributed across technical design, field

[79] https://publications.iadb.org/publications/english/document/Adaptation-Solutions-Taxonomy.pdf

contextualization, expert validation, and multi-stakeholder finalization so that the guidance is locally adapted, operationally feasible, and directly supports climate-resilient land and livelihood management in the target communes.

- Activity 2.1.1.1: Develop integrated strategies and operational guidelines combining syntropic agroforestry principles with sustainable apiculture practices [USD 70,000], including: (i) technical desk review and synthesis of existing agroforestry and apiculture models in Burundi [USD 15,000]; (ii) preparation of integrated technical guidelines and seasonal management protocols [USD 30,000]; (iii) development of field-ready extension materials and job aids [USD 15,000]; and (iv) editing, translation, and formatting for operational use [USD 10,000]. This activity translates into climate adaptation by providing a practical framework for diversified production systems that improve soil cover, support pollination, and reduce climate-related production risks.
- Activity 2.1.1.2: Conduct participatory field assessments across representative agro-ecological zones to adapt and contextualize the guidelines [USD 85,000], including: (i) commune-level climate suitability assessments and site diagnostics [USD 35,000]; (ii) watershed targeting and identification of priority vulnerable landscapes [USD 20,000]; (iii) identification of locally suitable tree, forage, and bee-friendly species combinations [USD 18,000]; and (iv) community consultations on local climate stresses, adaptation barriers, and coping practices [USD 12,000]. This activity translates into climate adaptation by ensuring that the guidance responds to local drought, flood, erosion, and livelihood conditions rather than applying a generic model.
- Activity 2.1.1.3: Facilitate expert reviews to incorporate the latest research and emerging innovations [USD 40,000], including: (i) review by agroforestry, apiculture, land restoration, and climate adaptation specialists [USD 15,000]; (ii) revision of the draft guidelines based on technical recommendations [USD 10,000]; (iii) alignment with national standards and extension approaches [USD 10,000]; and (iv) final technical quality assurance [USD 5,000]. This activity translates into climate adaptation by increasing the technical quality and reliability of the recommended practices, thereby improving uptake and
- Activity 2.1.1.4: Convene multi-stakeholder workshops including local practitioners… to validate and finalize the strategy [USD 55,000], including: (i) provincial and commune-level validation workshops [USD 28,000]; (ii) inclusion of local practitioners, women, youth, and vulnerable farmer groups in final consultations [USD 12,000]; (iii) revision and finalization of the validated strategy [USD 10,000]; and (iv) dissemination of the final guidance package to implementing actors [USD 5,000]. This activity translates into climate adaptation by strengthening ownership, local relevance, and practical applicability of the adaptation package.

Output 2.1.2: 20 Demonstration sites showcasing effective integration of apiculture with syntropic agroforestry techniques developed.

80. The establishment of demonstration sites is a crucial activity that transforms the concepts learned during training sessions into tangible, practical examples that local farmers can learn from and replicate. Collaborating with local communities, the project will identify and prepare diverse locations across various ecological zones, ensuring that these sites represent the diverse agricultural contexts found in Burundi as well as undertake training for integrating beekeeping with syntropic agroforestry practices, resulting in increased knowledge and skills for sustainable agricultural productivity and ecosystem health. The specific activities under this output are, with the USD 700,000 allocation directed to site preparation, establishment of integrated agroforestry and apiculture systems, and farmer training so that the demonstration sites function as practical adaptation hubs for replication across the target communes:

- Activity 2.1.2.1: Identify and prepare site locations for establishing demonstration sites in collaboration with local communities [USD 130,000], including: (i) community mobilization and participatory engagement for site selection [USD 20,000]; (ii) climate suitability assessments and watershed targeting in vulnerable landscapes [USD 35,000]; (iii) site mapping, demarcation, and fencing [USD 40,000]; and (iv) land preparation and local site management arrangements [USD 35,000]. This activity translates into climate adaptation by establishing localized adaptation learning hubs in the areas most exposed to erosion, runoff, water stress, and land degradation
- Activity 2.1.2.2: Design and establish syntropic agroforestry systems to illustrate different combinations of crops and bee-friendly flora that can coexist beneficially[USD 250,000], including: (i) plot design and

species layout for diversified syntropic systems [USD 30,000]; (ii) procurement and planting of multipurpose trees, shrubs, and associated crops [USD 100,000]; (iii) soil improvement inputs, mulching, and establishment support [USD 55,000]; and (iv) field installation labor, supervision, and basic monitoring equipment [USD 65,000]. This activity translates into climate adaptation by increasing vegetation cover, improving soil structure, reducing heat and moisture stress, and diversifying production under variable rainfall conditions.

- Activity 2.1.2.3: Install, manage and showcase integrated apicultural practices with diverse forestry species that are beneficial for both crops and honeybees, such as nectar-producing trees and shrubs [USD 180,000], including: (i) procurement of beehives, protective gear, and essential apiary equipment [USD 90,000]; (ii) installation of apiary units and demonstration management systems [USD 35,000]; (iii) planting and maintenance of bee forage species linked to the agroforestry sites [USD 30,000]; and (iv) basic honey and beeswax handling and demonstration equipment [USD 25,000]. This activity translates into climate adaptation by promoting pollination, supporting biodiversity, creating low-water livelihood options, and reducing pressure on degraded ecosystems.
- Activity 2.1.2.4: Undertake training to 24,000 farmers on apiculture with syntropic agroforestry practices, resulting in increased knowledge and skills for sustainable agricultural productivity and ecosystem health [USD 140,000], including: (i) development of farmer training modules and field curricula [USD 20,000]; (ii) delivery of practical training sessions and field demonstrations [USD 70,000]; (iii) coaching of lead farmers and local extension facilitators [USD 25,000]; and (iv) training materials, follow-up visits, and farmer support tools [USD 25,000]. This activity translates into climate adaptation by strengthening the capacity of target beneficiaries to adopt and maintain diversified, climate-resilient production systems.

Outcome 2.2: Improved soil stability and water catchment health in agricultural lands

Output 2.2.1: Soil and water conservation techniques and farmers capacity enhanced through syntropic agroforestry practices.

81. In Burundi, where rainfall can cause substantial soil erosion and water runoff in hilly and sloped areas, soil and water conservation techniques are crucial. Rainwater harvesting and water retention features within these systems assist to address water scarcity and irregular rainfall patterns exacerbated by climate change, thereby enhancing the resilience of agricultural systems. The specific activities under this output are:

- Activity 2.2.1.1: Undertake SLM practices (contour planting and terracing design) to reduce erosion and runoff [USD 900,000], including: (i) contour mapping, layout, and engineering design for sloping farmland [USD 170,000]; (ii) terracing, bunding, and associated earthworks on priority sites [USD 430,000]; (iii) vegetative stabilization measures such as grass strips and reinforcement planting [USD 150,000]; and (iv) tools, supervision, and community implementation support [USD 150,000]. This activity translates into climate adaptation by reducing soil loss, slowing runoff, protecting cultivated land during intense rainfall, and maintaining agricultural productivity under increasing rainfall variability.
- Activity 2.2.1.2: Implement surface water harvesting and water retention features within agro-ecological systems [USD 900,000] including: (i) construction of runoff capture and diversion structures [USD 220,000]; (ii) infiltration pits, trenches, and recharge features [USD 210,000]; (iii) small retention ponds, check structures, or farm-level water storage features where feasible [USD 350,000]; and (iv) operation, maintenance, and local management training [USD 120,000]. This activity translates into climate adaptation by improving water availability during prolonged dry periods, increasing infiltration, reducing flash runoff, and supporting more stable farm production under erratic rainfall.
- Activity 2.2.1.3: Produce and educate stakeholders on organic matter retention for soil health and water conservation [USD 600,000] including: (i) establishment of composting, mulching; green manure systems, organic input systems and regenerative agriculture training [USD 250,000]; (ii) mulching, cover application, and associated soil moisture retention measures [USD 150,000]; (iii) farmer training and practical demonstrations on soil organic matter management [USD 120,000]; and (iv) local extension follow-up and technical support [USD 80,000]. This activity translates into climate adaptation by improving soil fertility, increasing soil moisture retention, reducing crop stress under heat and drought, and strengthening the resilience of farming systems to degraded soil conditions.
- Activity 2.2.1.4: Facilitate exchange visits of lead farmers to the 20 Demonstration sites under Output 2.1.2 to gain_experiences and learn strategies for effective soil and water management [USD 600,000], including: (i) organization of lead farmer exchange visits and field learning events [USD 180,000]; (ii)

structured demonstration-based learning cycles [USD 150,000]; (iii) commune-level replication planning and peer learning support [USD 140,000]; and (iv) monitoring of farmer uptake and adaptation practice replication [USD 130,000]. This activity translates into climate adaptation by accelerating adoption of proven soil and water conservation measures and strengthening farmer capacity to sustain and scale resilience practices beyond the initial sites.

Component 3: Develop and promote value-added products to expand income opportunities and improve market access for economic resilience and stability.

Objective: *Diversify income sources for smallholder farmers through the development and marketing of value-added crop and livestock products, enhancing market access and economic stability*.

82. Component 3 focuses on enhancing economic diversification and broadening market access for smallholder farmers through an Intersectional Approach (IA) integrates various sectors and stakeholders to achieve comprehensive outcomes. IA's cross-sectoral collaboration involves private sector innovation, governmental support, and community engagement to uplift smallholder farmers economically. Within the component and broader project, IA orchestrates collaboration between agricultural advancements, market connectivity, and value addition to create a robust economic environment resilient to climate change.
83. This approach prioritizes environmental sustainability and ensures economic stabilization and diversification for smallholder farmers are integrated with climate adaptation strategies. By creating a symbiotic relationship between economic growth, rural economy resilience, and environmental stewardship, IA fosters a sustainable and resilient future for smallholder farmers.
84. This component also aims to overcome barriers to lucrative markets for smallholder farmers through training in value addition and processing techniques, along with essential certifications, enhances product quality and marketability. This initiative transforms the economic landscape by equipping farmers with tools and knowledge to increase product value, leading to higher returns and climate-resilient practices. Farmer cooperatives or associations strengthen collective action and negotiation power, amplifying farmers' voices in the marketplace. Cooperative development fosters community resilience, enabling farmers to confront and adapt to climate change challenges.
85. The project also develops product standards and implements certification schemes to align agricultural practices with global market demands. Certifications like organic and fair trade open premium markets to smallholder farmers, increasing their income potential. This strategic move promotes sustainability and ensures farmers are rewarded for their commitment to climate-resilient agriculture, encouraging continued adoption and innovation.
86. Following the product prioritization exercise, the online platform will be designed to directly connect producers with three distinct market tiers, each with clearly defined buyer requirements, transaction terms and quality standards: 1. Local Institutional and Urban Markets: This segment comprises school feeding programs, hospitals, hotels and urban retailers in Bujumbura, Gitega and Ngozi. These buyers require consistent supply, documented quality assurance (moisture content ≤14% for grains; HACCP compliance for honey), and reliable delivery schedules. The platform will enable bulk order placement, digital invoicing, and mobile money payments within seven days of delivery, backed by cooperative-issued delivery guarantees. 2.Regional cross-border markets, targeted exports are being made to the Democratic Republic of the Congo (DRC) in the provinces of South Kivu and Goma, and to Tanzania (Kigoma and Mwanza). In these markets, there is a demand for drought-tolerant beans, cassava flour and honey, for which there is a price premium of 20-30%. The following buyer requirements must be met: East African Community (EAC) quality grading, aflatoxin certificates for legumes, and phytosanitary certificates for processed goods. Transactions will be facilitated through pre-negotiated framework contracts with regional wholesalers, with payments secured via escrow services integrated into the platform. 3.Specialty International Markets: The Source Plus is a trusted supplier of premium bee products (honey and beeswax) and selected agroforestry products. Similar products from Burundi are intended for niche organic and fair-trade buyers in the EU and Middle East. Buyers in these will require organic certification, full traceability from producer to end-consumer, and compliance with EU sanitary and phytosanitary (SPS) regulations. The platform will integrate block chain -based traceability and batch-level quality testing results to meet these requirements. Export logistics will be managed in partnership with regional

export consortia with experience in consolidated shipments from East Africa. Trust-Building Mechanisms: The platform will feature verified producer and buyer profiles, third-party quality verification before shipment, and a rating/review system to build reputational capital for both sides. Initial transactions will be underwritten by project-supported performance guarantees, gradually transitioning to private sector-led mechanisms. Operationally, the platform will not function as a passive listing site. Last-mile collection will be organized through commune-level cooperative aggregation points, where producer groups and designated aggregation agents will consolidate produce, complete first-level quality checks, and prepare lots for dispatch. Onward transportation to urban, regional, and export buyers will be undertaken through framework contracts with private transporters and buyer/off-taker logistics partners, rather than through a grant-owned truck fleet. To maintain the integrity of the dry chain during floods and heatwaves, the platform will prioritize sealed packaging, pallets, tarpaulins, ventilated temporary storage, moisture control, and weather-informed dispatch planning based on climate alerts; any more temperature-sensitive products will only be traded where insulated handling or hired refrigerated capacity is commercially justified. This integrated model combines digital matching, aggregation, quality assurance, dispatch scheduling, and contracted logistics, thereby making the platform an active and climate-resilient market connector.

87. The platform will operate under a cooperative ownership model: 51% owned by farmer cooperatives, but commercial efficiency will be safeguarded through a performance-based operating structure. 30% by private technology partner TechnoServe East Africa, and 19% by the Government of Burundi (via MINAGRIE). A board of directors with equal stakeholder representation will ensure democratic governance. Sustainability will be supported by a 3% transaction fee, premium listing charges, and annual cooperative membership fees (USD). The board will retain responsibility for strategic oversight, annual business plans, safeguard compliance, and approval of major contracts, while day-to-day commercial management of the platform including buyer acquisition, dispatch coordination, route planning, service quality control, and market analytics will be delegated to a competitively selected operating partner under a renewable management agreement. This operating agreement will include clear performance indicators on order fulfilment, delivery times, spoilage and rejection rates, farmer retention, buyer retention, and recovery of operating costs. During the grant period, project funds will support platform establishment, onboarding of cooperatives and buyers, testing of delivery routes, and initial working capital for market development. The exit strategy is a phased transition from grant support to earned revenue through transaction fees, logistics service margins (i.e., the margin the platform retains between the consolidated collection-and-delivery fee charged to buyers and off-takers and the lower bulk rates it pays contracted transport and logistics partners under framework contracts), premium quality and certification services, and export facilitation commissions, with grant dependence declining annually as commercially viable volumes grow. Government participation will remain limited to enabling regulation and oversight, while cooperative ownership secures farmer inclusion and the contracted operator provides the commercial discipline necessary to remain competitive and responsive to changing market demand.

88. Key takeaways from comparable models: The design draws inspiration from the success of Kenya's Twiga Foods (a producer-to-retailer supply platform) and Tanzania's Selina Wamucii (an export linkage platform for smallholders). Both models were successful in combining digital ordering with offline extension support, maintaining rigorous quality control, and offering flexible payment terms to build trust.. The platform’s design draws lessons from comparable models, but it does not assume that Burundi can simply replicate venture-backed firms such as Twiga Foods. The relevant lesson is not ownership structure but operational logic: successful market platforms combine digital ordering with active aggregation, delivery management, buyer servicing, and quality control. The Burundi platform will therefore use a hybrid model in which extension agents and cooperative managers support farmer onboarding and quality assurance, while contracted commercial operators manage dispatch, customer service, and market intelligence. Flexible collection arrangements and decentralized aggregation points will reduce first-mile costs and keep services close to farmers, especially in remote communes. Competitiveness after the grant will depend on regular review of product mix, buyer demand, delivery performance, route economics, and post-harvest loss rates, allowing the platform to adapt services, revise routes, and discontinue commercially weak lines where necessary. In this way, the platform is designed to remain an active, managed, and financially disciplined market connector, rather than a static digital

marketplace.

89. As part of an initial climate vulnerability, adaptation assessment and food security, the first prioritization of products based on their resilience to climate risks, market potential, and alignment with project objectives was undertaken. Priority Tier 1 includes drought-resistant crops (cassava, sweet potatoes, drought-tolerant bean varieties) and bee products (honey, beeswax), selected for their minimal water requirements, storage stability, and high market value even during climate shocks. Priority Tier 2 encompasses climate-smart livestock (indigenous goats, improved poultry breeds) and agroforestry products (indigenous tree fruits, medicinal plants) that provide income diversification while enhancing ecosystem resilience through carbon sequestration and soil improvement. Priority Tier 3 includes traditional crops (maize, bananas) that will be supported through climate-resilient varieties and improved post-harvest handling to reduce losses during extreme weather events. This prioritization ensures that 70% of project resources focus on products that not only generate income but actively contribute to climate adaptation by improving soil health, water retention, biodiversity conservation, and providing reliable income streams during climate-related agricultural disruptions, thereby maximizing both economic and environmental co-benefits while building long-term resilience for smallholder farmers. This prioritization also intentionally favors products with lower cold-chain dependence and greater storage stability so that market access remains viable during floods, road disruption, and heat stress, while more temperature-sensitive products will only be expanded where handling and transport arrangements are demonstrably reliable. The operational delivery model for these prioritized product tiers is illustrated in Figure Operational Logistics & Exit Strategy Framework. Under this model, commune-level cooperative aggregation centers and aggregation agents manage first-mile collection and dispatch preparation, private transport and buyer logistics partners undertake onward delivery under performance-based contracts, and platform logistics margins together with cooperative maintenance reserves support the maintenance of project-supported collection and handling assets, thereby linking climate-resilient market access with a credible transition to commercially self-sustaining service delivery.

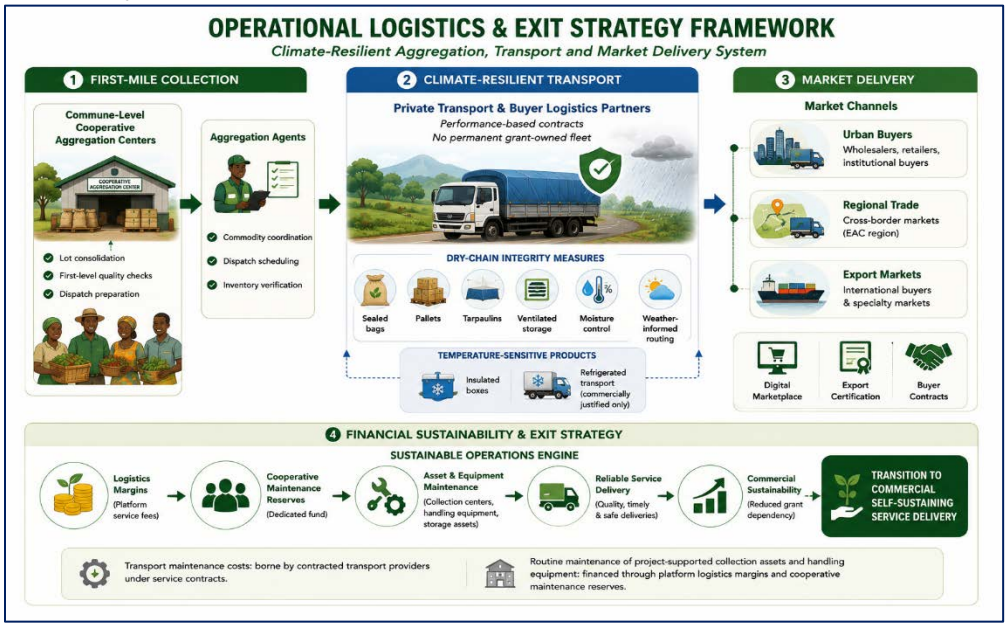


Table 5 : Burundi Online Platform Implementation Framework

Priority Tier & Product	Target Markets	Buyer Requirements & Standards	Transaction Models & Trust Mechanisms	Lessons from Comparable Platforms
TIER 1 Drought-resistant crops	• Local (urban & peri-urban) • Regional (EAC)	• EAC grain standards • Moisture ≤12–14%	• Aggregated sales via cooperatives	Twiga Foods (Kenya) Direct farmer contracts and digital payments to build trust

Priority Tier & Product	Target Markets	Buyer Requirements & Standards	Transaction Models & Trust Mechanisms	Lessons from Comparable Platforms
(Cassava, Sweet Potatoes, Drought-tolerant Beans)		• Aflatoxin-free • Pest-free	• Framework contracts • Mobile money payments	
TIER 1 Bee Products (Honey, Beeswax)	• Local premium markets • Regional buyers • International niche (EU, Middle East)	• HACCP compliance • Organic certification • SPS standards • Traceability	• Premium buyer contracts • Escrow payments • block chain quality verification	SheTrades (Ghana) Women-led export networks for specialty products
TIER 2 Climate-smart Livestock (Indigenous Goats, Improved Poultry Breeds)	• Local butchers • Urban supermarkets • Regional cross-border trade	• Veterinary health certificates • Animal welfare compliance	• Cooperative-managed supply • Forward purchase agreements • Micro-insurance-backed transactions	NAEB Rwanda Quality-based pricing and cooperative branding for premium buyers
TIER 2 Agroforestry Products (Indigenous fruits, Medicinal plants)	• Local processors • Regional herbal markets	• Phytosanitary certification • Documented origin • Organic verification	• Direct contracts with processors • Export consortia for cross-border trade	Ethiopia Spice Cooperatives Joint marketing and pooled quality control
TIER 3 Traditional Crops (Maize, Bananas)	• Local food markets • School feeding programs	• Climate-resilient varieties • Improved post-harvest handling	• Structured supply agreements • Warehouse receipt systems	WFP Purchase for Progress (Uganda) Linking smallholders to institutional buyers

90. By staying informed about market trends and consumer preferences, the project will ensure a dynamic approach to supporting smallholder farmers. This commitment to innovation ascertains sustainable economic and environmental strategies remain relevant and effective, securing a resilient future for rural communities in the face of climate change. Through these efforts, Component 3 aims to integrate economic empowerment with climate resilience, ensuring smallholder farmers survive and thrive in environmental challenges. This strategic approach is essential for establishing sustainable pathways for rural development and climate adaptation.

Outcome 3.1: Enhanced income diversification for smallholder farmers through value-added livestock and crop food value chains products.

Output 3.1.1: 24,000 Farmers trained on processing and value addition of livestock and crop food products.

91. Under this output, a series of training modules will be developed to educate farmers on value addition techniques specifically tailored for livestock and crop value chains. This initiative aims to enhance the economic resilience of rural communities by diversifying their income sources and increasing the market value of their products. The specific activities under this output are:

- Activity 3.1.1.1: Develop tailored training modules on livestock and crop food processing techniques, value addition practices, and quality control, ensuring content accessibility
- Activity 3.1.1.2: Establish farmer-led processing hubs to facilitate collective action, access to shared equipment, and knowledge exchange
- Activity 3.1.1.3: Organize community-based training sessions and demonstration workshops to provide

hands-on experience in processing techniques, such as drying, packaging, preservation, and others.

- Activity 3.1.1.4: Develop and distribute educational materials and toolkits (e.g., manuals, videos, and online resources) that farmers.

Output 3.1.2. 60 Inclusive community crop nurseries are established for producing genetically diverse and climate resilient crop planting material.

92. Access to good seedlings is a significant challenge in improving the productivity of crops and related products in Burundi. This challenge becomes even more pressing in context of emerging pests and diseases that spread from farm to farm through the sharing of planting materials by farmers. The specific activities under this output are:

- Activity 3.1.2.1: Develop/foster partnerships with research institutions and seed banks to source genetically diverse and climate-resilient crop varieties in nurseries
- Activity 3.1.2.1: Provide training and capacity-building workshops for local farmers and nursery managers on best practices for nursery management…
- Activity 3.1.2.3: Facilitate the distribution of planting materials to local farmers, with a focus on creating an equitable access system.

Output 3.1.3: Certification, SPS (Sanitary and Phytosanitary) framework, and quality assurance for livestock and crop value chain established.

93. Future efforts will involve collaboration with certification bodies to streamline the process for obtaining organic and fair-trade certifications for bee and agroforestry products. This process will enable farmers to access premium markets and ensure their products meet international standards, thus opening up new avenues for economic growth. Trainings on SPS standards will be conducted to educate farmers on compliance with these international market requirements, ensuring their products can compete globally. The specific activities under this output are:

- Activity 3.1.3.1: Develop a national certification scheme in collaboration with local authorities and international standards organizations
- Activity 3.1.3.2: Establish a Sanitary and Phytosanitary (SPS) regulatory framework by working with agricultural experts, veterinary services, and policy makers to create guidelines for controlling diseases and pests.
- Activity 3.1.3.3: Develop training modules and train farmers, livestock producers, and agribusinesses on the importance of quality assurance and SPS standards

Output 3.1.4: Market linkages for livestock and crop food products established locally, and internationally.

94. To further enhance the economic resilience of farming communities, the project will focus on strengthening the value chains for livestock and crop products by establishing critical market linkages at local, regional, and international levels. The platform's grant financing is designed to cover establishment costs, early-stage de-risking, farmer onboarding, and the initial integration of climate-resilient supply chains. Over time, operational sustainability will rely on a phased transition toward transaction-based revenues, service fees linked to actual value creation, and cooperative aggregation volumes that lower unit costs. The platform will therefore exit from grant dependence by moving from project-supported market formation to commercially disciplined service delivery, while governance arrangements will include performance benchmarks, periodic commercial review, and adaptive product prioritization to maintain competitiveness as market demand evolves.
95. The platform will complement rather than replace traditional intermediaries by creating transparency and fair pricing throughout the value chain, allowing farmers to choose between direct sales (higher margins) and intermediary sales (convenience and immediate payment). Active market linkages will be ensured through dedicated relationship managers who facilitate buyer-seller connections, organize regular virtual and physical market events, provide price negotiation support, and maintain quality assurance standards. The system includes automated matching algorithms based on product specifications, quantity requirements, and geographical proximity, while maintaining human intermediation for relationship building and dispute resolution, ultimately creating a hybrid model that leverages both digital efficiency and traditional relationship-based trading practices.
96. The digital marketplace will open three concentric rings of demand, each with clearly defined quality and transaction protocols. Ring 1 (local institutional buyers) targets Burundi's school-feeding programme and urban

hotels, which collectively absorb an estimated 1 600 t of beans/maize and 90 t of filtered honey per year; contracts will specify Grade 1 East African Standard moisture limits (12-14 %) for grains and ≤ 20 % moisture plus ≤ 40 mg kg^{-1} HMF for honey, with payment within 7 days via mobile-money escrow. Ring 2 (regional wholesalers in Rwanda, eastern DRC and Tanzania) requires bulk (> 5 t) deliveries on EURO pallets, aflatoxin < 10 ppb for maize, and producer-traceable barcodes that interface with Rwanda FDA's import portal; transactions use 30-day documentary collections backed by Stanbic's regional trade-finance window. Ring 3 (international specialty buyers) focuses on EU-certified organic honey and beeswax and on East African Community cassava flour grade "EAC-CF-03"; shipments follow INCOTERM FOB Dar-es-Salaam with pre-shipment inspection by SGS and block chain -verified certificates of origin. In every ring, the platform's matching algorithm filters listings by these buyer-declared specifications, and relationship managers confirm compliance before contracts are finalised. Traceability-linked certification also protects adaptation gains by enabling producers of climate-resilient goods to retain access to premium markets that reward resilient production systems.

97. Design features borrow heavily from proven African e-agri platforms. From Twiga Foods (Kenya) the project adopts a hub-and-spoke logistics model in which the platform, not the farmer, books and tracks third-party trucks, cutting post-harvest losses by 12 %. AgroCenta (Ghana) shows that smallholders will keep using a digital exchange when receipts double as collateral; the Burundi system therefore links every completed sale to a revolving credit line with Caisse Cooperative (up to 70 % of last-season turnover). Finally, M-Farm (Kenya) demonstrates the power of radical price transparency in building buyer trust; hence the platform publishes anonymised weekly bid/ask spreads and seller star-ratings that update after each verified delivery. Technically, every transaction hash anchors to the same block chain ledger described, so buyers can audit the full chain of custody, while a two-tier dispute-resolution panel (co-op first, then an independent ombudsperson) settles claims within 10 days. These layered incentives and safeguards replicate the governance and participation mechanisms that have kept the reference platforms active for more than a decade, ensuring that Burundi's marketplace moves beyond a mere website to a trusted, commercially attractive trading ecosystem.

98. The digital marketplace to be developed will be owned and operated by a newly established farmer cooperative federation, with technical development and maintenance provided by private sector partners under service agreements. The platform will anticipate achieving financial sustainability through transaction fees, subscription fees from agribusinesses, and premium services for market analytics and quality certification. A governance board comprising 60% farmer representatives, 25% private sector, and 15% technical partners will oversee operations, ensuring farmer interests remain central while maintaining commercial viability and technical excellence.

- Activity 3.1.4.1: Facilitate partnerships between farmers, cooperatives, and agribusinesses with local and international buyers, traders, and export firms
- Activity 3.1.4.2: Establishment of formal agreements to ensure consistent market access and fair pricing.
- Activity 3.1.4.3: Develop a digital marketplace platform that connects producers to buyers

Outcome 3.2: Increased market access and fair-trade opportunities for crop and livestock value chains.

Output 3.2.1: 24 Farmer cooperatives or associations established for better market negotiation.

99. The project will initiate the formation of farmer cooperatives or associations, a strategic move to enhance farmers' collective bargaining power and facilitate access to broader markets. Community meetings will be pivotal in discussing the logistics and benefits of such formations, aimed at encouraging farmers to pool resources and share knowledge, thereby strengthening their market presence and negotiation capabilities. The specific activities under this output are:

- Activity 3.2.1.1: Identify and mobilize farmers in target regions to form cooperatives or associations, focusing on collective bargaining and improved market access for their livestock and crop products.
- Activity 3.2.1.2: Facilitate legal registration and governance training for the newly formed cooperatives, ensuring they operate under clear leadership, structure, and regulatory compliance.
- Activity 3.2.1.3: Provide financial literacy and business management training, enhancing their capacity to negotiate better prices, access credit, and manage profits.

Output 3.2.2: Enhanced visibility and market presence of agricultural products through participation in trade fairs and engagement with online market platforms.

100. The strategy includes securing spaces for cooperative members at national and international trade fairs, a move designed to significantly boost the visibility and market presence of livestock/crops products and other agricultural goods. The specific activities under this output are:
    - Activity 3.2.2.1: Organize participation in regional and international trade fairs to showcase agricultural products, enabling producers to network with buyers, investors, and other key stakeholders.
    - Activity 3.2.2.2: Develop marketing materials and promotional campaigns on the quality, sustainability, and unique selling points increasing visibility among potential buyers.
    - Activity 3.2.2.3: Train farmers and cooperatives on digital marketing and e-commerce strategies to effectively use online platforms, and other digital tools.

Output 3.2.3: Comprehensive workshops delivered on marketing strategies and brand development specifically tailored for livestock and crop products.

101. Engaging marketing professionals to deliver workshops on brand building, digital marketing, and customer engagement will equip farmers and cooperative members with the skills necessary to effectively promote their products in a competitive market. Mentorship programs with successful agribusiness entrepreneurs will facilitate knowledge transfer, providing practical insights into navigating market challenges and seizing opportunities. This comprehensive approach to building marketing capacity among farmers and cooperatives is integral to achieving the project's objectives of enhancing climate resilience through economic empowerment and sustainable agricultural practices. The specific activities under this output are:
    - Activity 3.2.3.1: Design and deliver workshops on branding and packaging specifically for bee and agroforestry products.
    - Activity 3.2.3.2: Provide training on market analysis and consumer preferences for livestock and crop products, enabling producers to tailor their products to meet market demands.
    - Activity 3.2.3.3: Offer practical sessions on developing marketing strategies that include digital marketing, social media, and content creation tailored to livestock and crop value chains.
    - Activity 3.2.3.4: Conduct market research to identify consumer trends and opportunities for product positioning.

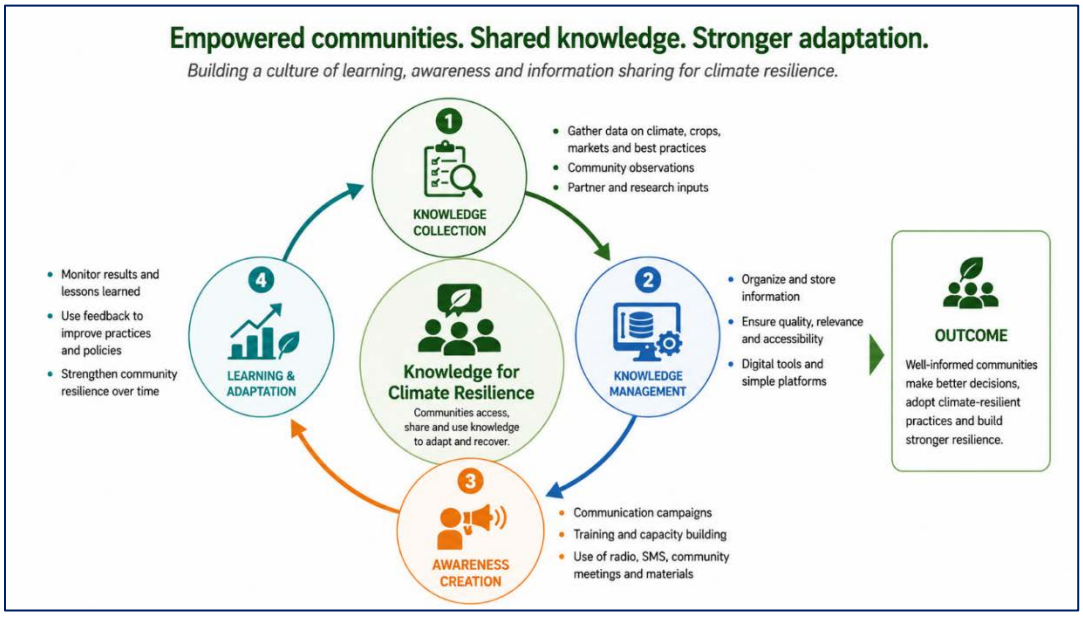
Component 4: Enhancing knowledge Management, awareness creation and information sharing

Objective: *Create an enabling environment for sustainable adaptation by catalysing behavioural change, co-developing inclusive policy frameworks, and embedding adaptive learning systems across institutions and communities.*

102. This component is restructured into two outcomes that together shift the current paradigm from reactive, top-down practices to proactive, participatory climate governance. The underlying causal logic is that increasing droughts, floods, rainfall variability, erosion, and pest pressures expose rain-fed smallholder systems to repeated production and livelihood shocks. Because these households face degraded soils, low savings, weak storage systems, limited access to climate-risk finance, and constrained market options, climate hazards translate into high vulnerability and slow recovery. The project responds by combining ecosystem restoration, soil and water conservation, climate-risk management tools, climate-resilient storage, and adaptive market access. These interventions are expected to increase water retention, reduce erosion, lower post-harvest losses, stabilize income after shocks, and strengthen local adaptive capacity. The resulting effect is greater resilience to recurrent climate stress and more sustained climate-resilient livelihoods over time.

103. This component directly addresses the current paradigm characterized by limited adoption of climate-smart practices due to unfamiliarity with new technologies, mistrust of financial innovations, weak extension support, and fragmented institutional learning. It does so by linking local knowledge uptake to practical adaptation results: farmers first observe and test field-based resilience measures, then gain confidence in linked risk-management and market-support tools, and finally participate in feedback, learning, and replication mechanisms that strengthen long-term ownership. In this way, knowledge management is positioned not as a stand-alone dissemination activity but as the mechanism that connects implementation, learning, adaptation uptake, and institutional scale-up. Component 4 addresses this through:
    - Developing government-adopted strategies that provide institutional legitimacy to innovations

- Creating peer networks and community champions who demonstrate benefits
- Establishing systematic knowledge transfer mechanisms that build technical capacity
- Implementing behavioral change programs that address cultural barriers to adoption



Outcome 4.1: Development of Enabling policies, strategies, and legal frameworks developed and adopted, enhancing project sustainability.

Output 4.1.1: Policy advocacy campaigns and stakeholder engagement meetings conducted.

104. The project will organize stakeholder forums to gather insights and opinions from a diverse range of participants, including farmers, policymakers, and environmental sector representatives. These forums will influence the dissemination and adoption the strategies (o. 2.1.1) and update of national documents related to agricultural and environmental policies. The project's output aims to enhance the policy landscape for sustainable agriculture and climate adaptation. By organizing stakeholder forums and digital advocacy campaigns, the project seeks to shape agricultural and environmental policies that reflect the needs of farmers and align with global best practices. International engagement will ensure that local policies are informed by global insights, fostering comprehensive climate resilience strategies. This outcome focuses on creating a supportive institutional and regulatory environment to ensure the long-term success of the project. By influencing national and local policies, the project aims to embed its climate adaptation and sustainable agriculture approaches into formal governance systems—thus ensuring sustainability beyond the project's duration.

- Activity 4.1.1.1: Organize multi-stakeholder forums ensuring inclusive discussions that inform the drafting of new agricultural and environmental policies that promote climate adaptation and sustainability.
- Activity 4.1.1.2: Implement digital advocacy strategies, including social media campaigns, webinars, and online petitions, to raise public awareness and generate support for sustainable agriculture and climate-resilient policies.
- Activity 4.1.1.3: Facilitate policy dialogue sessions to align national policies with global best practices and the latest scientific research, creating policies that strengthen climate resilience.

Output 4.1.2: Policy briefs and recommendations based on project findings developed.

105. Create actionable policy briefs targeting legislative changes to support sustainable agriculture and climate resilience. Clearly explain the connection between sustainable farming practices, climate resilience, and policy frameworks. Present a compelling case for legislative reform. Emphasize the advantages of adopting recommended practices and policies, supported by impact assessments. Organize dissemination events to engage over 500 stakeholders and create a supportive policy environment for climate adaptation.

- Activity 4.1.2.1: Develop Data-Driven Policy Briefs on Sustainable Agriculture and Climate Resilience
- Activity 4.1.2.2: Conduct impact assessment studies to reinforce the policy recommendations with

quantifiable benefits.

- Activity 4.1.2.3: Organize policy dissemination events, involving key stakeholders from government, civil society, and the private sector including a policy toolkit.

Output 4.1.3: Workshops and forums with policymakers, community leaders, private sector and stakeholders on sustainable practices and climate adaptation conducted.

106. The project will develop training modules and organize a series of local regional workshops to explore the scalability of successful climate-resilient farming models across different geographies within the country. These workshops will serve as platforms for knowledge exchange, enabling farmers, scientists, policymakers, private sector and community leaders to share experiences and strategies for scaling up climate adaptation efforts. By involving at least 2,000 participants across various sectors, the project aims to foster a collaborative approach to addressing the challenges posed by climate change. Furthermore, recognizing the critical role of the private sector in driving innovation and investment in climate adaptation, the project will engage with this sector to identify legislative and regulatory hurdles that currently impede engagement in sustainable agriculture. This assessment will pave the way for the development of more inclusive policies and strategies that encourage private investment in climate-resilient agricultural practices and create public-private partnership (PPP). This initiative will facilitate the dissemination of cutting-edge research and innovative adaptation strategies to a broad audience.

- Activity 4.1.3.1: Organize a series of local regional workshops on scaling climate-resilient farming models across different geographies.
- Activity 4.1.3.2: Develop interactive training modules and deliver training sessions for community leaders using participatory methods
- Activity 4.1.3.3: Launch a fellowship program for young leaders to engage in policy advocacy and governance related to climate resilience
- Activity 4.1.3.4: Establish a public-private partnership (PPP) forum to facilitate ongoing discussions and collaborations between the public and private sectors towards climate resilience.

Outcome 4.2: Strengthened knowledge management systems aid community adaptation to climate change

Output 4.2.1: Multi-stakeholder platforms for knowledge exchange and coordination established based on strengthened extension services/Lead farmers program (ToT Model).

107. This output envisions establishing a Climate Resilience Innovation huB (CRIhB) that fosters collaboration and knowledge sharing among diverse stakeholders, including agriculture, environmental science, and policymaking. The CRIhB will serve as a central repository for disseminating cutting-edge research, innovative adaptation strategies, and successful practices, with particular emphasis on documenting and sharing community behavioural change approaches that promote sustained adoption of climate-smart practices. An integral component of this output is the Trainer of Trainers (ToT) model, which aims to train a network of selected community leaders and extension workers in climate-resilient agricultural practices.

108. These trained individuals will further educate their communities. The ToT model specifically incorporates behavioural change methodologies and community engagement techniques to address resistance to new practices and build trust in climate adaptation innovations. Effectively amplifying the reach of the project's reach and ensuring widespread adoption of climate adaptation strategies. Additionally, an annual climate resilience conference will be organized to showcase innovative solutions and facilitate networking among stakeholders.

- Activity 4.2.1.1: Establish and operationalize the Climate Resilience Innovation huB (CRIhB) that serves as a central repository for experts, practitioners, and community members.
- Activity 4.2.1.2: Develop and implement the Trainer of Trainers (ToT) program on climate-resilient agricultural practices, including specific modules on overcoming community resistance, building trust in financial innovations, and using culturally-appropriate communication methods to promote technology adoption.
- Activity 4.2.1.3: Undertake community trainings on ToT topics related to climate resilience, incorporating behavioural change methodologies to address community resistance, establish peer-to-peer learning networks, and create community champion systems that demonstrate tangible benefits of block chain

traceability and parametric insurance to build social proof and trust.

- Activity 4.2.1.4: Conduct Baseline, Capacity Needs Assessment, and KAP Survey of All Stakeholders to understand behavioral barriers to technology adoption and design appropriate knowledge transfer approaches.
- Activity 4.2.1.5: Establish knowledge documentation protocols within the CRIhB to systematically capture successful approaches for changing community attitudes toward climate innovations, creating a replicable methodology for addressing the current paradigm in similar contexts.

109. The project is fully aligned with the Adaptation Fund Results Framework and contributes directly to AF Outcomes 1, 2, 3, 5, 6, and 7: Component 1 contributes to Outcome 1 (reduced exposure to climate-related hazards and threats) and Outcome 2 (strengthened institutional capacity to reduce risks associated with climate-induced losses); Component 2 contributes to Outcome 5 (increased ecosystem resilience); Component 3 contributes to Outcome 6 (diversified and strengthened livelihoods and sources of income); and Component 4 contributes to Outcome 3 (strengthened awareness and ownership of adaptation and climate risk reduction processes) and Outcome 7 (improved policies and regulations that promote and enforce resilience measures). The detailed mapping of project objectives and outcomes to the Adaptation Fund Results Framework, including indicators, targets, and grant amounts, is presented in Part III.A.

B. Section Economic, social and environmental benefits

110. Wide benefits to Burundi in terms of socio-economic and environmental aspects. The proposed solution will generate impacts from economic, social and environmental perspective to alleviate poverty for all stakeholders (farmers, public authorities, rural farmers/communities) and mitigate/adapt to climate in the target country-Burundi in terms of medium and long terms.

i). Economic co-benefits

111. Agriculture is the most efficient way to improve the lives of poor communities in rural, remote areas of developing countries, especially Sub-Saharan Africa. It creates significant positive changes for individuals and provides income for communities through various uses. Key factors for Burundi's economic prosperity include climate change adaptation and **income stability.** Initiatives to adapt farmers to climate change led to increased earnings and an additional economic benefit of $6.5 million annually. Enhancing value added and expanding income-generating prospects improves farmers' resilience to climate variations, yielding an additional $1.2 million annually.

112. **Enhanced** production and market access through climate-resilient agricultural technologies, continuous technical support, and training in organic farming and drought-resistant crop varieties will lead to surplus production and higher prices. This will benefit both female and male farmers and support the shift towards climate-resilient and nutritious agricultural value chains. Measures to reduce contaminants and enhance product quality, lessen harvest losses, and add value to produce under Output 3.1.1, alongside efforts to expand market access for agroforestry and bee products in Output 3.1.3, will diversify smallholder farmers' livelihoods and increase income sources. This will also lead to increased domestic produce exportation and reduced national debt due to a shift towards organic farming.

113. **Targeted** climate and agricultural advisories under Component 1 will further reduce crop losses and provide economic advantages. The project aims to connect smallholder farmers with innovative climate services and enhance gender-sensitive information dissemination, including through digital platforms. This empowers farmers, especially women, to plan and mitigate climate-related risks effectively. The anticipated economic gains include preventing financial losses from crop failures and optimizing production under favourable conditions. Regional estimates suggest that farmers adjusting their practices based on weather advisories could see their annual incomes rise by 67 percent. Assuming an average annual household income of USD 693.5 and two productive years within the project's five-year lifespan, affecting approximately 60 percent of the project's direct beneficiaries (24,000 households), this equates to an average income boost of around USD 2,316.29 per household over five years for 14,400 households, or a total income increase of about USD 33,354,576 for the project. These figures are conservative, considering the cumulative positive impact of the project's risk reduction, adaptation strategies, and the potential for over 60% of targeted households to benefit.

114. **Access to** finance and risk management facilitates households to handle minor shocks by establishing risk reserves and accessing microcredit for productive ventures. Combining with insurance schemes, these mechanisms enhance resilience to both minor and major shocks, contributing to insurance premium payments. Warehouse receipts safeguard against minor shocks, and micro insurance doubles women's savings in various

countries. Receipts and micro insurance as collateral for loans increase access to financial services. In Kenya, Uganda, and Tanzania, credit access doubled after five years of ACRE Africa's micro insurance interventions. Farmers secured loans at least three times larger than non-participants in 13 countries. This enhanced access allows participants to invest in agricultural inputs, tools, and livestock, promising at least a 60 percent increase in credit access among targeted female farmers. Non-quantifiable economic benefits include farmer empowerment, especially women and youths, from rural Farmer cooperatives mobilization and services under Output 3.1.3 and Output 3.2.1. This prepares them to face climate-change challenges in selected value-chains. The Apiculture industry (non-timber agroforestry and honey) can increase foreign exchange earnings and contribute to GDP. This can be achieved through high-quality products and revenue for farmers in the long term.

- Proactive measures for bee and tree loss management (farming sector, public authorities; medium & long term).
- Economic resilience: farm diversification improves crop resilience (Farming sector; medium); honey technology diversification enhances sector resilience & food security (outside; medium & long term).
- Increased agricultural quantity produce for Burundi farms (Public sector, Farmers; medium term).

ii). Social co-benefits

115. The project aims to deliver substantial social benefits, particularly for vulnerable smallholders, by improving their livelihoods and resilience. It adopts an inclusive approach to ensure its services reach those most in need, fostering social capital, economic empowerment, and social inclusion. Key demographics include women and youth, who face barriers to accessing agricultural resources. Research by the Food and Agriculture Organization (FAO) shows that equal resources to women farmers can increase agricultural output by four percent in developing countries, potentially reducing undernourishment by up to 17%. The project emphasizes ensuring at least 57% of beneficiaries are female to replicate these effects and boost agricultural productivity, improving food security and nutritional outcomes. It's structured around three main components: bolstering agricultural resilience, supporting post-production activities for income security, and promoting agro-ecotourism and market access for income diversification. The project integrates micro insurance, block chain traceability, and other tools to enhance participants' resilience. This holistic approach is expected to significantly reduce reliance on negative coping strategies, with 40% of beneficiary households becoming more resilient to shocks.
116. The project design was informed by an initial Gender Assessment conducted across eight provinces and involving 320 community members and 18 key informants (see Annex 4). The assessment revealed that 85% of women report severe climate impacts compared to 70% of men, due to entrenched inequalities such as land tenure (only 22% of women own land), limited access to credit (35% vs. 65% for men), and underrepresentation in climate governance structures (25% women vs. 85% men in leadership roles).
117. These insights informed a series of gender-responsive design elements, including:
    - Targeting 57% of project beneficiaries as women, especially female-headed households
    - Designing gender-sensitive training materials and inclusive climate-smart agriculture programs
    - Providing childcare and flexible training schedules to reduce time poverty and enable women's participation
    - Promoting joint land titling and supporting legal awareness campaigns on women's land rights
    - Introducing women-focused parametric insurance and microfinance solutions
118. In response to educational and information access gaps (e.g., 45% female illiteracy and only 30% climate information access), the project also integrates mobile-based and community radio outreach tailored to low-literacy users.
119. The project also conducted consultations in areas where Indigenous Peoples and ethnic groups including the Twa, Hutu, and Tutsi are present. In all eight provinces, these communities were consulted through targeted focus group discussions and key informant interviews. Their concerns, such as limited access to land and resources, cultural marginalization, and lack of voice in climate decision-making have been formally integrated into the project design.
120. This includes commitments to free, prior, and informed consent (FPIC), allocation of community-based representation in governance structures, and prioritization in benefit-sharing mechanisms and training activities. These findings and actions are documented in detail in Annex 4 (Gender Assessment Summary), which serves as a guiding framework to ensure that the project remains inclusive, equitable, and transformative.

121. The project prioritizes Gender Equity and Social Inclusion (GESI), ensuring women and youth are key drivers of success. It allocates at least 60% of activities and benefits to women, including female youth, to empower them in design, testing, learning, and adoption of innovative solutions. This approach recognizes women and youth's significant contributions without competition with men. Gender considerations are central to the project's design and implementation, addressing gender inequalities in agriculture and value chains. Gender-sensitive analysis, value chain assessments, and equitable decision-making are conducted to understand and address roles, challenges, and opportunities for men, women, and youth. The project aims to economically empower women and youth, recognizing their crucial role in innovation and adaptation. Measures like free childcare enable women's participation in training and awareness sessions. Engaging communities through Focus Group Discussions (FGDs) and during proposal development is crucial.
122. At least 57% participation by women is committed to gender inclusivity. The project aims to facilitate equitable youth participation and adapt logistical aspects to accommodate women farmers' schedules. It provides free childcare to eliminate barriers and conducts a Social and Environmental Safeguards (SES) assessment to mitigate potential negative impacts. This comprehensive approach ensures ethical execution and benefits the diverse needs of the communities.

    Fieldwork, including experimental design and typology surveys, considers gender dynamics in agricultural practices. It explores how men and women manage individual plots or operate as independent farmers to tailor interventions that respect and address their unique challenges. Three key strategies combat gender inequalities and boost women's empowerment: (i) identifying gender-specific adaptation needs and capabilities; (ii) promoting gender-equitable participation in decision-making; and (iii) ensuring gender-equitable access to finance and advantages resulting from investments in adaptation measures. The project aligns with several areas of the UNFCCC Gender Action Plan.
123. The project aims to enhance gender equality and women's empowerment in climate adaptation strategies. It includes capacity-building for women in agriculture, knowledge management through educational materials and an online repository, improved tracking and reporting on gender-related mandates, and strengthening integration of gender considerations within UNFCCC bodies. Additionally, it promotes a fairer distribution of workload and economic benefits between genders through labor-saving technologies and household methodologies. Promoting female role models is also crucial to inspire women and youth. With 57% of beneficiaries being women, the project enhances agricultural efficiency and sustainability while paving the way for a more inclusive society.

iii). Environmental co-benefits

124. The project aims to address environmental challenges in Burundi, focusing on benefits to vulnerable communities and considering the gender impact. Sustainable agricultural practices, conservation, and community engagement create a model for inclusive environmental stewardship. To note, Burundi faces deforestation[80], driven by global warming and agricultural demands, resulting in 10% tree cover loss from 2001 to 2021. It directly improves the management and resilience of 3,617.10 km² of land and natural ecosystems across the six target provinces. This represents approximately 13% of Burundi's total land area, creating significant landscape-level adaptation benefits. Through syntropic agroforestry and integrated beekeeping practices, the project will restore ecosystem services on 501.55 km² of forested land and 2,385.82 km² of rangeland, enhancing the adaptive capacity of these landscapes to withstand climate variability and extreme weather events.
125. The co-benefits of the project are highlighted as follows: *Soil health and agricultural sustainability are key* concerns. Extensive soil erosion and degradation due to unsustainable practices lead to annual losses of 3 to 30 tons per hectare, reducing soil fertility, organic matter, and water retention capacity. This impacts land productivity and crop yields, increasing the risk of landslides exacerbated by changing rainfall patterns. The project proposes conservation agriculture, good agricultural practices (GAPs), and organic production methods to combat these challenges. These approaches enhance soil fertility and reduce erosion, addressing environmental issues while improving agricultural output and sustainability. The project's conservation agriculture, good agricultural practices (GAPs), and organic production methods will achieve a quantified 30% reduction in soil erosion rates across 414.69 km² of cropland, preventing an estimated 372,621 tons of soil loss annually. Enhanced soil organic matter content will increase by 15-20%, improving water retention capacity by 25% and crop resilience to drought conditions.

[80] Global Forest watch

126. *Biodiversity and Ecosystem Services.* The project aims to strengthen natural resources, biodiversity, and ecosystem services in target areas. Sustainable agro-ecological technologies like conservation agriculture, syntropic agroforestry and organic farming are integrated to prevent biodiversity loss from chemical misuse. Improving the natural resource base supports the agricultural community and ensures local ecosystem viability. Through the establishment of 20 demonstration sites and integration of beekeeping with syntropic agroforestry, the project will create habitat corridors supporting a 40% increase in pollinator populations across project areas. This will enhance pollination services for both agricultural crops and wild plant species, with direct benefits for food security and ecosystem stability. The project expects to restore habitat for approximately 150 native plant species and 80 bird species currently threatened by habitat fragmentation.
127. *Water Resource Conservation and soil* techniques will enhance water catchment health across agricultural lands, improving groundwater recharge by an estimated 20-25% in target watersheds. Surface water harvesting and retention features will capture approximately 2.4 million cubic meters of rainwater annually, reducing flood risks during intense rainfall events while providing drought resilience through improved water availability. These interventions will benefit water security for approximately 143,040 people directly and 572,160 people indirectly.
128. *Reducing environmental pressure* through sustainable livelihoods is the project's strategy. Climate adaptation training, asset creation, and productivity improvement build economic resilience against shocks. Increasing income and diversifying livelihoods, especially through components 2 and 3, and risk transfer activities under component 1, lessen dependency on ecosystem goods and services. This approach addresses climate change impacts like floods, landslides, and temperature-related droughts. The project will establish forest cover on approximately 125 km² of degraded lands through natural regeneration, afforestation, and reforestation activities. This forest restoration will sequester an estimated 375,000 tons of CO_2 equivalent over the project lifetime as an adaptation co-benefit, while primarily serving to enhance ecosystem resilience to climate variability.
129. *Land restoration through community engagement and apiculture promotes* tree planting for bee forage, providing an alternative income source and encouraging tree preservation and planting, improving water catchment areas and environmental health. The project will visualize climate change vulnerabilities through maps, fostering soil erosion prevention and landscape restoration. The project will establish forest cover on approximately 125 km² of degraded lands through natural regeneration, afforestation, and reforestation activities. This forest restoration will sequester an approximately 2,170,260 tons of CO_2 equivalent over the project lifetime as an adaptation co-benefit, while primarily serving to enhance ecosystem resilience to climate variability.
130. *Restoring forest cover* on degraded lands through natural regeneration, afforestation, reforestation, and agroforestry enhances environmental health and protects pollinators. Food Forestry management plans will be developed and implemented under output 2.1.2, with capacity building for climate-resilient practices. Education on biodiversity and pesticide impacts will secure pollinator health and food security. Education on biodiversity and pesticide impacts will secure pollinator health and food security, with an expected 60% reduction in harmful pesticide use across project sites, benefiting both human health and ecosystem integrity.
131. *Climate Adaptation Infrastructure Benefits* through climate information systems and early warning mechanisms will enhance the adaptive capacity of ecosystems by enabling timely responses to climate stresses. Mobile applications and web platforms will provide real-time environmental monitoring data, supporting ecosystem-based adaptation decisions. The block chain traceability systems will incentivize sustainable land management practices by providing market premiums for environmentally certified products, creating long-term economic incentives for ecosystem conservation.

C. Consistency with Sustainable development strategies

132. The project aligns perfectly with Burundi's national development strategies and its commitments under key international agreements, such as the UN Convention on Biological Diversity, the Convention to Combat Desertification, the UN Framework Convention on Climate Change, and the Paris Agreement. The project targets the key objectives of the updated NDC for Burundi (2030), which primarily focuses on adaptation. It also highlights agriculture and health as priority sectors for adaptation, with the aim of further identifying adaptation priorities in the National Adaptation Plan.

The Burundi National Communication reports to the UNFCCC (2021 and 2022) and presents the country's climate profile, identifying the sectors and regions most vulnerable to climate change impacts. Several sectors are particularly vulnerable, including agriculture and forestry, which are the two sectors the project will prioritize.

133. By adhering to Burundi's Nationally Determined Contributions and directly contributing to the priorities outlined in its National Adaptation Programme of Action, such as installing erosion control mechanisms in sensitive areas and promoting drought-resistant crops, the project integrates global environmental objectives with local adaptation needs. This strategic alignment underscores the project's commitment to addressing climate change impacts while fostering sustainable development. It demonstrates a holistic approach to environmental conservation and climate resilience in Burundi. It's worth noting that many of the measures recommended in the reports and on which the project aligns are also part of the Land Degradation Prevention initiative. These measures include reducing deforestation for agricultural land and creating green jobs as mitigation strategies. The UNFCCC 2022 report identifies capacity building needs at the national level, which the project will address through its second component. The report also emphasizes the importance of strengthening strategic planning for climate change adaptation at the local and regional levels, as well as in the sector-level planning process. This can be achieved through the project's fourth component. The Project also contributes to the objectives and priorities set out in the following national policies and national strategies:

Table 6: Alignment with National Strategies and Sub-National Strategies

Strategic Plan	Year	Priorities	Project Alignment (Activities)
National Agriculture Strategy	2018–2027	• Promote sustainable land and water use • Enhance agricultural resilience • Strengthen institutions	• Roll out soil and water conservation demo farms • Establish drought-resilient nurseries • Train local officials on sustainable practices • Promote composting and low-tech irrigation
National Development Plan (PND)	2018–2027	• Boost productivity and job creation • Foster inclusive and resilient economy	• Promote beekeeping for income and land restoration • Provide digital micro-loans with insurance • Link producers to buyers via e-market platforms
Green Growth Strategy (Draft)	2023	• Mobilize green finance • Engage private sector in green investments • Strengthen climate governance	• Create climate innovation hubs • Introduce block chain traceability for high-value crops • Host agri-investor showcases
Water and Sanitation Policy	2022	• Ensure climate-resilient water access • Promote watershed management	• Install bunds and reforest catchments • Integrate hydro-data into early warning systems • Train on water-smart land use
National Gender Policy & OBPE Gender Strategy	2012–2025 / 2021	• Promote gender equity in climate policy • Strengthen women's access to land, finance, and information	• Register women in insurance pilots • Set up women-led apiculture cooperatives • Use gender-sensitive surveys for inclusive planning
National Adaptation Plan (NAP) Process (Initiated 2014)[81]	2014	• Strengthening sector integration, governance coordination, inter-ministerial and sector integration for adaptation • Embedding risk-informed planning and adaptive finance • Build technical skills, foster innovation and ensuring participation of marginalized groups in adaptation planning	• Establishing multisectoral platforms with government and local stakeholders to guide adaptation decisions. • Deploying parametric insurance, weather-indexed systems, and block chain traceability in agricultural settings. • Training of farmers, especially women and youth, in agroforestry and risk-informed farming techniques. • Building climate support platforms, radio outreach, and farmer field schools for sharing best practices. • Embeding gender-responsive design with women-targeted insurance and childcare during trainings. • Introducing micro-loans, digital value chains, and private-sector engagement to mobilize green finance.
Strategic plan: Third national communication	2019	• Strengthening skills in weather forecasting and climate risk modelling, along with providing comprehensive	• Rolling out information services that encompass climate risk modelling software, alongside training for local personnel on its use.

[81] https://unfccc.int/documents/635430?utm

on climate change (TNCCC). [82]		agro-meteorological support. • Foster, encourage, and aid in the development of community-led adaptation strategies for agriculture and livestock to address climate change impacts. • Incorporating climate and environmental considerations into agricultural enhancement strategies, including the creation of risk assessments and emergency response measures.	• Establishing a knowledge management framework to facilitate access to, and the sharing of, information about adaptation practices, tools, and technologies among stakeholders. • Implementing intelligent farming practices and crafting disaster and drought response strategies to adjust agricultural and livestock practices to the realities of climate change. • Conducting climate risk evaluations and deploying adaptation practices, tools, and technologies, with subsequent adjustments to strategies and action plans as necessary.
Strategic plan: Nationally Determined Contributions (NDC)[83]	2021	• Adapting and Managing Climate Risks • Manage climate risks and predictions proactively through probabilistic assessments and predictive analysis, enabling pre-emptive action. • Safeguarding both water-based and terrestrial ecosystems. • Educate and empower communities to strengthen their resilience against the impacts of climate change. • Implement effective monitoring, evaluation, and knowledge-sharing systems for tracking and managing climate change impacts. • Advance the practice of climate-smart farming, incorporating weather and climate information into agricultural planning and decision-making.	• Adapting and Managing Climate Risks • Deployment of information services designed to analyse and predict disaster and drought risks, initiating proactive response strategies. • Utilization of apiculture as a method to prevent land degradation and preserve ecosystems. • Strengthening the capability of institutions and communities to enhance resilience against climate change, specifically within the agricultural sector. • Establishment of systems and tools for monitoring, evaluation, and the dissemination of knowledge regarding climate change impacts. • Implementation of climate-smart methodologies, including innovative tools and technologies, to boost crop production.
		• Capacity-building, knowledge management and communication. • Improve the mechanisms for managing, sharing, and distributing data and information. • Enhance the system for communication and exchange of information and data. • Strengthen the systems for monitoring climate change impacts through detailed observations and research.	• Capacity-building, knowledge management and communication. • Standardize and centralize the collection, management, and dissemination of weather data. • Centralize and standardize the communication of data and information, supported by comprehensive toolkits and information services. • Integrate monitoring and evaluation processes to systematically assess the effects of flood and drought incidents.
Strategic plan: Burundi national development plan NDP Burundi 2018-2027.[84]	2018	• Boosting Burundi's economy by improving overall national productivity. • Enhancing Burundi's economic strength through the generation of employment opportunities.	• Utilizing beekeeping practices to prevent soil erosion, thereby enhancing crop cultivation potential. • Adopting micro insurance and financial strategies to maximize agricultural yields. • Establishing connections with purchasers to boost sales and foster job creation. • Supporting market access and value addition through digital and physical infrastructure. • Integrating financial inclusion and risk protection mechanisms, especially for youth and women
Strategic plan: National	2018	• Sustainable and efficient use of natural resources, especially focusing	• Introducing innovative adaptation strategies, tools, and technologies (such as information services and

[82] https://unfccc.int/sites/default/files/resource/Burundi%20TNC%20executive%20summary.pdf
[83] Republic of Burundi (2018). Nationally Determined Contribution: http://www4.unfccc.int/ndcregistry/PublishedDocuments/Burundi%20First/CPDN%20BURUNDI.pdf
[84] https://www.presidence.gov.bi/wp-content/uploads/2018/08/PND-Burundi-2018-2027-Version-Finale.pdf

Agriculture Strategy 2018-2027.[85]		on land and water. • Strengthening resilience against climate change impacts. • Enhancing the capabilities of institutional and organizational frameworks.	micro insurance) to facilitate better access to natural resources and bolster resilience to risks posed by climate change. • Conducting capacity-building initiatives for both institutions and communities to foster climate change resilience, particularly within the agricultural sector. • Promoting innovative adaptation technologies like syntropic agroforestry, block chain-enabled traceability, and micro insurance. • Enhancing institutional and farmer capacity through training, toolkits, and cooperative development. • Implementing soil and water conservation practices, crop diversification, and resilient input supply systems.
Strategic plan: Technology Needs Assessment Adaptation.[86]	2016	• Agriculture and Livestock sector • Implementation of soil conservation systems. • Establishment of community-based early warning mechanisms.	• Productivity and food security by adopting agroecosystem management techniques focused on the conservation of soil, water catchments, and effective crop management. • Deployment of both physical devices and software solutions for weather monitoring.
Programme: Community Disaster Risk Management in Burundi	2012	• Establishment of early warning systems to alert communities about risks and vulnerabilities induced by climate change, including newly emerging threats. • Conducting assessments of risks to livelihoods and infrastructure with an analysis that specifically considers gender differences. • Policy measures are initiated based on forecasts of climate change, aiming for proactive adaptation.	• Launching information services that include systems for weather alerts to inform the public in a timely manner. • Development and application of a mechanism to assess adaptation benefits, enabling climate risk analysis and scoring. This mechanism helps in tailoring interventions to support groups most vulnerable to climate change impacts, including women and children. • Analysing the effects of climate change risks and designing appropriate adaptation strategies to be integrated into policies and planning documents.
Strategic plan: National Climate Change Strategy and Action Plan[87]	2012	• Incorporate strategies for mitigating disaster risks within sustainable development policies and planning processes. • Enhance the resilience to natural hazards by bolstering the infrastructure, systems, and capabilities of relevant institutions. • Ensure that considerations for minimizing risks are embedded within strategies for emergency response and recovery operations.	• Include innovative adaptation methods, tools, and technologies (such as block chain and insurance models) in strategic planning and policymaking. • Support the enhancement of institutional and community resilience against climate-related risks through comprehensive capacity-building initiatives, underpinned by financial support, insurance solutions, and practical toolkits. • Integrate insurance as a strategic approach within broader measures and practices aimed at reducing the impact of disasters in planning frameworks.
Strategic plan: National Strategy and Action Plan to Combat Soil Degradation 2011-2016.[88]	2011	• Enhancement of soil fertility and restoration of ecological balance in areas affected by degradation. • Strengthening the capabilities of both institutions and communities in effective soil management practices.	• Deployment of information services designed to aid in the management of soil health. • Adoption of climate-smart agricultural methods, such as agroforestry and beekeeping, to boost soil biomass. • Promotion of intelligent agricultural practices alongside capacity-building efforts to improve soil

[85] http://extwprlegs1.fao.org/docs/pdf/Bur190783.pdf
[86] https://unfccc.int/ttclear/misc_/StaticFiles/gnwoerk_static/TNA_key_doc/e2a748d4d7fb46a886411a2739cf72d7/eb976df133a34e74b758e3e22fd15490.pdf
[87] Nile Basin Initiative (2013): Climate Change Strategy. http://www.nilebasin.org/index.php/media-center/publications/doc_down- load/104-nbi-climate-change-strategy
[88] http://obpe.bi/images/pdf/Strategie_Degration_des_terres.pdf

			management techniques. • Establishment of a knowledge management framework that enables access to, and the sharing of, soil management information among stakeholder groups.

D. Cost-effectiveness of the proposed project

134. The cost-effectiveness of the proposed project is a pivotal aspect, demonstrating significant benefits over the current situation of no project intervention scenario. To understand this cost-effectiveness, it's crucial to consider both the direct and indirect costs of climate change impacts on Burundi and how the project's interventions aim to mitigate these costs effectively. The direct costs of climate change in Burundi include losses in agricultural productivity due to increased frequency of extreme weather events such as droughts and floods, leading to food insecurity and increased food prices. Without the project, these costs are ongoing and likely to increase as climate change impacts worsen. For instance, if we assume a conservative annual loss in agricultural productivity of 61%, given the agriculture sector's contribution to Burundi's GDP (around 40%), this translates to substantial economic losses each year.

135. **Component 1:** Integrating the economic rationale behind enhanced climate services with the specifics of Component 3, we find a comprehensive strategy aimed at fortifying agricultural resilience against climate variability through cost-effective measures. The introduction of block chain traceability, Warehouse Receipt System and index-based micro insurance as part of this strategy represents a pivot towards significantly more efficient risk management practices. By slashing operational and transaction costs by approximately 50-60%, this approach stands out as a markedly more accessible alternative to traditional indemnity insurance, particularly for the agricultural sector in Burundi. Highlighting the practical impacts, consider the deployment of index-based micro insurance to cover 24,000 farmers. This wide-reaching implementation not only facilitates the broad and efficient distribution of financial risk management tools but also ensures that the savings from lower premium costs extend the benefits of insurance to a broader segment of the farming community. The efficiency and cost-effectiveness of this component are underscored by the projection that a 25% reduction in annual crop loss, with each farmer potentially avoiding $500 per farmer in losses, would collectively prevent $12,000,000 in losses annually across the participating farmers. This estimation not only demonstrates the immediate financial benefits but also reflects the potential for substantial economic impact through the reduction of vulnerability to climate-induced crop failures. Furthermore, drawing on global and regional analyses, the justification for such an approach is bolstered by studies showing the immense return on investment from similar initiatives. For instance, investments in reliable weather forecasting in India reaped benefits 50 times the initial investment in just a year, with a projected increase in benefits over the following years. Closer to the project's context, in Burundi, farmers who adjusted their agricultural practices based on weather advisories witnessed up to a 53% increase in their annual income. These outcomes not only highlight the direct benefits of climate services and risk management tools but also underscore the broader implications for enhancing climate resilience among smallholder farmers. Considering the economic analyses of resilience-building activities and the demonstrated cost-effectiveness of NRM-related risk reduction measures, with benefit-to-cost ratios reported in various studies ranging from 2.3:1 to 13.2:1, the project's strategy reflects a prudent investment in climate resilience. Even with a conservative estimation of a 2.9:1 benefit-to-cost ratio, the value of institutionalizing index-based micro insurance in Burundi becomes evident. This initiative promises not only to mitigate against the transformational challenges faced by the agricultural sector and food systems due to climate change but also to do so in a manner that is economically viable and sustainable, ensuring that every dollar spent on resilience yields a multiplicative return in benefits ranging from avoided aid, crop and animal losses to broader development.

136. **Component 2:** This component focuses on EbA, it aims to integrate beekeeping with syntropic agroforestry practices, a strategy that is both cost-effective and sustainable for catch areas and land management. Syntropic agroforestry, by design, improves biodiversity, soil health, and crop yields, often enhancing yields by up to 15-30%. Beekeeping adds another layer of income with minimal additional land use in agroforestry; and 5 beehives, with an initial setup cost around $200 per farmer, can produce about 75kg of honey annually per

hive. Given global average honey prices, this could translate to an annual income of approximately $375 per hive. With over 60 percent of farmers involved, the cumulative increase in income, even at a conservative increase of 20% from both practices, significantly outweighs the initial investment, offering a robust return on investment and substantially improving livelihoods at a community level. The project will impact the amount of bare ground, areas covered in bush encroachment and invasive alien plants, and increase water infiltration, decrease human-wildlife conflicts relative to baselines collected for each village grazing area at the initiation of project activities at that site. The healthier ecosystems will be the basis of EbA model for Burundi.

The selected approach under Component 2 integrates ecosystem restoration techniques such as syntropic agroforestry, reforestation, and water harvesting, with community-based adaptation strategies, including the establishment of farmer cooperatives and farmer field schools. This holistic model, budgeted at USD 3.95 million, is designed to restore approximately 6,235 km² of degraded land and benefit over 300,000 vulnerable individuals in the target regions. An alternative scenario involving ecosystem restoration alone without community involvement would reduce the cost to approximately USD 3.0 million. However, this would also result in significantly reduced uptake and maintenance, as evidenced by FAO (2020)[89], which found a 30–40% lower success rate in land restoration efforts lacking local stewardship. Another scenario focusing solely on community training without restoration inputs estimated at USD 2.2 million, would deliver limited physical impact. IFAD (2019) highlights that fewer than 20% of trained farmers adopt new practices in the absence of tangible support or infrastructure. Therefore, the integrated approach maximizes ecological outcomes and local ownership, ensuring sustainability and long-term cost-effectiveness.

137. **Component 3:** The third component focuses on economic diversification and enhanced market access through the development of value-added products and improved market linkages. By training 24,000 farmers in processing and value addition, a modest increase in income of $2,316.29 per farmer annually due to these added values, the total income boost across 60 percent of the cohort would be $16,677,288 million each year. Additionally, certification (e.g., organic or fair trade) can command premium prices of 20-35%. If a quarter of the farmers achieve such premiums, the income elevation would not only recover the costs of certification but also significantly increase the farmers' earnings and market competitiveness. This component underscores a high potential for economic stability and growth with a strategic, relatively low-cost investment in training and certification facilitation.

138. Component 3 employs a value chain development strategy that includes product processing infrastructure, digital traceability tools (via block chain), and market linkage platforms. At a cost of USD 1.65 million, this model targets at least 75,000 smallholder farmers and is expected to increase their incomes by 30–45% through enhanced market access, price transparency, and certification. A lower-cost alternative, relying on traditional trade channels and aggregators, would require an investment of approximately USD 1.0 million but would leave farmers with limited control over pricing and market information conditions that perpetuate low income and exploitative dynamics (World Bank, 2021[90]). A second scenario focusing only on local processing infrastructure without digital traceability would cost around USD 1.2 million, offering some immediate value addition but failing to provide traceable, climate-resilient supply chains for export or premium domestic markets. The proposed integrated model ensures both short- and long-term economic resilience while laying the groundwork for replicable, data-driven agricultural transformation.

139. **Component 4:** This component emphasizes the development and adoption of supportive policy frameworks and governance mechanisms, which, while not easily quantifiable in direct financial terms, offer long-term cost savings and benefits. Effective water management policies, for instance, can lead to a 20-30% increase in water use efficiency, indirectly improving agricultural productivity and reducing costs associated with farming. Engaging 24,000 farmers in policy advocacy ensures that policies are grounded in the realities of those most affected by climate change, facilitating sustainable agricultural practices and climate adaptation at a relatively low cost when spread across the benefits to a large farming community. The estimated 500 individuals who

[89] FAO. (2020). The State of the World's Forests: Forests, biodiversity and people. Rome.

[90] World Bank. (2021). Unlocking Markets for Agricultural Value Chains in Africa: The Role of Digital Platforms. Washington, D.C.

receive professional development as TOT will have permanently improved adaptive capacity as a result of these newly acquired skills that are in high demand. Improved management of 361,710 hectares (table 1) and unlocking of markets will build livelihood resilience through enhanced provision of fodder and income generation. Through improvements to the rural economy and ecosystem services, especially during extreme climate events, an additional 53% of the population within the target areas are also likely to benefit from enhanced economic resilience of the farming community to drought.

140. The project's approach to Component 4 combines participatory policy development with a community-driven knowledge management system to build institutional and grassroots adaptive capacity. At a cost of USD 700,000, the initiative supports the development and formal adoption of six commune-level adaptation strategies and establishes 12 communal knowledge hubs. It also includes a Trainer-of-Trainers program to build a network of 240 grassroots facilitators who will champion behaviour change and local learning. By contrast, a knowledge only dissemination model, estimated at USD 500,000, would likely fail to embed adaptation practices into local governance structures, risking a disconnect between awareness and action (UNDP, 2020[91]). Alternatively, a top-down policy drafting model with limited community engagement, budgeted at USD 600,000 would suffer from low ownership and poor policy enforcement, as seen in prior GCF-funded projects (GCF, 2021[92]). The integrated model not only ensures institutional uptake but also supports ongoing, community-informed refinement of adaptation actions, delivering a high return on investment in terms of sustainability and replication.

141. The Project will decrease loss of economic assets, diversify livelihoods, and improve income generation opportunities thereby directly increasing the adaptive capacity of 143,040 individuals in Burundi's most vulnerable farming economies. These direct beneficiaries represent ~83.7% of the population in the target regions. Most of the targeted households fall below the national poverty line and the global poverty line of <$1.9 per day. Given the dependence of local economies on agriculture-related income, as well as improved facilitation of national mitigation and adaptation policies the project will deliver indirect resilience benefits to the national population of ~ 1.1 million individuals. Finally, this project approach is to roll-out a technology system using real, priority trade opportunities in one sub region. If the results are as successful as expected, the harmonization of such a technology system will be more cost effective than the current approach, which has not only each province in Burundi using different approaches, but all of their trading partners using different approaches for decisions regarding risk management as well. The possibility of using an equivalent risk management plan for a honey contaminant could save significant resources when the option given by a trading partner does not fit with the realities of the exporting country. There is confidence in the block chain traceability and insurance system, so that enhanced confidence will facilitate improved application of an international approach. It has been demonstrated that use of harmonized approaches or rules can reduce costs to all parties involved in trade. The results framework tracks both physical and livelihood adaptation gains, including reduced erosion, improved water retention, lower post-harvest loss, expanded climate-resilient storage and demonstration infrastructure, broader reach to 24,000 direct beneficiaries, and faster household recovery support through climate-risk finance and insurance-linked services

E. Alignment with national technical standards

142. The project complies with all key national technical standards applicable to agriculture, environment, insurance, water, and cooperative management, including the Environmental Impact Assessment Law (2010), Forest Law (2016), Water Code (2012), Land Law (2011), and the Environmental Code (amended 2021). Sector-specific standards are respected through tailored compliance measures such as EIAs, water permits, agroforestry zoning, and biodiversity safeguards.

In addition to these, the project also complies with other relevant national regulatory frameworks that apply to

[91] UNDP. (2020). Strengthening Climate Governance in Fragile States. New York.

[92] GCF. (2021). Lessons Learned from Adaptation Projects in Africa. Green Climate Fund Evaluation Synthesis Report.

emerging technologies and digital financial services. These include:

- *The **Insurance Law (2008, amended 2018)** for licensing, product design, and consumer protection in relation to parametric insurance.*
- *The **Financial Services Law (2017)**, which governs digital finance and mandates consumer data protection protocols applicable to the block chain traceability and mobile payment system.*
- *The **Information and Communication Technology Law (2013)**, which regulates data privacy, cybersecurity, digital identity verification, and electronic transactions; all relevant to the project's use of block chain and mobile applications for traceability and climate services.*

143. No additional national technical standards currently exist in Burundi that regulate block chain platforms or cross-border technology solutions; however, the project will proactively engage with relevant regulators (e.g. Insurance Regulatory Authority) to ensure adaptive compliance and policy alignment as the legal framework evolves.

144. The project will adhere to Burundi's national technical standards, as outlined in its laws and regulations. The national procedure for Environmental Impact Assessments (EIAs) mandates that the project's bearer confirm the need for an EIA with the competent authority (OBPE). Since OBPE is the project's bearer, there's no risk of non-compliance with the national procedure for EIAs. Considering none of the planned works under the project are of "complex" nature, EIAs are not anticipated to be required. However, OBPE will systematically conduct Environmental Impact Assessments for all works during the project's implementation. Additionally, where necessary, OBPE will ensure that adequate Environmental Conditions are maintained and obtain Environmental No-Objections. The project has been meticulously designed to minimize any negative environmental impact. The project will respect and adhere to Burundi's national laws and the Government of Burundi (GoB) in particular with the following laws:

Table 7:Regulatory Framework Summary

Framework	Scope & Relevance to Project
Environmental Impact Assessment Law 2010, No. 100/22	Governs the requirement for EIAs for rural development projects with potential environmental impacts. Directly relevant to agroforestry, land restoration, and community demonstration activities under Component 2, ensuring that adaptation interventions are environmentally sound. OBPE as the competent national authority and an Executing Entity will screen all physical works, systematically conduct EIAs during implementation, and obtain the required environmental clearances and no-objections before works begin.
Forest Law 2016, No. 1/07	Regulates forest use, biodiversity conservation, and sustainable forest management. Key to syntropic agroforestry and beekeeping interventions, especially where forest or buffer zones are used, ensuring biodiversity protection and legal forest access. The project will obtain the required authorizations for any activity in forest or buffer zones, use approved native and bee-friendly species, and apply biodiversity safeguards in site selection and management.
Environmental Code 2000, No. 1/010 (Amended 2021)	Provides the overarching environmental management framework, promoting pollution prevention, soil conservation, and sustainable resource use. Applicable to all components, particularly in ensuring environmentally responsible implementation and community compliance. Project's soil conservation and pollution-prevention measures are embedded in all field activities and will be monitored through the project's environmental and social management plan and annual safeguards reporting.
Water Code 2012, No. 1/02	Regulates water access, use, and protection of hydrological systems. Essential for activities involving irrigation, rainwater harvesting, and watershed restoration under Components 1 and 2, to ensure sustainable water use in agriculture and infrastructure. The project will secure water-use permits for all water harvesting and retention structures and design them to national norms in consultation with the competent water authorities.
Insurance Law 2008, No. 1/05 (Amended 2018)	Sets legal standards for insurance product development and consumer protection. Critical for the introduction of parametric insurance products under Component 1, ensuring they meet regulatory standards and are accessible to vulnerable populations. Parametric insurance products will be developed with licensed insurers, submitted to the Insurance Regulatory Authority for approval, and designed to meet the Law's consumer-protection requirements.
Financial Services Law 2017, No. 1/12	Governs digital finance and financial consumer protection. Applies to Component 1's block chain traceability and microfinance access systems, ensuring compliance with digital

	finance laws and user safety. Mobile-payment and platform services will operate through licensed financial-service providers, applying the mandated consumer data-protection protocols to all digital transactions.
ICT Law 2013, No. 1/08	Regulates electronic transactions, data security, and technology services. Directly supports the secure deployment of digital platforms (Component 1) and mobile-based knowledge hubs (Component 4), ensuring safe, legal use of technology in rural areas. The block chain and mobile applications will be built to meet the Law's data-privacy, cybersecurity, digital-identity, and electronic-transaction requirements, verified before deployment.
Cooperative Law 2011, No. 1/13	Provides governance rules for cooperatives and their economic participation. Integral to Component 3 for ensuring legal formation and operation of 24 rural farmer cooperatives, which are central to value chain integration and economic resilience. The 24 farmer cooperatives will be legally registered and governed in accordance with the Law, with capacity-building provided on statutory governance obligations.
Quality Standards and Metrology Law 2020, No. 1/15	Establishes certification and product quality standards. Directly relevant to Component 3, ensuring honey and agricultural products meet safety and export standards for domestic and international markets. Product certification and quality assurance under Component 3 will be undertaken with the Burundi Bureau of Standards and Quality Control (BBN) to meet national certification and metrology requirements.
Land Law 2011, No. 1/13	Governs secure land tenure, usage rights, and dispute resolution. Critical for ensuring long-term land access for demonstration sites and agroforestry under Component 2, and supporting women's land rights and climate-resilient land practices. Demonstration and agroforestry sites will be established only on land with documented tenure or formal community land-use agreements, with specific attention to women's land rights.

F. Project duplication with other funding sources

145. In Burundi, the introduction of index-based micro insurance, Warehouse Receipt System and Syntropic agroforestry for smallholder farmers is a novel initiative. Currently, there's neither agricultural insurance nor Warehouse Receipt System in the country, so this move ensures there won't be any overlap with existing financial support mechanisms. To implement this insurance model at a broader level, a cohesive approach is being adopted to bolster rural resilience. This strategy involves effectively collaborating and enhancing ongoing and upcoming projects within the target areas. The goal is to augment and fortify the initiatives of the Government of Burundi and its developmental allies, thereby enhancing the project's effectiveness and longevity, as well as the initiatives it supports.
146. A comprehensive assessment has been conducted to evaluate the various projects currently underway, completed, or in the planning stages in Burundi. The focus is on their potential to either complement or overlap with this initiative. Extensive consultations with stakeholders were conducted to prevent any redundancy in efforts, resource allocation, or coverage areas. The intention is to ensure that this project aligns seamlessly with existing and prospective initiatives.
147. The review involved a variety of programs facilitated by international entities such as the World Bank, the Adaptation Fund (AF), the Global Environment Facility (GEF), the Green Climate Fund (GCF), the Global Center of Adaptation (GCA), and the African Development Bank (AfDB).

Table 8: Ongoing and planned initiatives related to Agriculture and Restoration in Burundi

Project	Objective(s)	Scope	No Duplication/alignment
Community Disaster Risk Management in Burundi.[93] *Approved 2014* ***Funder: GEF***	Enhance the abilities of local communities in Bugesera, Mumirwa, and Imbo Lowlands to prepare for and respond to climate disaster risks. This approach aims to secure sustainable	Deliverables • Establishment of a functional Community-Based Early Warning system capable of engaging with and reaching target communities for the prevention of climate change disaster risks and to guide adaptation activities. • Training for communal services, relevant ministry support services, and Provincial disaster risk platforms in the use of climate risk management tools for long-term planning, considering climate	No Duplication • Focuses on agroforestry and beekeeping, not solely on disaster risk management. • Emphasizes economic diversification through market access, unlike emergency preparedness. • Utilizes block chain for traceability and insurance, different from early warning systems. • Promotes policy advocacy and governance for climate adaptation, beyond emergency responses.

[93] https://www.thegef.org/projects-operations/projects/4990

	emergency preparedness and reconstruction efforts in these regions over the long term.	change variability and projections. • Investments in appropriate early warning systems and adaptation technologies to safeguard infrastructure and local livelihoods against the impacts of climate change. Regions: Kirundo, Bujumbura Rural, Bururi and Makamba	Alignment • Enhance community resilience to climate variability and impacts. • Utilizes climate information and risk management, aligning with early warning system objectives.
Lessons	• Community ownership critical for sustainability - integrated into all project components • Gender-sensitive approaches increase participation - 57% women target established • Traditional leaders' buy-in essential - community champions program developed • Technology adoption requires extensive training - comprehensive capacity building planned • Coordination with local government prevents conflicts - formal partnerships established		
Natural Landscapes Rehabilitation and Climate Change Adaptation in the Region of Mumirwa in Bujumbura and Mayor of Bujumbura through a Farmer Field School Approach[94] *Approved 2019* ***Funder : AF***	Tackle the fundamental reasons behind landscape degradation, which stem from climate change and unsustainable land practices, by restoring degraded land. Implement integrated farming and natural systems that are adapted to climate change.	Deliverables • Provision of training to enhance skills in identifying, prioritizing, implementing, monitoring, and evaluating adaptation strategies and measures. • Completion and regular updates of risk and vulnerability assessments along with pertinent technical evaluations. • Establishment of institutional frameworks to oversee, coordinate, and facilitate the integration of climate change adaptation (CCA) into applicable policies, plans, and related procedures. • Identification and improvement of the type and extent of assets to increase resilience against climate change impacts. • Expansion of the number of individuals or geographic areas that have access to enhanced climate information services. Regions: Region of Mumirwa in Bujumbura Mairie and in the Lake Tanganyika coastal area.	No Duplication • Focuses on enhancing agricultural productivity through beekeeping and agroforestry. • Leverages block chain technology for traceability and insurance, distinct from Farmer Field School approach. • Strengthens economic diversification and market access, not just landscape rehabilitation. • Develops climate-responsive policy advocacy, extending beyond landscape and farming practices. Alignment • Utilizes training and capacity building, aligning with skills enhancement in adaptation strategies. • Employs climate information and risk management, supporting enhanced climate information services access. • Advocates for the integration of climate change adaptation into policies, aligning with institutional framework goals.
Lessons	• Farmer Field Schools effective for peer learning - demonstration sites approach adopted • Vulnerability assessments must be participatory - community consultations prioritized • Policy integration requires early government engagement - Component 4 designed accordingly • Technical packages must be locally adapted - agro-ecological zone customization planned - Institutional capacity varies by region - differentiated capacity building designed • Climate information needs simple formats - mobile apps with visual interfaces planned		
Burundi Landscape Restoration Project[95] *Approved 2016* ***Funder:* World Bank**	Restore degraded landscapes by community members in two priority regions, and in the event of an eligible crisis or emergency, to provide immediate and effective response to said eligible crisis or emergency.	Deliverables • Empowerment of traditional and local institutions to play a more significant role in the restoration of landscapes. • Improved accessibility to advanced climate information and early-warning systems for better preparedness and response. • Allocation of resources towards the rehabilitation of degraded lands and the promotion of ecosystem-based approaches to adaptation. Region:(North-West region) Bubanza, Kayanza, Bujumbura Rural, (East region)	No Duplication • Introduces integrated beekeeping with agroforestry, not just land restoration. • Promotes block chain for insurance and traceability, unique from early-warning systems focus. • Concentrates on economic diversification and market access, beyond emergency response. Alignment • Utilizes climate information for risk management, aligning with early-warning systems enhancement. • Supports the empowerment of local

[94] https://www.thegef.org/projects-operations/projects/8010
[95] https://documents1.worldbank.org/curated/en/408471487004538339/pdf/ITM00184-P160613-02-13-2017-1487004534488.pdf

		Cankuzo, Ruyigi and Muyinga Province	communities and institutions in climate adaptation efforts.
Lessons	• Traditional institutions key to project acceptance - elder involvement in design process • Land restoration requires economic incentives - honey/agroforestry income streams included • Emergency response capacity needed - risk management protocols developed • Restoration success depends on species selection - native/climate-resilient varieties prioritized • Community competition can undermine cooperation - cooperative formation approach adopted • Monitoring systems must be participatory - community-based monitoring included		
Climate proofing food production investments in Imbo and Moso basins in the Republic of Burundi.[96] *Approved 2020* ***Funder:*** **GCF**	Revitalise agro-ecological practices in Imbo and Moso catchments for sustainability and enhancing farmer resilience through better management of soil and water to improve productivity and food security.	Deliverables • Collaborate with farmers to create and enact landscape management strategies focused on soil and water conservation techniques. • Facilitate capacity building and the establishment of water harvesting infrastructures to optimize water use. • Enhance post-harvest processes through support and innovation, aiming to reduce losses and increase efficiency. Conduct training sessions for farmers on advanced soil and water conservation methods to improve agricultural sustainability. Regions: Imbo and Moso basins	No Duplication • Focuses on apiculture and agroforestry integration, distinct from soil and water management. • Implements block chain for traceability and insurance, not covered in water use optimization. Aims at market access and economic diversification, broader than post-harvest process enhancement. Alignment • Enhances agricultural productivity and ecosystem health, complementing soil and water conservation. • Employs climate information for risk management, supporting water use optimization efforts. Advocates for sustainable land management practices, aligning with advanced conservation training goals.
Lessons	• Post-harvest losses major constraint - warehouse receipt system designed to address this • Water management requires community agreements - cooperative governance structures included • Technical training needs practical demonstration - hands-on training approach adopted • Infrastructure maintenance challenging without ownership - community ownership models developed • Soil conservation requires immediate economic benefits - beekeeping provides quick returns • Gender roles in water management must be considered - women's participation in water management training		
Scaling up Climate Resilience Solutions for Burundian Smallholders (SAP045)[^84] *Approved 2023* **Funder: GCF**	Strengthen climate resilience through scaled climate-smart agriculture, sustainable land management, and enhanced access to climate information and financial services.	Deliverables • Climate-smart agriculture scaling across 8 provinces • Climate information services and early warning • Climate-resilient crop value chains • Climate micro finance and loan products • Landscape restoration through sustainable land management Regions: Cankuzo, Rutana, Ruyigi, Makamba, Bururi, Gitega, Muyinga, Kirundo	• Strong Complementarity • Geographic overlap with innovation layering • Technology integration opportunities • Value chain enhancement synergies • Insurance product complementarity • Coordination mechanisms planned
Lessons	• Scaling requires proven baseline technologies - block chain builds on established practices • Multi-provincial coordination complex - streamlined governance structure adopted • Insurance uptake depends on trust - gradual introduction strategy designed • Value chain strengthening needs market linkages - international market focus included • Farmer training saturation limits - complementary rather than competing approaches needed • Climate information services require integration - mobile platforms designed for interoperability • Financial service adoption gradual - patient capital approach for parametric insurance • Institutional capacity building takes time - realistic timelines and expectations set		

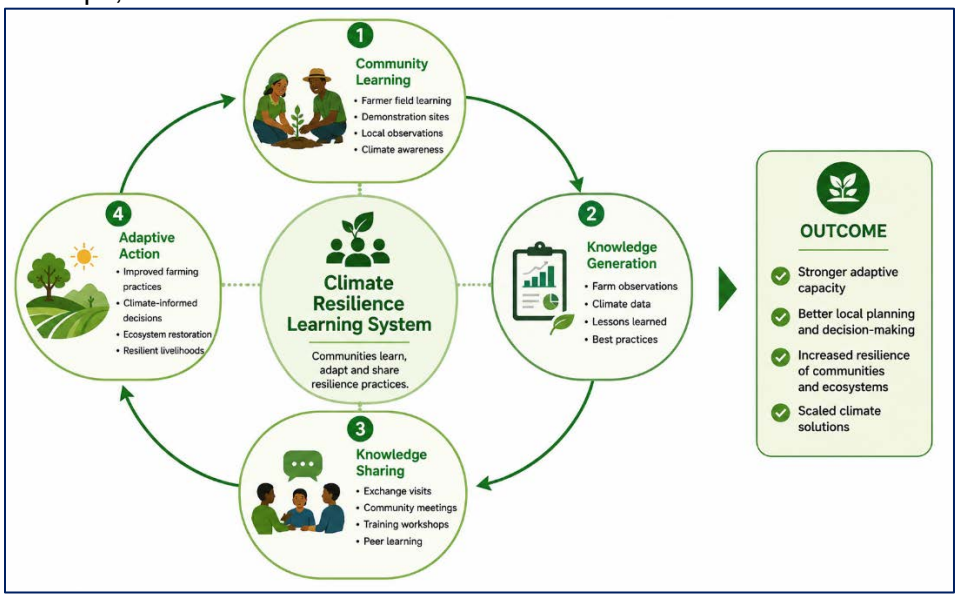
[96] https://www.greenclimate.fund/sites/default/files/document/sap017-ifad-burundi.pdf

G. Learning and Knowledge management

148. Learning and knowledge management (component 4) is crucial in capturing, disseminating, and leveraging insights gained throughout the implementation of the project. Thus, the primary focus is on building resilience and enhancing adaptive capacities within the communities to address climate change threats which is hence included in the project framework. This will consist of a combination of "learning-by-doing" and "learning-by-observation" methods. In this context, farmers, local experts from the Ministry of Agriculture & Environment and local advisory teams work together to understand and implement appropriate land use practices and farm management practices that are adapted to climate change and climate variability and that, in general, improve and secure agricultural productivity and forest resource management. The "learning by observation" component refers to guided visits to the demonstration fields by farmers from the project area and from outside the project area, totalling 24,000 farmers.

149. This combined approach of learning and knowledge exchange will be enriched by learning from the best practical experiences of leading agricultural institutions in countries with similar conditions to rain fed through different activities (training of professionals, technical visits of farmers, and others). The project will ensure a sound knowledge dissemination practice by following the principles for knowledge strategy, which cover 4 basic areas: i) Policy and Program; ii) People; iii) Technology; and iv) Implementation and Support. The scope of support activities associated with the Knowledge Strategy may include coordination, provision of an enabling environment, specific services to technical programs, and direct services to beneficiaries. There will be a communication plan that comprises of:

a) Communication to raise awareness of the projects' activities in order to facilitate its implementation. Since the collaboration of farmers will be fundamental for the success of the project.
b) Communication to raise awareness of the results achieved by the project, covering inception of the project, human interest stories, success stories, tracking improvements events, milestones, meetings, trainings, workshops, etc.



150. The practical support and implementation aspect of the project will be carried out in dialogue with the work on indicator development and on-farm observation. Farmers who are involved in supporting measurements on farms will also evaluate practices implemented in their fields in both quantitative and qualitative way, alongside stakeholders. In each project location the project will apply the methodology of transformation labs (T-Labs), a type of 'living lab' approach to place-based, collaborative and participatory analysis and innovation in conjunction with local communities and stakeholders. A T-Lab is a space for: facilitated, collective learning about the nature of a problem or challenge; learning about different kinds of possible solutions, or pathways of possible change; helping to create a collective sense of the need for change – within and beyond the stakeholders directly involved; developing strategies for affecting change; identifying which actors have

transformative potential[97]. For this project, T-Labs will be connected to stakeholder panels and the field networks in each site. The T-Labs will be used to operationalize a participatory and collaborative, transdisciplinary approach. A university of Burundi PhD student will work on the T-Labs across components in a doctoral study investigating sustainability transformations. The project will engage with a broad range of actors to investigate and analyze diverse understandings of agroecology/agroclimatic. To understand the interactions of the biophysical aspects of the farm sites with their socioeconomic resilience, we will use the whole-farm FarmDESIGN bio-economic model that can reveal and explore livelihood and environmental impacts, synergies, and trade-offs at the household level.

151. Though crop, agriculture and resilience data will largely be collected by different individuals within sites, to create manageable workloads, the individuals will work in collaboration, and the collected observed data will be integrated when initializing and evaluating the FarmDESIGN model. The data inputs required for running the model include: (i) biophysical environment characteristics (e.g., soil data that will be measured at farm level, and climate characteristics); (ii) socio-economic factors (e.g., labor price for farm management and input costs for production, which will be captured in our household surveys); (iii) crops and crop products yield, composition, and use (data which will be captured from a mixture of farm level modelling outputs, observations, and household surveys) (iv) agriculture and agriculture products yield, composition and use (captured from household surveys and agriculture observations); (v) mineral fertilizer use (captured from household surveys and observations); (vi) household members and labor availability (captured from household surveys). For the knowledge generation, learning and dissemination strategy, the following constrains, and proposed actions will be taken into account:

Constraints / Baseline Situation	Proposed Activities
• **Limited information on climate vulnerability at local level, and/or lack of conceptual interpretation** • **Lack of consideration of CC adaptation measures in community development plans** • **Limited local knowledge on successful concrete adaptation interventions** • **Limited exchange of knowledge between Siwa and other regions** • **CC Adaptation as a relatively novel concept in the region**	• Conduct local rapid vulnerability analyses, document and share findings and methodologies • Awareness raising and capacity building activities, • Documentation of best practices, challenges, lessons learned and dissemination to stakeholders at all levels • Exchange visits in and between regions, attendance and participation in international conferences to share experiences.

H. Consultative process

152. Development of this project originated from the urgent needs of local communities to address the environmental, social, and economic challenges faced, driven by climate change and unsustainable practices in managing natural resources. It involved a deeply consultative process that embraced a participatory approach to ensure the integration of diverse perspectives, particularly focusing on vulnerable groups and gender considerations. This process strictly adhered to the Environmental and Social Policy of the Adaptation Fund and was meticulously designed to gather comprehensive insights from various stakeholders at national, community, and individual levels. Summary outcomes are drawn from the consultation records presented in Annex 2. Various engagement activities and stakeholder workshops were undertaken to gather information as presented in Table 9 below, including consultation dates, summary outcomes, and how these inputs were incorporated into the concept note development:

Table 9: Summary of consultation events, key discussion outcomes, and incorporation into concept note development

Dates	Consultations	Summary outcomes of discussion	How incorporated into concept note

[97] Pereira et al. 2022. "Transdisciplinary Methods and T-Labs as Transformative Spaces for Innovation in Social-Ecological Systems." In Transformative Pathways to Sustainability: Learning Across Disciplines, Cultures and Contexts

March 2021 – June 2024	**National-Level Stakeholder Consultation Workshops**	Confirmed drought, floods, pest outbreaks, land degradation, and limited access to climate-risk finance as priority constraints for smallholder farmers. Stakeholders emphasized practical adaptation measures, improved climate information services, affordable financial protection, ecosystem restoration, and stronger institutional coordination.	Reflected in the problem statement, adaptation rationale, and overall design of the four components, particularly Component 1 (climate-risk management and financial protection), Component 2 (ecosystem-based adaptation and sustainable land management), and Component 4 (policy support, knowledge management, and coordination). Inputs also informed the analysis of complementarity and non-duplication.
December 2022 – January 2023	**Focused Validation Workshop**	Validated the proposed outcomes and outputs and highlighted the need for stronger coherence between climate-risk reduction, ecosystem restoration, livelihood resilience, and market access. Participants also emphasized inclusiveness and responsiveness to the needs of women, youth, and other vulnerable groups.	Reflected in the refinement of the project's outputs, outcome logic, and component sequencing, including stronger linkages between resilience, livelihoods, and institutional support.
October 2024	**Bilateral and Community Consultations**	Highlighted the need to avoid duplication, strengthen coordination with ongoing programmes, improve implementation realism, and ensure accessibility of financial and technical solutions for vulnerable farmers. Stakeholders also stressed the importance of linking climate-risk management, ecosystem restoration, and livelihood support.	Reflected in the sections on project complementarity, institutional arrangements, implementation roles, and the design of financial and technical support measures.
October 2024	**Targeted focus group discussions using FPIC protocols with Batwa (Rutana and Bururi), Hutu-kofero pastoralists (Muyinga), and Banyamulenge agro-pastoralists (Cibitoke)**	Raised concerns regarding secure land-use rights for apiaries and agroforestry plots, culturally appropriate extension methods, equitable access to warehouse-receipt finance, recognition of customary forest-product rights, and representation in governance structures.	Reflected through integration of communal forest parcels into land-use planning, adaptation of extension materials to oral and visual formats, recognition of customary rights in collaboration with relevant authorities, and inclusion of indigenous/ethnic minority representation in governance and grievance arrangements.
6–20 November 2022	**Bilateral and Government Consultations**	Confirmed the project's early strategic orientation around agricultural adaptation priorities, including the need to combine resilience-building investments with practical support for vulnerable communities. Helped shape the early financing logic and strategic alignment of the concept.	Reflected in the initial framing of the project concept, including alignment with adaptation priorities, climate-finance logic, and the focus on strengthening resilience of smallholder farmers.

30 November–13 December 2023	**Bilateral and Government Consultations**	Helped refine project positioning, partnership opportunities, and alignment with climate-finance expectations.	Reflected in the refinement of partnership roles, institutional arrangements, and the project's broader climate-finance positioning.
11–22 November 2024	**Bilateral and Government Consultations**	Further validated the need for a coherent adaptation rationale, practical implementation arrangements, and consistency between the technical approach, institutional structure, and financing logic.	Reflected in the strengthening of the project's adaptation rationale, implementation approach, and overall internal coherence, including refinement of component linkages and financing logic.
October 2024	**Community Consultation Meetings**	Identified heavy rainfall, drought, erosion, pest outbreaks, declining soil fertility, weak market access, and limited access to finance as key challenges. Communities emphasized the need for practical field-level support, resilient production systems, ecosystem restoration, demonstration-based learning, and livelihood options that can withstand climate shocks.	Reflected in the targeting rationale, beneficiary needs analysis, and design of field-level interventions under Component 2 and Component 3, including demonstration sites, soil and water conservation, beekeeping/agroforestry support, livelihood diversification, and inclusive training and capacity-building measures.

153. A total of 71 individuals participated in national and bilateral consultations, with a deliberate effort to ensure female representation. The community consultations engaged 320 participants, including women and men from various socio-economic backgrounds to reflect diverse perspectives. Thus, the consultative process prioritized inclusivity and gender sensitivity at every stage. Special attention was given to the needs and challenges faced by women and youth, recognizing them as particularly vulnerable groups. Gender-focused discussions and a gender assessment were conducted to tailor the project's strategies to support these groups effectively. The project aims to achieve a gender balance of more women than men (57:43), particularly targeting female-headed households.

154. Dedicated focus-group discussions (FGDs) were specifically organized with three self-identified indigenous and ethnic minority groups; Batwa (Rutana & Bururi Provinces), Hutu-kofero pastoralists (Muyinga), and Banyamulenge agro-pastoralists (Cibitoke**)** in October 2024, using Free, Prior and Informed Consent (FPIC) protocols. These groups raised particular concerns regarding *(i)* secure land-use rights for apiaries and fuel-wood plantations; *(ii)* culturally appropriate extension methods (visual and oral materials); *(iii)* equitable access to warehouse-receipt finance; *(iv)* recognition of customary forest-product rights; and *(v)* direct representation in cooperative governance structures. In response, the project incorporated communal forest parcels explicitly managed by Batwa into land-tenure mapping, adapted extension materials to oral formats, formally recognized customary forest-product rights in collaboration with the Ministry of Environment and included an indigenous elders' panel in the Grievance Redress Mechanism. General consultations conducted in all project locations inherently included extensive participation of the rest of indigenous groups ethnic groups (Hutu and Tutsi), whose inputs informed all aspects of project design, governance structures, and intervention strategies as described comprehensively in Table 10.

155. Phase 1: Initial Gender Assessment (Completed - March-April 2025) An initial rapid gender assessment was conducted in 4 target communes using desk review, key informant interviews, and focus group discussions with 120 participants (65% women). This assessment provided foundational understanding of gender roles in agricultural activities and decision-making, women's access to resources, credit, and markets, barriers to female participation in cooperative structures, and preliminary gender-responsive intervention strategies. The results are summarized in Annex 4 and informed the CN design. Phase 2: Comprehensive GAAP Development

(PFG Phase - USD 8,500) The PFG allocation supports expansion from initial assessment to comprehensive Gender Analysis and Action Plan through: geographic expansion validation (USD 3,600) extending analysis from 4 to 12 target communes across all 6 provinces to validate initial findings across diverse cultural contexts and ensure representative participation from marginalized groups not reached initially; participatory enhancement (USD 2,400) employing community-based participatory research methods following UN Women guidelines, engaging male community leaders and traditional authorities for buy-in, and documenting indigenous knowledge and gender-specific adaptation practices; and implementation planning (USD 2,500) developing province-specific action plans reflecting local contexts, creating detailed implementation guidelines with gender-responsive indicators, and establishing community-based monitoring frameworks. This phased approach follows UNFCCC Gender Policy and Adaptation Fund Gender Policy requirements for iterative gender analysis, where initial assessments inform project design, followed by participatory validation and detailed implementation planning during formulation phases. The initial assessment provided sufficient information for concept development, while the PFG phase enables the comprehensive, participatory GAAP required for successful implementation. This represents enhancement and validation rather than duplication of gender analysis work.

156. The consultations revealed critical climate risks faced by smallholder farmers in Burundi, such as heavy rainfall, drought, and pest outbreaks. The engagement process uncovered vulnerabilities in the agricultural sector and the specific adaptation needs of the community. It underscored the importance of affordable insurance solutions and climate-resilient agricultural practices. This comprehensive consultative process, characterized by its participatory approach and focus on vulnerable groups, significantly shaped the Concept Note. It ensures that the project aligns with the priorities and needs of the Burundi community, addressing key climate risks and leveraging opportunities to enhance the resilience of smallholder farmers through innovative insurance solutions and supportive services. The project's design reflects a collective vision for a climate-resilient future, informed by diverse stakeholder perspectives and grounded in inclusivity and gender sensitivity. Additional consultations, as outlined in Annex 2 and an in-depth Evaluation of Crop Viability in Relation to Climate Risks, will be conducted during the FP.

I. Justification of funding request

157. To ensure the long-term sustainability and resilience of Burundi's agricultural sector amidst the challenges of climate change, the requested funding is crucial. This strategic investment is allocated across four key components, each meticulously designed to address the current vulnerabilities faced by smallholder farmers. By enhancing their adaptive capacities and promoting sustainable agricultural practices and economic stability. These components aim to mitigate the impacts of climate change and foster resilience. The justification for this funding is based on the explicit baseline scenarios and the significant added value each component brings with the AF project/intervention, as detailed below. With the resources requested from the Adaptation Fund, the proposal will be able to effectively deliver on its proposed objectives:

	Baseline Scenario	With AF Project/Intervention
Component 1	Access to reliable and actionable climate information is severely lacking in Burundi, leaving farmers ill-equipped to anticipate and effectively respond to climate-induced risks. The current agricultural decision-making process is hindered by the absence of precise and localized climate forecasts, resulting in sub-optimal planting, harvesting, and risk management strategies. Additionally, the unavailability of affordable and accessible insurance products means that smallholder farmers bear the full brunt of climate-related losses, pushing them into cycles of poverty and debt. The lack of a robust risk management framework, including innovative insurance solutions and traceability systems, significantly impedes the ability of farmers to safeguard their livelihoods against the increasing frequency and severity of climate risks[98].	The introduction of block chain technology for traceability and the development of parametric insurance products is a cutting-edge solution that places Burundi's smallholder farmers at the forefront of climate-smart agriculture. This technological leap will revolutionize the way farmers access and utilize climate information, offering a transparent, efficient, and secure method to track agricultural products from farm to market. Parametric insurance, simplified and made accessible through block chain, promises rapid compensation for weather-related losses, thus providing a safety net that enables farmers to recover quickly from climate shocks. The real-time climate information accessed via mobile applications empowers farmers to make informed decisions, enhancing their preparedness and adaptive capacity to climate variability. Expected to benefit over 24,000 farmers, this component aims to mitigate the climate risks that threaten agricultural productivity and food security, fostering a more resilient agricultural sector.
Component 2	Burundi's agriculture faces significant ecological challenges, including soil erosion, loss of biodiversity, and water scarcity, exacerbated by conventional farming practices that fail to mitigate these issues. Smallholder farmers, constituting the majority of the agricultural workforce, primarily depend on rain-fed agriculture, rendering them highly vulnerable to the erratic and changing climate patterns. Soil degradation due to over cultivation and deforestation for agricultural expansion has led to decreased soil fertility and water retention capacity, further reducing agricultural productivity and biodiversity. This ecological decline not only threatens food security but also undermines the livelihoods of rural communities, making it imperative to transition towards more sustainable and climate-resilient farming practices[99].	The funding earmarked for this component is a game-changer for smallholder farmers, introducing them to the synergistic practices of syntropic agroforestry and apiculture. These practices are not just agricultural innovations but are pillars for ecological restoration and climate adaptation. Training and resources provided will not only uplift agricultural productivity by leveraging biodiversity (specifically pollinators & food forestry) to enhance crop yields but also stabilize and enrich the soil, reducing erosion significantly. The anticipated 30% reduction in soil erosion will directly translate to improved water quality and retention in the soil, enhancing drought resilience. By incorporating food forestry and beekeeping, farmers will open new revenue streams from honey, food forest products and other bee products, enriching their livelihoods while contributing to ecosystem health. This comprehensive approach is expected to directly benefit over 24,000 farmers, substantially increasing their income through higher crop yields and diversified income sources, thereby improving their economic stability and resilience to climate variability.
Component 3	Smallholder farmers in Burundi currently face a critical lack of access to markets and opportunities for economic diversification. Traditional agricultural practices and the limited scope of agricultural products have restricted farmers' ability to generate sustainable incomes and improve their economic resilience. The absence of value-added processing and a structured market access system has resulted in low farm gate prices, reducing the incentive for farmers to adopt improved agricultural practices. Moreover, the lack of economic diversification avenues exacerbates the vulnerability of rural households to climate-induced shocks, making it essential to enhance market access and introduce mechanisms for economic diversification[100].	The allocation of funds to develop market access and value addition represents a pivotal shift towards economic empowerment for the rural farming communities. By facilitating the establishment of certification and quality frameworks for bee and agroforestry products, the project directly addresses the market barriers currently faced by smallholder farmers. This strategic intervention is designed to open up new local, regional, and international markets, significantly enhancing the visibility and competitiveness of Burundi’s agricultural products. Through training in processing and branding, coupled with the establishment of farmer cooperatives or associations, farmers are projected to see an income increase of at least 50%. This economic uplift is not just a pathway to improved livelihoods but also a strong incentive for the adoption of sustainable farming practices, ensuring that economic diversification goes hand in hand with environmental sustainability.

[98] Only 10% of Burundi's farmers have access to tailored climate information, severely limiting their capacity to make informed agricultural decisions (Burundi Meteorological Department, 2022). The penetration rate of agricultural insurance is similarly low, at less than 5%, with the majority of smallholder farmers being exposed to climate-related risks without any financial safety net (Insurance Regulatory Authority of Burundi, 2020). The resulting economic losses from climate-induced disasters are estimated at $50 million annually, underscoring the critical need for robust climate information and risk management systems (World Meteorological Organization, 2021).

[99] In Burundi, agricultural productivity faces critical challenges due to extensive soil erosion, affecting approximately 50% of arable land (Ministry of Agriculture and Food Security, Burundi, 2020).

[100] Market access remains a critical bottleneck for 80% of Burundi's smallholder farmers, limiting their income potential and economic resilience (World Bank, 2020).

	Baseline Scenario	With AF Project/Intervention
Component 4	The policy and governance landscape in Burundi currently does not adequately support the adoption and scaling of climate-resilient agricultural practices. Existing policies and institutional frameworks are insufficiently aligned with the needs of smallholder farmers and the realities of climate change, limiting the effectiveness of adaptation efforts. There is a critical gap in advocacy and governance mechanisms that can facilitate the development and implementation of enabling policies, legal frameworks, and strategies for climate adaptation. This gap undermines the potential for sustainable agricultural development and climate resilience, necessitating a focused effort on strengthening policy advocacy and governance structures to support effective climate adaptation and resilience building.	By investing in policy advocacy and governance, the project catalyzes a critical transformation in the regulatory and institutional framework that underpins agricultural and environmental management in Burundi. The development and adoption of enabling policies, strategies, and legal frameworks will provide the much-needed support for the widespread implementation of climate-resilient agricultural practices. This component not only aims to foster an enabling environment for sustainable development but also to enhance community adaptation efforts through strengthened governance frameworks. The establishment of multi-stakeholder platforms for knowledge exchange and the facilitation of policy adaptation to incentivize private sector participation in sustainable agriculture are pivotal steps towards achieving long-term sustainability and project impact. This strategic focus on governance and policy is designed to ensure that the benefits of the project extend beyond the immediate beneficiaries, influencing national policies and contributing to the resilience of the agricultural sector at large.

J. Project Sustainability

158. At the concept note stage, no stand-alone block chain -based livestock traceability pilot has yet been completed under the project in Burundi. To ensure feasibility, the system will therefore be introduced through a planned phased pilot in selected target sites before wider roll-out, allowing the project to test livestock registration, tag retention, offline data capture, event recording, user acceptance, and operational costs in real field conditions. Integrating block chain technology with micro insurance is expected to enhance the project's sustainability by linking verified livestock records with animal health histories, farmer identity, and climate-risk management services in a gradual and practical manner. It creates a resilient, transparent, and efficient ecosystem that benefits smallholder farmers in Burundi. However, the project acknowledges significant technological sustainability challenges that must be addressed to ensure long-term success and equitable access. The dependence on internet connectivity and mobile technology creates access gaps with 78% mobile network coverage in target areas, especially among vulnerable groups including women, youth, elderly farmers, and those in remote areas. These digital divides must be systematically addressed through strategic partnerships with telecommunications providers to improve mobile network coverage in target communes, establishment of community digital access points equipped with reliable internet connectivity and backup power systems, implementation of offline-capable versions of key applications that can sync when connectivity is available, and provision of mobile solar-powered charging and internet Hub stations for mobile devices in remote farming communities. Additionally, the project will design user interfaces in local languages (Kirundi) with voice-guided features for farmers with limited literacy, develop simplified mobile applications with basic phone compatibility not requiring smartphones, create hybrid systems that combine digital tools with traditional paper-based record keeping as backup, and establish technology support networks using trained local youth as digital literacy facilitators.

159. To Ensure accurate data input at the point of entry, the project will establish strict data verification protocols to maintain the integrity of block chain records. At the point of entry, all farmer and livestock data will be captured by trained cooperative data officers and extension agents using pre-programmed mobile applications with built-in validation rules (e.g. mandatory fields, dropdown menus to prevent free-text errors, Geo-tagging to verify farm locations). For livestock, RFID/NFC tags will be scanned in real-time, with the system auto-matching tag IDs to the registered farmer profile to prevent duplication. Each entry will require a second-level verification by a supervisor before it is permanently written to the block chain ledger. Random spot audits (a minimum of 10% of records on a quarterly basis) will be conducted by independent local verification teams, and discrepancies will trigger automatic alerts and correction protocols. This layered approach ensures the traceability and quality of the data for micro insurance claims and GAP monitoring. Comparable experience from livestock traceability initiatives in Africa underscores the importance of a gradual, phased implementation approach for new systems, allowing for adaptation, iterative learning, and stronger stakeholder engagement across the livestock value chain. Evidence from the pilot livestock identification and traceability system implemented along the Northern Tanzania–Narok–Nairobi beef corridor showed that rollout was more effective when preceded by strong sensitization of farmers, traders, brokers, and market managers, and when systems relied on visible

ear tags, production-level tagging, and simple mobile-based electronic data collection rather than more complex or less familiar identification methods (Mutua et al., 2017[101]). These lessons are highly relevant for Burundi, where trust, usability, and operational simplicity will be critical to adoption in rural livestock systems. More recent implementation experience from Ethiopia's Livestock Identification and Traceability System (ET-LITS) further highlights the importance of offline-first mobile applications that allow animal registration, movement recording, and health-event capture directly in the field, with synchronization once connectivity becomes available (Ethiopian Ministry of Agriculture, 2022[102]; FAO & AU-IBAR, 2021). This is particularly relevant to Burundi's low-connectivity rural context, where digital systems must continue functioning in remote areas and integrate with existing institutional workflows (Charlebois et al., 2014[103])Experience from Zimbabwe's block chain -enabled cattle traceability rollout also demonstrates the practical value of combining RFID tagging with a tamper-proof digital ledger that records animal ownership, dipping, vaccination, and treatment events over time (Mapiye et al., 2022[104]; Ncube & Tawonezvi, 2021[105]). This model shows how block chain can strengthen transparency, improve animal-health monitoring, support disease surveillance, and build trust among producers, buyers, and regulators when introduced through clearly defined field-level processes. Collectively, these regional experiences suggest that in Burundi, a feasible block chain -based livestock traceability system should be introduced through a phased pilot, supported by intensive stakeholder sensitization, offline-capable mobile tools, visible animal identification, and strong local verification arrangements before wider scale-up.

160. To drive adoption, the project will combine direct and indirect incentives to farmers. These will include: Immediate Financial Benefits where early adopters will receive subsidized farm inputs (up to 30 % discount), priority access to irrigation services, and premium prices (5–8 % above market) from partner buyers for verified GAP-compliant produce; Insurance-linked Security whereby farmers registered on the platform gain automatic eligibility for climate-risk micro insurance payouts within 14 days of verified loss events; Enhanced Market Linkages: block chain -based traceability will enable access to niche organic and fair-trade markets willing to pay higher prices for documented sustainable production; and Recognition and Peer Learning whereby annual

161. Long-term sustainability requires robust infrastructure maintenance strategies to overcome technological challenges. Essential tools including RFID tags (estimated at $5 per tag), basic smartphones (estimated at $50 each for cooperative leaders), and QR code scanners will be procured through bulk purchasing agreements with technology suppliers, reducing costs by 40%. A revolving fund mechanism will be established where 10% of increased farmer revenues contribute to hardware replacement and maintenance, ensuring sustainability. The project will train local technicians in each target province to provide ongoing system maintenance and user support, establish partnerships with local mobile phone repair shops to serve as technology service points, create revenue-generating models for local tech support to ensure financial sustainability beyond the project period, and develop troubleshooting guides and training materials for common technical issues. System resilience will be enhanced through implementation of backup systems that allow core functions to operate during technology outages, design of modular technology systems that can function independently if certain components fail, establishment of data backup and recovery systems to prevent loss of farmer records and insurance data, and creation of alternative communication channels such as SMS and radio for critical information dissemination.

162. Stakeholder roles will be formalized through signed Memoranda of Understanding (MoUs) before implementation. OSS: Technical oversight and block chain platform development. OBPE: Coordination with government veterinary services and data validation oversight. Africa Apiculture Consortium (AAC): Farmer training, cooperative integration, and GAP compliance support. Econet Burundi: Connectivity solutions, maintenance, and USSD/SMS system integration. Community Animal Health Workers (CAHWs): Primary data collection with monthly stipends (USD 50). Insurance Partners: Loss verification and claims processing through block chain records. During the pilot phase, a quarterly coordination meeting chaired by OBPE will review field-testing results, including farmer and trader uptake, tag retention, data quality, synchronization performance,

[101] Mutua F, Kihara A, Rogena J, Ngwili N, Aboge G, Wabacha J, Bett B. Piloting a livestock identification and traceability system in the northern Tanzania-Narok-Nairobi trade route. Trop Anim Health Prod. 2018 Feb;50(2):299-308. doi: 10.1007/s11250-017-1431-4. Epub 2017 Sep 30. PMID: 28965304; PMCID: PMC5780531.

[102] Ethiopian Ministry of Agriculture. (2022). *Livestock Identification and Traceability System (LITS) Implementation Framework*. Addis Ababa: Government of Ethiopia.

[103] Charlebois, S., Sterling, B., Haratifar, S., & Naing, S. K. (2014). Food traceability systems and livestock identification in developing countries. *Journal of Development Agriculture*, 6(2), 45–59.

[104] Mapiye, C., Chikwanha, O. C., & Dzama, K. (2022). Blockchain-based livestock traceability systems in Southern Africa. *African Journal of Agricultural Systems*, 14(1), 88–103.

[105] Ncube, B., & Tawonezvi, P. (2021). RFID and Blockchain Integration for Cattle Traceability in Zimbabwe. Harare: Zimbabwe Agricultural Research Council.

and practical bottlenecks affecting women, youth, and remote livestock keepers, and will use these findings to refine the system before scale-up...

163. To address the risk of low adoption rates by farmers that could threaten long-term sustainability, the project will implement comprehensive adoption strategies. These include implementing a graduated approach where farmers can access basic services without full technology adoption initially, providing immediate tangible benefits such as subsidized inputs and premium crop prices for early adopters, creating peer-to-peer demonstration programs where successful early adopters train and mentor other farmers, and establishing recognition and reward systems for farmers who successfully integrate technologies. Risk mitigation for technology resistance will be addressed through extensive community consultations to understand and address specific concerns about technology adoption, ensuring all technology solutions complement rather than replace existing traditional practices, providing multiple pathways to access project benefits including non-digital alternatives for reluctant adopters, and implementing gradual technology introduction allowing farmers to adapt at their own pace.
164. The project will deliver comprehensive, culturally-appropriate digital literacy training tailored to different age groups and education levels, establish farmer field schools that combine traditional agricultural training with technology education, create mentorship programs pairing tech-savvy farmers with those requiring additional support, and develop training materials using visual aids, demonstrations, and hands-on practice rather than written instructions. A comprehensive sustainability framework will address these technological challenges through development of cost-recovery mechanisms for technology services through user fees scaled to farmer income levels, creation of partnerships with private sector technology providers willing to maintain services beyond the project period, establishment of revolving funds for technology maintenance and upgrades managed by farmer cooperatives, transfer of technology management responsibilities to local institutions with appropriate capacity, development of policy frameworks that support continued investment in rural digital infrastructure, and creation of public-private partnerships for ongoing technology service provision. This innovative approach improves the traceability of climate-resilient agricultural practices and streamlines the micro insurance process. It offers a more secure and equitable platform for risk management. The project uses block chain technology to establish a decentralized ledger recording all transactions related to climate-resilient agricultural practices and micro insurance participation. Establishing the underlying digital infrastructure will cost an estimated US $ 379 500, a figure that fits within existing budget lines after reallocating modest underspends from earlier studies. The main items are 40 000 ISO-compliant RFID/NFC ear- or hive tags (US $ 200 000), 300 smart-feature phones for cooperative leaders (US $ 21 000), twelve solar-powered community Digital Access Points that host offline block chain nodes (US $ 40 000), twenty-four portable solar “Internet Hub” backpacks for extension agents (US $ 40 000), and five years of data-hosting and connectivity fees (US $ 25 000), plus a ten-percent contingency. All technology will be procured through an open, competitive process that begins with public pre-qualification, followed by a two-stage evaluation in which technical merit counts for 60 percent and price for 40 percent. Preference margins of five percent each are applied for Burundian SMEs and for women-owned firms, and winning vendors enter framework contracts with ceiling prices so that replacement units can be called off quickly over the project’s four-year horizon. This system ensures immutability and transparency of data related to adopting Good Agricultural Practices (GAPs), organic farming, and climate-resilient technologies. The pilot will generate practical lessons for Burundi by tracking the completeness and accuracy of animal records, tag retention, time required to record animal-health events, offline functionality, user satisfaction, and average operating cost per registered animal. Expansion beyond the pilot sites will be based on the documented results of this feasibility phase and on adjustments agreed with OBPE, veterinary services, cooperatives, community animal health workers, and participating farmers.
165. The initial livestock focus is on dairy cattle, goats, and poultry. These species are climate-resilient, culturally sensitive, high in local demand, and manageable by both men and women farmers. The primary farmer profiles include smallholder crop-livestock mixed farmers with <2 ha land and ≤5 head of livestock (60 % women, 30 % youth); women-led cooperatives involved in poultry and vegetable production for local markets and Youth entrepreneurs engaged in locally adapted, high yielding goat rearing and horticulture value chains. These groups will be selected through baseline surveys in the target communes and consultations with local cooperatives, ensuring alignment with community priorities and market demand.
166. By combining robust verification protocols, concrete farmer incentives, targeted livestock and farmer engagement, and formalized institutional roles, the block chain traceability system ensures both technological integrity and financial sustainability. The platform will provide transparent, immutable records that strengthen

market access, enable fair insurance pay-outs, and enhance climate resilience, while embedding cooperative ownership and local capacity for long-term operation.

167. A study by the World Bank (2019) highlighted the potential of block chain applications in agriculture. It suggested that such systems could reduce transaction costs by up to 60% and enhance market access for smallholder farmers by providing verified data on their sustainable practices to buyers. block chain ’s role in the project is to create an immutable record of transactions and sustainable farming practices. This direct link between climate-resilient technology adoption and farmers’ micro insurance premiums and claims is strengthened by block chain technology. For example, block chain can reduce insurance processing times by up to 50% by automating claims based on data like weather conditions and crop yields recorded on the block chain. The project’s insurance graduation strategy is significantly enhanced by block chain . By recording and verifying farmers’ commitments to sustainable practices, block chain establishes a transparent mechanism for reducing insurance premiums over time. Initially, the project covers insurance premiums entirely, aiming to gradually transition this responsibility to farmers as they build savings and revenue through increased market access, assured by the traceability block chain provides. This approach has been shown to enhance smallholders’ savings capacity, as evidenced by a study where farmers involved in block chain -tracked agriculture reported a 38% increase in their income (block chain for Agriculture, 2021). block chain traceability not only supports the project’s micro insurance component but also opens new market opportunities for farmers by providing verifiable proof of adherence to sustainable and organic farming practices. This is crucial for gaining access to premium markets and for consumers seeking transparency in agricultural products. The increased market access, up to 40%, reported by smallholder coffee producers in Colombia participating in a block chain pilot program (FAO & ITU, 2020) further supports the sustainability of the micro insurance scheme. Farmers are better positioned financially to cover their premiums through this access. Integrating block chain and micro insurance offers a transformative chance for agricultural sustainability, yet it also presents challenges, particularly in terms of digital literacy and infrastructure. To address these challenges, the project aims to provide targeted training and gradually deploy technology, ensuring the system’s accessibility and benefits for all, particularly the most vulnerable. Continuous investment in capacity building is crucial, as evidenced by successful implementations where farmer engagement with digital tools increased substantially after training (TechBridge Africa, 2021).

168. Environmental sustainability is ensured through improved water resource management, enhanced soil fertility, and sylvo-pastoral practices, which reduce waterlogging and mitigate land degradation. These measures contribute to the protection of people and properties while improving living conditions in vulnerable areas. The integration of advanced analytics, including climate modeling, further strengthens the project’s insurance design, addressing the actuarial risks posed by unpredictable weather patterns. By incorporating forecasts predicting a 20% rise in extreme weather events (IPCC, 2021), the project ensures the reliability and responsiveness of its micro insurance scheme.

169. Accessibility to insurance is crucial for the project’s sustainability. Establishing a comprehensive insurance ecosystem ensures that micro insurance is accessible, affordable, and beneficial. However, the unpredictability of weather patterns poses a risk to the insurance’s actuarial soundness. Leveraging advanced analytics, as exemplified by the TSP’s role, can integrate additional assumptions to enhance risk underwriting. For instance, incorporating climate models that forecast a 20% rise in extreme weather events into the insurance design can enhance its reliability (IPCC, 2021). Furthermore, a pilot project in Tanzania successfully implemented a dispute mechanism and a basis risk fund, reducing discrepancies between actual losses and payouts by 15% (World Bank, 2018). Despite financial constraints preventing the Government of Burundi from subsidizing the insurance scheme, ACRE Africa’s experience suggests that with the right enabling environment, the project can achieve sustainability. In Uganda, similar projects achieved a 35% adoption rate among smallholder farmers within three years without government subsidies, demonstrating the potential for success in Burundi (ACRE Africa, 2021).

170. The project aligns with Burundi’s national strategies and policies, ensuring long-term institutional and systemic support. For instance, integrating the project with the 12th Five-Year Plan and the 21st Century Economic Roadmap is crucial. A comprehensive insurance feasibility study, similar to the one conducted in Ethiopia that predicted a 50% increase in farmers’ resilience to climate risks over a decade, will further validate the sustainability of the proposed insurance scheme (Ethiopian Ministry of Agriculture, 2020). Gender mainstreaming and equitable participation are fundamental to the project’s sustainability. Targeting specific activities to benefit women and female youth equitably addresses a critical development constraint. For

instance, a project in Malawi that aimed to empower women in agriculture achieved a remarkable 60% improvement in productivity and significantly reduced gender disparities (IFAD, 2019).

K. Environmental and Social impacts and Risks

Checklist of E&S principles	No further assessment required for compliance	Potential impacts and risks – further assessment and management required for compliance
Compliance with the Law		**No risk/Low Risk**: The preparation of the ESMF takes into account national and international laws and regulations in the formulation of the project. In addition, the work involved in the relevant institutions concerned will ensure compliance with regulations and laws during project implementation. The project will set up a mechanism to monitor compliance with laws and regulations in the implementation of the project. Furthermore, the proposed project has been developed in line with international standards on climate change, biodiversity, land conservation, water resources, ecosystem management, and poverty reduction. It considers selected national and regional priorities, policies, plans, and technical standards for climate change adaptation and sustainable development.
Access and Equity		**Low risk:** The project's is using inclusive approach model this will enable fair and equitable access to project benefits to all participants, including marginalized and vulnerable groups.
Marginalized and Vulnerable Groups		**Low risk:** Interventions will target marginalized and vulnerable groups, including vulnerable small-Scale farmers, especially women and youth.
Human Rights		**No risk:** All interventions will respect and promote human rights
Gender Equality and Women's Empowerment		Low Risk: While the project targets 57% women beneficiaries, medium risk exists due to: The project recognizes medium-level gender-related risks that may hinder the effective participation and empowerment of women and marginalized groups. Key risks include: (1) entrenched patriarchal norms that limit women's decision-making power and their participation in training and adoption of new technologies such as block chain and parametric insurance; (2) time poverty and mobility constraints due to women's disproportionate burden of household, caregiving, and agricultural responsibilities; and (3) limited access to collateral and the absence of formal identification documents, which restrict women's ability to benefit from financial services and insurance products. In response, a comprehensive gender mainstreaming strategy has been developed and embedded across all components of the project.
Core Labor Rights		**Low risk/No risk:** The project upholds core labor rights as identified by the International Labor Organization (ILO) and aligned with Burundi's national labor standards. Measures are in place to ensure fair labor practices, including non-discrimination, prevention of forced and child labor, and safe working conditions. Periodic audits and training sessions will reinforce compliance with labor rights standards.
Indigenous Peoples		**Low/Medium Risk:** The project will be implemented in areas where indigenous/ethnic groups (Twa, Tutsi, and Hutu) are present across the 12 target communes in 6 provinces. While the project aims to benefit all community members inclusively, specific measures are required to ensure these groups are meaningfully consulted and that their rights, traditional knowledge, and cultural practices are respected and protected**.**

Involuntary Resettlement		**No risk:** The project does not involve any resettlement activities.
Protection of Natural Habitats		**No risk:** The project aims to protect and restore natural habitats through activities like natural assisted regeneration, afforestation, and reforestation. Efforts will be guided by ecological principles to avoid any adverse impacts on biodiversity. A monitoring mechanism will track the progress of habitat restoration and ensure compliance with environmental safeguards.
Conservation of Biological Diversity		**No risk:** Activities under the project will prioritize the conservation of biological diversity by promoting sustainable practices such as agroforestry, anti-erosive hedges, and conservation agriculture. Nationally identified critical biodiversity areas will be mapped and protected from any potentially harmful project activities. Collaboration with conservation experts will ensure adherence to biodiversity conservation guidelines
Climate Change		**Low risk:** The project is designed to enhance climate resilience and reduce vulnerability to climate change impacts. By promoting low-emission agricultural practices and the adoption of climate-resilient crops, the project will contribute to both mitigation and adaptation efforts. Regular assessments will evaluate the project's effectiveness in addressing climate change challenges.
Pollution Prevention and Resource Efficiency		**No risk:** The project will prevent pollution by replacing chemical inputs with organic alternatives and promoting conservation agriculture practices. Training workshops will educate stakeholders on resource efficiency and the use of eco-friendly inputs. Environmental Impact Assessments (EIA) will be conducted as required for value chain upgrades.
Public Health		**Low risk:** The project adopts a nutrition-sensitive approach, addressing the root causes of food insecurity and public health issues. By supporting sustainable value chains and promoting natural resource management, the project aims to improve community health outcomes. Compliance with national food safety standards will be ensured throughout implementation.
Physical and Cultural Heritage		**Low/no risk:** The project will respect and incorporate traditional knowledge and practices of smallholder farmers. National cultural heritage sites in project areas will be identified and protected from any adverse impacts. Measures will be implemented to ensure the preservation of cultural resources and values
Lands and Soil Conservation		**Low/no risk:** Project activities are tailored to address land degradation and promote sustainable land management practices. Through erosion control measures, reforestation, and sustainable agriculture techniques, the project will contribute to soil conservation and the restoration of degraded lands.

171. The project is categorized as **Category B (moderate risk)** under the Adaptation Fund's Environmental and Social Policy. The proposed activities may present localized, manageable risks related to access and equity, gender inequality, inclusion of marginalized groups such as the Twa, and potential minor environmental impacts from land use and agroforestry practices. However, these risks are not significant or irreversible and will be mitigated through targeted measures including free, prior and informed consent (FPIC), a gender action plan, ecological restoration guidelines, and stakeholder-driven planning. No involuntary resettlement or major biodiversity loss is expected. Overall, the project promotes environmental benefits and social inclusion while ensuring compliance with relevant national standards and international safeguards.

PART III: IMPLEMENTATION ARRANGEMENTS

A. Alignment of project objectives/outcomes with Results Framework of the Adaptation Fund

Project Objective(s)[106]	Project Objective Indicator(s)	Adaptation Fund Outcome	Adaptation Fund Outcome Indicator	Grant Amount (USD)
To enhance the adaptive capacity and resilience of rural communities in Burundi, particularly small-scale farmers in "last-mile communities," in response to the negative impacts of climate change and land degradation.	Increased adoption of climate-smart and ecosystem-friendly agricultural practices.	Outcome 5: Increased ecosystem resilience in response to climate change and variability-induced stress	5. Ecosystem services and natural resource assets maintained or improved under climate change and variability-induced stress	2,200,000
	Proportion of smallholder farmers accessing diversified income opportunities and market linkages.	Outcome 6: Diversified and strengthened livelihoods and sources of income for vulnerable people in targeted areas	6.1 Percentage of households and communities having more secure access to livelihood assets	1,580,000
			6.2. Percentage of targeted population with sustained climate-resilient alternative livelihoods	2,020,000
	Number of farmers using block chain traceability systems and parametric insurance products.	Outcome 1: Reduced exposure to climate-related hazards and threats	1. Relevant threat and hazard information generated and disseminated to stakeholders on a timely basis	1,650,000
	Number of policies and governance frameworks developed or strengthened.	Outcome 7: Improved policies and regulations that promote and enforce resilience measures	7. Climate change priorities are integrated into national development strategy	350,000
	Number of stakeholders trained in climate risk management and finance mobilization.	Outcome 2: Strengthened institutional capacity to reduce risks associated with climate-induced socioeconomic and environmental losses	2.1. Capacity of staff to respond to, and mitigate impacts of, climate-related events from targeted institutions increased	350,000
	Proportion of targeted population aware of predicted adverse impacts of climate change, and of appropriate responses.	Outcome 3: Strengthened awareness and ownership of adaptation and climate risk reduction processes at local level	3.1.Percentage of targeted population aware of predicted adverse impacts of climate change, and appropriate responses.	350,000
Total objective level grant amount				**8,500,000**

[106] The AF utilized OECD/DAC terminology for its results framework. Project proponents may use different terminology but the overall principle should still apply.

Project Outcome(s)	Project Outcome Indicator(s)	Adaptation Fund Output	Adaptation Fund Output Indicator	Grant Amount (USD)
Outcome 1.1: Improved resilience to climate variability and extreme weather events through access to climate information and insurance products.	Number of smallholder farmers accessing climate information services and parametric insurance products.	Output 1.2: Targeted population groups covered by adequate risk reduction systems	1.2.1. Percentage of target population covered by adequate risk-reduction systems.	1,200,000
Outcome 1.2: Enhanced capacity of farmers and government to manage climate-related risks in agriculture.	Number of farmers and government staff trained in risk management and decision-making.	Output 2.1: Strengthened capacity of national and sub-national centres and networks to respond rapidly to extreme weather events	2.1.1. No. of staff trained to respond to, and mitigate impacts of, climate-related events (by gender)	400,000
			2.1.2 No. of targeted institutions with increased capacity to minimize exposure to climate variability risks (by type, sector and scale)	600,000
Outcome 2.1: Increased agricultural productivity and ecosystem health through integrated beekeeping and Syntropic agroforestry practices.	Percentage increase in agricultural yield and biodiversity in project areas.	Output 5 : Vulnerable ecosystem services and natural resource assets strengthened in response to climate change impacts, including variability	5.1. No. of natural resource assets created, maintained or improved to withstand conditions resulting from climate variability and change (by type and scale)	950,000
Outcome 2.2: Improved soil stability and water catchment health in agricultural lands.	Number of hectares of land restored or stabilized using ecosystem-based adaptation practices.	Output 5 : Vulnerable ecosystem services and natural resource assets strengthened in response to climate change impacts, including variability	5.1. No. of natural resource assets created, maintained or improved to withstand conditions resulting from climate variability and change (by type and scale)	3,000,000
Outcome 3.1: Enhanced income diversification for smallholder farmers through value-added livestock and crop food value chains products.	Number of smallholder farmers trained in processing and value addition for agroforestry and bee products.	Output 6: Targeted individual and community livelihood strategies strengthened in relation to climate change impacts, including variability	6.1.1. No. and type of adaptation assets (tangible and intangible) created or strengthened in support of individual or community livelihood strategies	1,100,000
Outcome 3.2: Increased market access and fair-trade opportunities for crop and livestock value chains.	Number of farmer cooperatives or associations accessing markets and fair-trade opportunities.	Output 6: Targeted individual and community livelihood strategies strengthened in relation to climate change impacts, including variability	6.2.1. Type of income sources for households generated under climate change scenario	550,000

Outcome 4.1: Enabling policies, strategies, and legal frameworks developed and adopted, enhancing project sustainability.	Number of policies, strategies, or legal frameworks developed or improved for climate resilience.	Output 7: Improved integration of climate-resilience strategies into country development plans	7.1. No. of policies introduced or adjusted to address climate change risks (by sector)	350,000
Outcome 4.2: Strengthened knowledge management systems aid community adaptation to climate change.	Number of community members demonstrating sustained use of climate-smart practices through knowledge management interventions.	Output 3.1: Targeted population groups participating in adaptation and risk reduction awareness activities	3.1 No. of news outlets in the local press and media that have covered the topic .	350,000
Total				**8,500,000**

PART IV: ENDORSEMENT BY GOVERNMENTS AND CERTIFICATION BY THE IMPLEMENTING ENTITY

A. Record of endorsement on behalf of the government

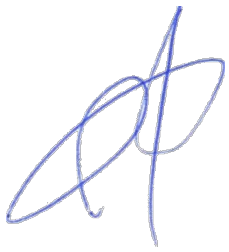
HATUNGIMANA Berchmans, Director General Director's office of the Environment and Climate Change Office Burundais pour la Protection de 'Environnement (OBPE) Burundi	Date*: January 29th , 2026*

B. Implementing Entity certification

I certify that this proposal has been prepared in accordance with guidelines provided by the Adaptation Fund Board, and prevailing National Development and Adaptation Plans of the Government of Burundi and subject to the approval by the Adaptation Fund Board, commit to implementing the project in compliance with the Environmental and Social Policy of the Adaptation Fund and on the understanding that the Implementing Entity will be fully (legally and financially) responsible for the implementation of this project.

Mr. Nabil BEN KHATRA *– Executive Secretary of the Sahara and Sahel Observatory (OSS) as the Implementing Entity Coordinator*





Date: *August 14th , 2026*	Tel. : (+216) 71 206 633 Email:nabil.benkhatra@oss.org.tn; boc@oss.org.tn
Project Contact Person: **Mrs. Khaoula JAOUI**	
Tel.: (+216) 71 206 633 Email: khaoula.jaoui@oss.org.tn	

Gitega, January, the 29/9/2026

REPUBLIQUE DU BURUNDI

MINISTERE DE L'ENVIRONNEMENT,
DE L'AGRICULTURE ET DE L'ELEVAGE

Office Burundais pour la Protection de l'Environnement

To: The Adaptation Fund Board
C/O Adaptation Fund Board Secretariat
Email: Secretariat@Adaptation-Fund.org
Fax: 202 522 3240/5

Subject: Endorsement for Strengthening Resilience to Extreme Weather Events – Drought and Flooding – for Smallholder Farmers in the Rural Regions of Burundi

In my capacity as the General Director of the national designated entity for the Adaptation Fund in Burundi, I confirm that the above national project proposal is in accordance with the government's national priorities in implementing adaptation activities to reduce adverse impacts of, and risks, posed by climate change in the Burundi.

Accordingly, I am pleased to endorse the above project proposal with support from the Adaptation Fund. If approved, the project will be implemented by **Observatoire du Sahara et du Sahel (OSS)** and executed by **Office Burundais pour la Protection de l'Environnement (OBPE)**.

Sincerely,

HATUNGIMANA Berchmans

GENERAL DIRECTOR OF OBPE

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Revised PFG Submission Form[1]

Project Formulation Grant (PFG)

Submission Date: 1 June, 2026

Adaptation Fund Project ID:
Country/ies: Burundi
Title of Project/Programme: Strengthening resilience to extreme weather events - drought and flooding - for smallholder farmers in the rural regions of Burundi
Type of IE (NIE/RIE/MIE): Regional Implementing Entity
Implementing Entity: Sahara and Sahel Observatory (OSS)
Executing Entity/ies: Africa Apiculture Consortium (AAC); Office Burundais pour la Protection de l'Environnement (OBPE)

A. Project Preparation Timeframe

Start date of PFG	November, 2026
Completion date of PFG	June 2027

B. Proposed Project Preparation Activities ($)

Table B1. Detailed budget notes by activity — USD 150,000

List of Proposed Project Preparation Activities	Output of the PFG Activities	US$ Amount	Budget note
1. Technical Feasibility and Design Studies	Technical feasibility and design package completed, including climate risk analysis, GIS-based targeting, agroforestry/apiculture design parameters, and technical feasibility assessment for blockchain traceability and warehouse receipt system architecture.	**28,000**	Covers specialist inputs, field verification, climate/weather and hydrological analysis, GIS/spatial mapping, technical design options, and integration of technical findings into full proposal preparation.
2. Environmental and Social Safeguards	Environmental and Social Screening Report, Environmental and Social Management Plan (ESMP), mitigation measures, and	**21,000**	Covers safeguards specialist inputs, site screening, biodiversity and land-use risk review, social-risk analysis, consultation/disclosure

[1] As presented in AFB/PPRC.33/40 Annex 1.

List of Proposed Project Preparation Activities	Output of the PFG Activities	US$ Amount	Budget note
	safeguards monitoring framework prepared in accordance with Adaptation Fund requirements.		support, and drafting/finalization of the ESMP and safeguards package.
3. Gender mainstreaming operationalization and GAAP integration	Operationalize and integrate the completed Gender Analysis and Action Plan (GAAP) into the full proposal, including refinement of gender-responsive indicators, targets, budget provisions, implementation measures, and limited validation consultations to confirm final design and inclusion arrangements in target areas.	**18,000**	Covers gender/social inclusion specialist inputs, community consultations and FGDs, data collection and analysis, preparation of gender-responsive implementation measures, and validation/finalization.
4. Institutional and Partnership Assessment	Institutional capacity assessment, stakeholder mapping, implementation roles matrix, partnership roadmap, and partner engagement strategy completed.	**9,500**	Covers assessment of implementing/executing arrangements, stakeholder and institutional mapping, partnership consultations, governance and coordination analysis, and preparation of the institutional assessment note. Assess capacities of executing entities (OBPE, AAC).
5. Economic and Financial Analysis	Cost-effectiveness analysis, economic and financial appraisal, sustainability assessment, and detailed activity-based budget for the full proposal completed.	**16,000**	Covers financial/economic specialist inputs, cost-benefit and sustainability analysis, market/value-chain review, costing assumptions, and consolidation of the detailed full proposal budget.
6. Stakeholder Consultations and Validation	Stakeholder consultation report, validated design inputs, consultation records, and strengthened engagement framework for the full proposal completed.	**22,000**	Covers national and subnational consultations, community meetings, facilitation, travel and logistics, translation/materials where needed, consultation documentation, and integration of results into proposal design.

List of Proposed Project Preparation Activities	Output of the PFG Activities	US$ Amount	Budget note
7. Full Proposal Development and Quality Assurance	Full Adaptation Fund proposal package prepared, including narrative, results framework, implementation arrangements, workplan, M&E structure, annexes, and validation-ready final draft.	**25,000**	Covers proposal drafting, technical consolidation, results framework and M&E preparation, validation/review process, editing/formatting, annex integration, and final quality assurance prior to submission.
8. Implementing Entity Management Fee	Technical backstopping, quality control, fiduciary/administrative oversight, coordination, and final submission support provided by the Implementing Entity.	**10,500**	Covers project cycle management services by the IE, including technical review, quality assurance, financial oversight, coordination with partners, and submission/reporting support. A separate IE management fee use table should be included.
	Total	**150,000**	

Table B2. Implementing Entity management fee use — USD 10,500

IE management fee use category	Description of services covered	Amount (US$)
Technical backstopping and strategic review	Technical guidance to ensure that all PFG outputs are coherent, aligned with Adaptation Fund requirements, and integrated into a single high-quality full proposal package.	3,200
Quality assurance and compliance oversight	Review of deliverables for quality, consistency, safeguards, gender responsiveness, fiduciary soundness, and proposal completeness prior to final submission.	2,500
Financial oversight and grant administration	Internal oversight of grant use, budget control, disbursement review, and administrative/fiduciary management of the PFG process.	2,200
Coordination, reporting, and submission support	Coordination with executing entities and national counterparts, consolidation of PFG outputs, and preparation/review of the final submission package and reporting.	2,600
Total IE management fee		**10,500**

Total Project Formulation Grant: $150,000

Detailed Description and Justification of PFG Activities

1. Technical Feasibility and Design Studies

This activity will focus on conducting essential technical assessments to validate the project's innovative approaches and ensure successful implementation. The team will undertake comprehensive crop vulnerability assessments across the 12 target communes to identify the most climate-resilient varieties and determine appropriate insurance parameters for the parametric products. Food insecurity mapping will be conducted using GIS technology and household surveys to understand baseline conditions and target the most vulnerable communities effectively. The blockchain technology assessment will evaluate existing platforms, infrastructure requirements, and integration possibilities with local systems, ensuring the traceability system is technically feasible and culturally appropriate. Weather pattern analysis will examine 20-year historical climate data and future projections to inform both the insurance product design and agroforestry planning. Technical consultants with expertise in agricultural systems, climate science, and blockchain technology will conduct field assessments and develop detailed technical specifications for all innovative components. Its justification is to ensure interventions are context-appropriate, technically sound, and cost-effective, tailored feasibility studies are essential. These studies will guide the selection of technologies, assess scalability, and identify potential limitations, reducing implementation risk and enhancing long-term sustainability. The expected output will include:

1. Feasibility reports
2. Climate vulnerability and risk maps
3. Design options and technical specifications

2. Environmental and Social Safeguards

This critical activity ensures full compliance with the Adaptation Fund's Environmental and Social Policy given the project's Category B classification. Environmental and social specialists will conduct comprehensive impact assessments across all 12 target communes, examining potential risks and developing appropriate mitigation measures. The Environmental and Social Management Plan (ESMP) will address identified risks including land use changes, biodiversity impacts, and social dynamics related to new technology adoption. Documentation will include detailed risk assessments, mitigation strategies, monitoring protocols, and grievance mechanisms to ensure environmental and social safeguards are effectively implemented throughout the project lifecycle. Its justification is to have early identification of potential negative impacts ensures that appropriate mitigation and monitoring measures are integrated into the full proposal. This is crucial for compliance, community acceptance, and sustainability of the project. The expected outputs will include:

1. Environmental and Social Screening Report
2. ESMP with mitigation and monitoring plans

3. Gender Mainstreaming Operationalization and GAAP Integration

This activity will operationalize and integrate the completed Gender Analysis and Action Plan (GAAP) into the full proposal and implementation arrangements. Rather than conducting a new stand-alone gender analysis, the activity will translate the findings of the completed GAAP into project-specific design features, implementation measures, institutional responsibilities, gender-responsive indicators, targets, and budget provisions. Limited targeted consultations will be undertaken only where necessary to validate final implementation arrangements, confirm inclusion measures in the target areas, and ensure that the full proposal adequately reflects the practical needs and priorities of women, youth, and vulnerable groups. Particular attention will continue to be given to indigenous peoples' rights and to ensuring that the final proposal reflects appropriate safeguards and inclusion measures for Twa communities. A detailed Gender Analysis and Action Plan has already been conducted during concept note development. The PFG allocation is therefore not intended to duplicate that work, but to ensure that its findings are fully operationalized in the full proposal, including integration into component design, implementation arrangements, safeguards, monitoring systems, and budgeting. This is essential to ensure that the final proposal is fully aligned with the Adaptation Fund's Gender Policy and Action Plan and that gender-responsive measures are practical, costed, and implementation-ready.

The expected outputs will include:

1. Completed GAAP fully integrated into the full proposal
2. Finalized gender-responsive indicators, targets, and implementation measures

3. Gender-responsive budget provisions and monitoring arrangements
4. Validated inclusion measures for women, youth, and vulnerable groups in the target areas

4. Institutional and Partnership Assessment

This activity will strengthen the institutional and partnership arrangements necessary for successful project implementation while maintaining AAC and OBPE as the Executing Entities. The assessment will review the implementation roles, technical capacities, and operational readiness of AAC and OBPE, identifying any specific capacity support needs required for full proposal implementation. It will also clarify coordination arrangements between OSS, AAC, and OBPE and define how additional technical or private-sector partnerships may support implementation without changing the established executing-entity structure. Partnership discussions with technical service providers, market actors, and other relevant stakeholders will therefore be framed as complementary arrangements to support delivery by AAC and OBPE, rather than as substitutes for their execution role. A strong institutional framework is vital for effective execution and sustainability. This assessment will clarify implementation roles, confirm coordination arrangements, identify capacity needs, and support the preparation of implementation modalities while maintaining AAC and OBPE as the project's Executing Entities. This assessment will clarify roles, highlight capacity needs, and establish the basis for collaboration through Memorandums of Understanding (MoUs) or Letters of Agreement. The expected outputs will include:

1. Institutional capacity assessment report
2. Stakeholder mapping
3. Partnership strategy or implementation arrangements and framework

5. Economic and Financial Analysis

This activity will develop a comprehensive financial framework ensuring project sustainability and demonstrating value for money. Financial analysts will conduct detailed cost-benefit analyses with 20-year projections, examining the economic returns of different project components including blockchain traceability, parametric insurance, and agroforestry systems. Economic modeling will assess the potential income increases for farmers through improved market access and reduced climate risks. Market research will examine demand for certified organic bee and agroforestry products, identifying price premiums and market opportunities. The financial sustainability framework will design mechanisms for continuing the insurance scheme and technology platforms beyond the project period, including cost-recovery models and partnership arrangements. Budget development will create detailed financial plans with activity-based costing, procurement schedules, and cash flow projections. The analysis will demonstrate how the $10 million investment will generate sustainable economic benefits for 24,000 farmers while enhancing climate resilience across 3,617 km² of land as well as demonstrating value for money and inform prioritization of activities. The analysis will strengthen the proposal by providing a rationale for chosen interventions and co-financing strategies (if any). The expected outputs will include:

1. Cost-effectiveness analysis
2. Financial sustainability assessment
3. Justification for investment decisions

6. Stakeholder consultations

This activity will involve undertaking stakeholder mapping and preparing a stakeholder engagement plan to establish protocols for meaningful participation of all groups, especially women, youth, and marginalized communities. The consultations will engage a broad range of actors, including community members, indigenous populations, local authorities, government agencies, civil society organizations (CSOs), women's groups, youth associations, technical experts, and private sector actors, to inform the detailed design of the full proposal. Particular attention will be paid to indigenous peoples' rights, ensuring proper Free, Prior, and Informed Consent (FPIC) processes for Twa communities, where applicable. Community consultations will be conducted in local languages with culturally appropriate methods to ensure genuine participation. Stakeholder consultations are essential to ensure that the project design is inclusive, context-specific, and aligned with the priorities of those most affected by climate change. Engaging diverse actors, particularly vulnerable groups such as women, youth, and smallholder farmers, enables the identification and validation of local adaptation needs, knowledge, and capacities. These consultations promote community ownership, validate proposed interventions, and reduce implementation risks by addressing social, environmental, and cultural concerns early in the process. They also strengthen coordination among partners,

support compliance with the Adaptation Fund's Gender and Environmental and Social Policies, and contribute to the refinement of sustainable, locally led adaptation solutions.
The expected outputs will include:

1. Stakeholder consultation report with summary of participants, locations, and feedback
2. Community-defined adaptation priorities and risks
3. Inputs to the ESMP and to the operationalization of the completed GAAP
4. FPIC documentation where applicable

7. Full Proposal Development

This activity will synthesize all previous assessments and studies into a comprehensive Full Proposal document that meets all Adaptation Fund requirements. Project design specialists will integrate technical, environmental, social, gender, institutional, and financial assessments into a cohesive implementation strategy. The complete Full Proposal will include detailed component descriptions, implementation timelines, risk management frameworks, and monitoring protocols. The implementation plan will establish clear timelines with critical path analysis, procurement schedules, and coordination mechanisms between executing entities. The results framework will define measurable indicators aligned with the Adaptation Fund's results framework, establishing targets and monitoring protocols. The monitoring and evaluation plan will design systems for tracking progress, measuring impact, and ensuring adaptive management throughout implementation. Quality assurance processes will ensure the Full Proposal meets all AF standards and guidelines while maintaining consistency with the approved concept note objectives and outcomes.
The expected outputs will include:

1. Complete draft and final full proposal
2. All required annexes, including budget, ESMP, and integration of the completed GAAP
3. Submission-ready documentation

8. IE Management Fee

The Implementing Entity management fee supports OSS oversight and quality control throughout the PFG implementation period. This includes technical backstopping from OSS climate and development experts who will provide guidance on project design and ensure alignment with best practices in climate adaptation. Quality control measures will ensure all PFG deliverables meet international standards and Adaptation Fund requirements. Regular supervision and monitoring will track PFG progress, identify potential issues, and provide solutions to ensure timely completion. Technical support will include access to OSS networks and expertise in climate finance, technology transfer, and regional development. The management fee also covers reporting requirements to the Adaptation Fund Secretariat, financial management oversight, and coordination with national authorities. OSS will leverage its regional presence and experience implementing similar projects to ensure the PFG produces a high-quality Full Proposal that maximizes the project's potential for climate adaptation impact in Burundi. The expected outputs will include:

1. Timely execution and reporting of PFG activities
2. Compliance with fiduciary and operational standards
3. Coordination across partners and stakeholders

9. Expected Timeline

The eight-month PFG implementation period will follow an efficient timeline designed to maximize synergies between activities. It will be implemented by executing entities AAC (laed) and OBPE (partner).)**Months 1–3** will focus on technical feasibility studies and environmental and social safeguards work, establishing the foundation for detailed design. **Months 4–5** will emphasize institutional assessments, partnership development, and stakeholder engagement, while continuing any targeted validation work needed to finalize implementation arrangements. **Months 6–8** will concentrate on economic and financial analysis, integration of all technical inputs, and development of the Full Proposal, ensuring that all components are consolidated into a coherent implementation strategy. This timeline leverages the preliminary work already undertaken during concept note development, including the completed GAAP, while allowing sufficient time to translate existing analytical work into a robust, submission-ready full proposal.

C. Implementing Entity

This request has been prepared in accordance with the Adaptation Fund Board's procedures and meets the Adaptation Fund's criteria for project identification and formulation

Implementing Entity Coordinator, IE Name	Signature	Date (Month, day, year)	Project Contact Person	Telephone	Email Address
Mr. Nabil BENKHATRA		06/01/2026	Ms. Khaoula JAOUI	(+216) 71 206 633	khaoula.jaoui@oss.org.tn



Annex 2: Stakeholders Consultation

1. Overview of the consultation process

The project was designed through a **continuous and iterative consultation process** involving stakeholders from the **community level to the national level**. The consultation process followed a **hybrid approach**, combining virtual exchanges, in-country missions, bilateral meetings, focus group discussions, and community-level consultations. This approach enabled the project team to gather strategic guidance from national and regional institutions while also grounding project design in the realities faced by smallholder farmers and vulnerable groups in the target areas.

From **March 2021 to June 2024**, a series of **virtual meetings** was held with national and sub-regional stakeholders to discuss climate risks, adaptation priorities, agricultural vulnerabilities, institutional roles, and opportunities for complementarity with existing initiatives. These remote consultations created a strong foundation for subsequent in-person engagement by helping to identify the main climate-related challenges, institutional constraints, and strategic entry points for project design.

In parallel, a number of **in-country consultation missions** and targeted in-person meetings were undertaken. These included field and institutional engagements during **December 2022 – January 2023**, extensive consultations during **October 2024**, and bilateral strategic exchanges held in the margins of **UNFCCC COP27, COP28, and COP29**. These engagements enabled the project team to validate earlier findings, deepen the understanding of stakeholder priorities, and refine the project's technical and institutional design.

The continuous remote and in-person consultation process was therefore fully complementary. The virtual consultations supported early identification of key climate risks and priority issues, while face-to-face meetings made it possible to validate findings, capture local realities in greater detail, and strengthen stakeholder ownership of the proposed intervention.

2. Stakeholder coverage

The consultation process engaged a broad range of stakeholders representing the main institutions, expertise areas, and social groups relevant to the project. These included:

- **Government institutions and focal points**, including the Adaptation Fund focal point, relevant ministries, technical departments, and national research institutions;
- **Executing and implementing partners**, including AAC, OBPE, OSS, and technical organizations contributing expertise on climate resilience, apiculture, ecosystem restoration, gender, and finance;
- **Academic and research institutions**, particularly the University of Burundi and agricultural research institutions;
- **Development partners and international NGOs**, with expertise in climate adaptation, insurance, agroforestry, biodiversity, and inclusive rural development;
- **Civil society and community-based organizations**, including groups working on environment, gender, youth, agribusiness, and rural livelihoods;
- **Private sector actors**, including insurance companies, business support centres, export-oriented enterprises, and digital/data service providers;
- **Community-level stakeholders**, including smallholder farmers, women, youth, producer groups, and vulnerable and marginalized communities in the target provinces.

The list of stakeholders consulted is presented in **Table 10** below.

Table 1: List of Stakeholders

Institution	Name	Position	Gender
Government			
Focal Points	Mr. Nibizi Epimeny	National Focal Point for AF	**Male**
	Mr. Ndayizeye Liévin	NDA Adaptation Fund	**Male**
OBPE	Mr. Hatungimana Berchmans	General Director	**Male**
	Mr. Ndayikeza Longin	Research officer	**Male**
	Ms. Manirakiza Odette	Insect Researcher	**Female**

	Ms. Kaneza Belyse	Protected areas officer	**Female**
	Mr. Ntashavu Dieudonné	Communication and information officer	**Male**
	Mr. Hakizimana Claude	Environmental research officer	**Male**
	Mr. Bukuru Désiré	SIG officer	**Male**
	Ms. Kandame Aurore	Biological resources management officer	**Female**
	Mr. Ahishakiye Jérôme	Environmental monitoring officer	**Male**
	Mr. Masabo Onesphore	Habitat dynamics officer	**Male**
	Mr. Murengerantwari Janvier	Monitoring and evaluation officer	**Male**
MoAE	Mr. Mbonihankuye Denis	Environment and Hygiene officer	**Male**
	Ms. Ntawuyankira Neila	Insect Researcher at ISABU	**Female**
	Mr. Willy Désiré Emera	Researcher at the Institute of Agronomic Sciences of Burundi (ISABU)	**Male**
	Mr. Jean Claude NGWEBU	Director of Agricultural Statistics and Information	**Male**
	Mr. Claude BIGIRIMANA	Head of the phylogenetic resource conservation unit at the Burundi Institute of Agricultural Sciences (ISABU)	**Male**
	H.E. Hon. Ir. Prosper DODIKO	Minister	**Male**
	Mr. Ndorimana Emmanuel	Permanent secretary	**Male**
University			
Université du Burundi	Prof. Nduwarugira Déogratias	Professor	**Male**
	Prof. Nkengurutse Jacques	Professor	**Male**
	Prof. Bukuru Anatole	Research Fellow	**Male**
	Prof. Irampagarikiye Rosette	Research Fellow	**Female**
Development Partners/INGOs			
Africa Apiculture Consortium	Mr. Bronson Eran'ogwa	Executive Director	**Male**
	Ms. Rachel Olwanda	Gender Officer / Chairperson	**Female**
	Ms. Lucy Jerogony	Environment Officer	**Female**
	Mr. Eileen Mburu	Geospatial Information Science	**Female**
	Ms. Aida Bakri	East Africa Programme Officer	**Female**
	Dr. Gladys Bichang	Quality Assurance Officer	**Female**
	Dr. Erick Kioko	Culture and Social Impact Officer	**Male**
ACRE Africa	Mr. Ewan Wheeler	Chief Executive Officer	**Male**
	Ms. Jackline Chemtuai	Insurance and Gender Specialist	**Female**
	Ms. Lilian Waithaka	Advisory and Innovation Manager	**Female**
	Mr. Reuben Saina	Actuarial Manager	**Male**
	Ms. Diana Machogu	Business Development in Advisory	**Female**
	Dr. Linda Busienei	Projects and Programmes Manger	**Female**
Alliance Bioversity-CIAT	Dr. Marius Ekue	Senior Scientist; African lead agroforestry and tree genetic resources for resilient landscape restoration	**Male**
	Dr. Francois Iradukunda	Gender and Social Inclusion Specialist	**Male**
	Dr. Nduwimana Innocent	Agronomist	**Male**
	Dr. Dharani Dhar Burra	Data Solutions and Product Strategist	**Male**
	Ms Marie Ena Derenoncourt	Gender-Smart Investment Specialist	**Female**
	Mr. Daniel Masika	CSA Specialist	**Male**
OSS	Ms. Khaoula Jaoui	Director Climate Department	**Female**

	Mr. Steve Muhanji	Projects and Programmes Coordinator	**Male**
	Mr. Medard Ouinakonhan	Project Manager	**Male**
CSO/CBO's			
APRN/BEPB	Mr. Alexis NIKIZA	General Director	**Male**
	Ms. Felicissima NZOHABONIMANA	Legal Representative	**Female**
	Mr. Léonidas NDUWAYO	Programme Director	**Male**
	Ms. Christine MUGANI	Gender Officer	**Female**
	Ms. Bélyse Elodie NGEZAHAYO	Communication Officer	**Female**
	Mr. Séverin NYAMUYENZI	Environmental Consultant	**Male**
AHDI	Ms. Gloriose NZISABIRA	Agribusiness officer	**Female**
	Ms. AYINKAMIYE Audrey	Chief Operations Officer	**Female**
	Ms. Dr Clarisse IRADUKUNDA	Programmes Director Health Officer	**Female**
	Mr. Germain NIRAGIRA	Chief Executive Director	**Male**
	Mr. Médiatrice HATUNGIMANA	Youth Officer	**Male**
Conservation et Communauté de Changement (3C)	Ms. Chanelle DUSHIME	Programme Manager	**Female**
	Ms. Josélyne MUKARUKUNDO	Financial Officer	**Female**
	Mr. Léonidas NZIGIYIMPA	Chief Executive Director	**Male**
Uzima Women Association	Ms. Tania Gahama	Chief Executive Director	**Female**
Private sector			
SME Support Centre	Ms. Linda Onyango	Chief Executive Office	**Female**
	Mr. Daniel Ouma	Deputy Executive Officer	**Male**
	Ms. Yvette Lando	Business Analyst	**Female**
	Ms. Dorcas Maina	Client Services	**Female**
INKINZO Insurance	Mr. Philemon ITANGIGOMBA	Managing Director	**Male**
	Mr. Kevin RWASA	Technical Director	**Male**
The Source Plus	Mr. Andrew Soita	Director	**Male**
	Mr. Nicholas Musau	Data analyst and AI Officer	**Male**
	Mr. Dennis Murimi	IT/ Data Manager	**Male**
	Dr. Joslyn Muthio	Gender and Climate Officer	**Female**
	Prof. Evans Nyaboga	**SPS and Trade Officer**	**Male**

3. Objectives of the consultations

The consultations were undertaken to ensure that the project design is **responsive to stakeholder priorities, grounded in local realities, technically credible, socially inclusive, and aligned with national and sub-national adaptation frameworks**. The consultation process was not limited to information-sharing; rather, it served as a core design mechanism through which the project team validated risks, refined intervention priorities, identified implementation constraints, and incorporated stakeholder feedback into the Concept Note. In particular, the consultations pursued the following objectives:

i. Verify alignment with national and sub-national priorities

A first objective of the consultations was to verify that the proposed project is fully aligned with **Burundi's climate change adaptation priorities, agricultural development needs, and territorial planning realities** at both national and local levels. Through exchanges with government institutions, technical agencies, local authorities, development partners, and community representatives, the project team assessed whether the proposed thematic focus, target geographies, and intervention logic were consistent with existing policies, strategies, and planning frameworks.

This objective was important to ensure that the project responds to **documented climate vulnerabilities and locally recognized needs**,

rather than introducing activities that are externally driven or insufficiently adapted to the Burundian context. The consultations therefore helped confirm the relevance of focusing on rural smallholder farmers, climate-sensitive value chains, ecosystem restoration, risk management tools, and inclusive capacity-building. They also helped validate the selection of target provinces and communes based on climate exposure, agricultural vulnerability, ecosystem degradation, and the presence of vulnerable population groups. In this way, the consultations helped anchor the project in the country's **actual adaptation agenda**, while also strengthening the legitimacy and ownership of the proposed intervention.

ii. Avoid duplication and strengthen complementarity with existing initiatives

A second objective of the consultations was to identify **ongoing, completed, and planned projects and programmes** in order to avoid duplication and maximize complementarity. Burundi already hosts a range of interventions supported by government agencies, multilateral funds, bilateral cooperation partners, NGOs, research institutions, and private actors in the areas of climate resilience, agriculture, ecosystem restoration, disaster risk management, and rural livelihoods. The consultation process therefore served as an opportunity to systematically map this landscape and assess where the proposed project could add value.

Stakeholder discussions were used to identify areas of overlap, clarify institutional roles, and explore opportunities for coordination, sequencing, and operational synergy. This helped ensure that the project would not replicate activities already being financed elsewhere, but would instead fill unmet needs, reinforce successful existing approaches, and build on available institutional and technical platforms. The consultations also helped identify specific opportunities for collaboration with actors already engaged in climate information, insurance, biodiversity, agroforestry, gender inclusion, and value-chain support. As a result, the project design was strengthened in terms of **strategic positioning, implementation realism, and institutional coherence**, while the non-duplication analysis was made more robust.

iii. Assess the integration of traditional and scientific climate knowledge

A third objective of the consultations was to assess how **traditional knowledge systems and local experience** could be used alongside **scientific weather forecasting, agro-meteorological services, and climate information systems**. In many project areas, rural communities already rely on local indicators, indigenous forecasting practices, and accumulated ecological knowledge to guide planting, harvesting, livestock management, and resource use decisions. However, climate variability and changing weather patterns are increasingly reducing the reliability of some traditional forecasting methods when used in isolation.

The consultation process therefore explored how local knowledge could be recognized, documented, and, where appropriate, combined with scientific forecasting and formal advisory systems. This objective was particularly important in order to avoid a project design that treats scientific data as a substitute for local knowledge, rather than as a complementary resource. Discussions with communities, technical experts, and institutional actors helped clarify that climate-resilient decision-making in Burundi should be based on **both localized experience and improved access to scientific information**, especially where farmers face shifting seasons, irregular rainfall, emerging pests, and more frequent droughts and floods. This objective informed the project's emphasis on user-oriented climate services, locally adapted training approaches, and extension models that translate technical information into formats that communities can understand and use.

iv. Identify crops, livelihood priorities, and the specific needs of vulnerable groups

A fourth objective of the consultations was to identify the **priority crops, livelihood systems, and adaptation needs of the project's target groups**, with particular attention to women, youth, indigenous and ethnic minority groups, and other vulnerable producers. In line with the **Adaptation Fund Environmental and Social Policy (ESP)** and **Gender Policy (GP)**, the consultations were used to understand not only what climate risks communities face, but also how those risks affect different groups in different ways.

This objective supported a more nuanced understanding of livelihood vulnerability by examining which crops and production systems are most exposed to drought, floods, pest outbreaks, soil degradation, and market instability; which livelihood options are most promising under changing climate conditions; and what barriers different groups face in accessing land, information, finance, training, technology, and decision-making spaces. Through this process, the consultations helped reveal the distinct constraints faced by women in relation to workloads, asset ownership, registration in agricultural systems, and access to productive equipment; by youth in relation to limited economic opportunities and rural out-migration; and by indigenous and ethnic minority groups in relation to land use, customary rights, culturally appropriate extension, and inclusion in governance structures.

By identifying these differentiated needs early in the project design process, the consultations made it possible to tailor the project's interventions in a more targeted and inclusive way. This objective directly informed the prioritization of climate-resilient crops and livelihood options, the design of gender-responsive and youth-responsive support measures, the adaptation of communication and training formats, and the incorporation of specific safeguards and representation measures for vulnerable groups.

v. Identify potential environmental and social risks and impacts

A fifth objective of the consultations was to identify the **potential environmental and social risks, impacts, sensitivities, and inclusion challenges** associated with the proposed project activities. This objective was pursued in line with the Adaptation Fund ESP and GP and was integrated into the consultation process rather than treated as a separate compliance exercise. Stakeholder inputs helped identify

where project activities could unintentionally generate exclusion, inequity, land-related tensions, governance disputes, or environmental pressures if not properly designed and managed.
This included, for example, concerns related to access to land for agroforestry and apiary activities, representation in cooperative and governance structures, equitable access to finance and project-supported services, the cultural appropriateness of training and extension methods, and the potential for some groups to be disadvantaged by literacy, technology, or mobility barriers. Environmental concerns also emerged around natural resource management, degraded landscapes, erosion-prone areas, and the need for adaptation interventions to remain ecologically sound and locally acceptable.
The consultation process therefore played an important role in identifying issues that required mitigation, adaptation, or more explicit inclusion measures in project design. As a result, the Concept Note was strengthened through the integration of socially differentiated approaches, culturally appropriate communication methods, grievance and representation measures, and design features intended to reduce exclusion risks and enhance environmental and social sustainability. In this sense, the consultations contributed not only to the relevance of the project, but also to its **safeguard quality, social legitimacy, and implementation feasibility**.

4. Consultation methods and inclusiveness approach

A combination of qualitative and participatory consultation methods was used to ensure broad and meaningful engagement. These methods included:

- **semi-structured interviews**, to ensure systematic coverage of key thematic areas;
- **focus group discussions**, to enable in-depth discussion of risks, needs, and opportunities;
- **bilateral meetings**, particularly with government institutions, financial actors, and technical partners;
- **community consultation meetings**, to gather farmer perspectives directly from target areas;
- **targeted discussions with vulnerable and marginalized groups**, including women, youth, and self-identified indigenous and ethnic minority groups.

During local consultations, participants were in some cases divided into smaller groups in order to create space for **more vulnerable or marginalized individuals**, especially women and youth, to express their needs and concerns more freely. Separate and mixed consultations were both used, depending on the context and stakeholder group.
Special attention was given to ensuring a **gender-sensitive and youth-responsive consultation process**. This was particularly important in the Burundian context, where patriarchal social norms and rural out-migration of youth can make participation uneven. To address this, the project team made deliberate efforts to ensure that:

- women and men were consulted both separately and jointly;
- institutions with specific expertise on gender and youth were included;
- consultation timing and location took into account women's workloads, mobility constraints, and participation needs;
- attention was given to literacy, communication format, and the need for practical and culturally appropriate engagement.

5. Main discussion themes and project responses

The consultations generated detailed feedback on the major climate, social, economic, and institutional constraints affecting target groups. These concerns were used to refine the design of the project and strengthen its responsiveness to different stakeholder categories.
A summary of the main issues raised and the way they were addressed in project design is presented below.

i. Discussion

Table 2: Project Discussion

Stakeholder	Concern	Project response
Smallholder producers and small-scale processors	• Vulnerability to climate shocks (drought, heat, diseases, pests, etc.) • Natural resource degradation (soil, forests, pastures, etc.), erosion/landslides, forest fires • Limited economic opportunities and competitiveness (knowledge, accessibility, market linkages, etc.) • Cannot apply for existing government support.	• **Project will enhance the resilience of smallholders' livelihoods and strengthen their adaptive capacities through technical and financial support.** • **Project will improve resilience of ecosystems and resources.** • **Project will set up multi-stakeholder platforms (ensuring involvement of women and youth) increasing local social capital** • **Project specifically target those below the threshold for**

	• Degraded infrastructures lead to production loss and isolation in case of weather extremes	**already existing subsidies from the Government.** • **Project will promote the climate proofing of agro-infrastructure through rehabilitation of critical points**
Women	• Need to specifically support women to set up their businesses. • Production loss due to climate threats (heat, erratic rain) and lengthy tasks due to lack of equipment and technologies • Heavy workload due to lack of equipment and technologies • Women not registered in the register of agricultural holdings	• **57% of project activities will be allocated to women, their business skills will be strengthened, and networking efforts will be supported.** • **With grant support, women will be provided with equipment and technologies, such as such as early crop disease warning system and equipment for processing that will help them accelerate works in critical periods and reduce their workload.** • **Project will raise awareness on the importance of including women in the register of agricultural holdings and provide support in doing so.**
Indigenous and ethnic minority groups: • **Batwa (Rutana, Bururi)** • **Hutu-kofero pastoralists (Muyinga)** • **Banyamulenge agro-pastoralists (Cibitoke)**	• Land-use rights and tenure security for apiaries and agroforestry plots • Culturally appropriate, visual, and non-literate extension materials. • Equitable access to warehouse-receipt finance without formal collateral. • Formal recognition of customary forest-product rights. • Direct representation in cooperative governance structures.	• **Communal forest parcels traditionally managed by Batwa explicitly mapped and integrated into project land-use plans** • **Extension curricula include visual aids, pictograms, and oral storytelling modules** • **Warehouse-receipt by-laws reserve two board positions specifically for minority representatives and include targeted fee waivers** • **Formal MOU with Ministry of Environment explicitly recognizes indigenous customary rights to forest resources** • **Inclusion of indigenous elders' panel in Grievance Redress Mechanism for culturally appropriate dispute resolution**
Indigenous and ethnic minority groups: (all project locations, predominantly Hutu and Tutsi smallholders)	• Improved market access and fair pricing. • Reliable climate-resilient agricultural techniques. • Transparent and accountable governance of cooperatives and warehouses. • Inclusive training programs tailored to varying literacy and technology access levels. • Timely access to climate information and financial services.	• **Digital market-access platform implemented, connecting producers directly with local, regional, and international buyers, reducing intermediaries** • **Climate-resilient practices embedded across all agricultural interventions, including parametric insurance and ecosystem-based adaptation methods** • **Blockchain-enabled traceability system implemented for transparency, accountability, and trust in cooperative management and warehouse operations** • **Training tailored to gender, youth, and literacy levels delivered via field-based demonstration plots, radio, peer mentoring, and mobile-based extension tools** • **Integration of mobile-based climate-information delivery and financial access through digital wallets and USSD platforms**
Youth	• **Limited opportunities for youth in rural areas**	• **Project will build and create opportunities for youth (e.g. through technical support, community centres, mentoring opportunities, etc.)**

ii. Community Consultations

Table 3:Community Consultation and Consultation Dates

Province	Bubanza	Bururi	Kuruzi	Ruyigi	Rutana	Kirundo
Date	15/10/2024	16/10/2024	17/10/2024	17/10/2024	23/10/2024	**18/10/2024**
No. of women	14	37	20	20	21	**20**

No. of men	18	32	20	20	20	**20**
Total participants	**32**	**69**	**40**	**40**	**41**	**40**

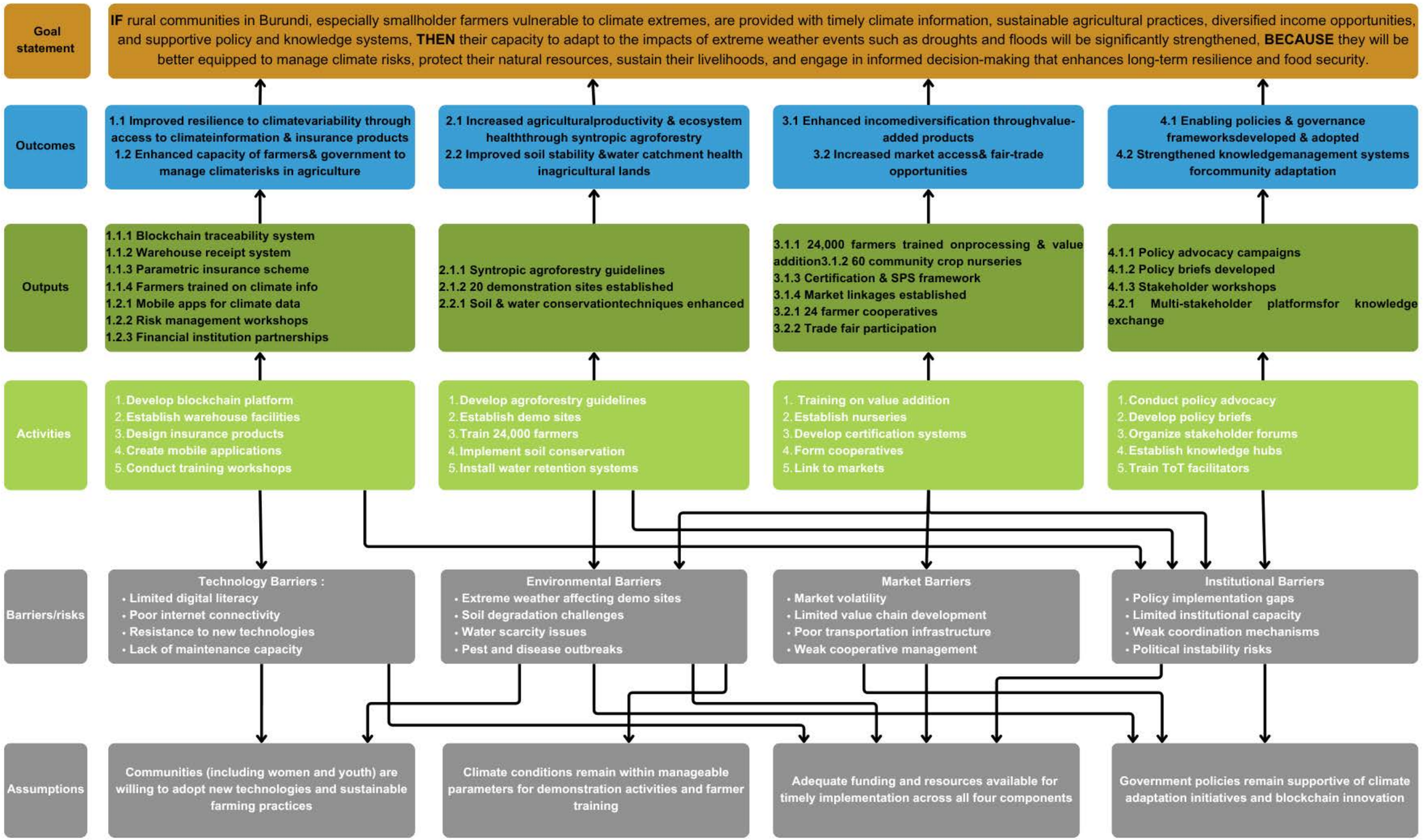
7. Overall consultation findings

Overall, the stakeholder consultation process confirmed that the proposed project addresses **real and urgent adaptation needs** in Burundi. The consultations consistently pointed to the need for an integrated response that combines:

- climate-risk management,
- ecosystem restoration,
- livelihood diversification,
- improved market access,
- inclusive governance,
- and targeted support for vulnerable groups.

The consultations also underscored the importance of ensuring that the project remains **practical, inclusive, and locally grounded**. For that reason, stakeholder feedback directly influenced the targeting of project areas, the identification of priority products and interventions, the integration of gender and inclusion measures, the treatment of indigenous and minority concerns, and the strengthening of governance and implementation arrangements.

Annex 3: Theory of Change



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Annex 4: Gender Assessment Summary

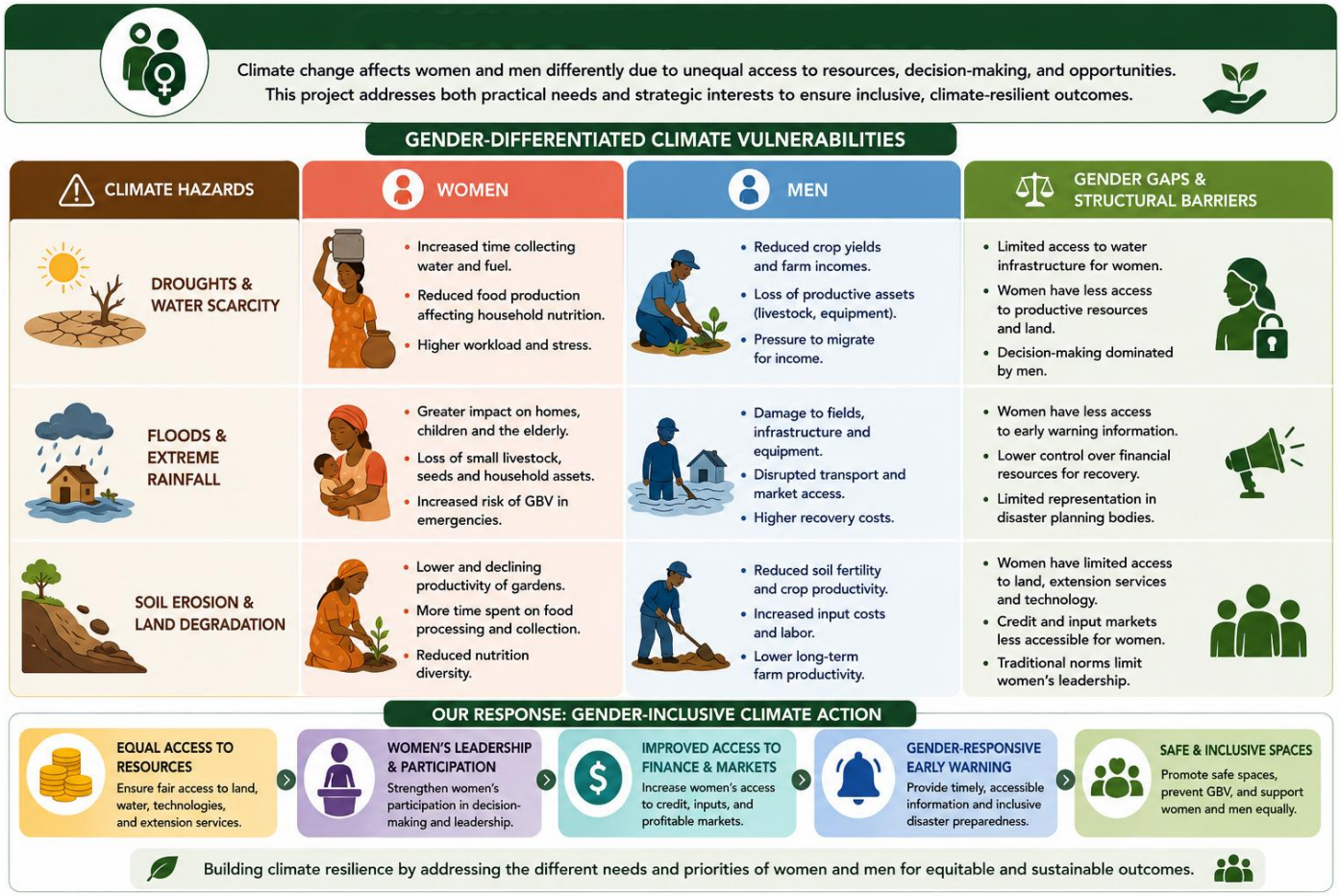
A. Background and Context

The **Gender Analysis and Action Plan (GAAP)** for *Enhancing Resilience in Burundi* examines how gender inequalities shape climate vulnerability, adaptive capacity, and access to resilience-building opportunities across eight target provinces: **Cibitoke, Bubanza, Bujumbura Rural, Bujumbura Mairie, Kirundo, Ruyigi, Rutana, and Bururi**. The assessment confirms that climate risks in Burundi are not gender-neutral. Rather, existing structural inequalities in access to land, finance, training, leadership, and information mean that women, girls, and other vulnerable groups experience climate shocks differently and often more severely than men.

The analysis shows that women's primary responsibilities for water collection, fuelwood gathering, household food management, and unpaid care work place them at the frontline of climate impacts. When droughts, floods, landslides, pest outbreaks, and environmental degradation intensify, the burden on women grows disproportionately. At the same time, women's lower rates of literacy, weaker representation in decision-making structures, and more limited access to productive resources reduce their ability to anticipate, absorb, and recover from climate-related shocks.

The assessment applied a **mixed-methods approach**, combining qualitative and quantitative information gathered through **16 Focus Group Discussions (FGDs)** involving **320 community participants** and **18 Key Informant Interviews (KIIs)** with government officials, agricultural extension officers, women's cooperative representatives, and community elders. This approach enabled the study to capture not only broad gender trends, but also province-specific differences in climate exposure, coping strategies, and institutional barriers.

Gender-Differentiated Climate Vulnerabilities



A. Gender-Differentiated Climate Vulnerabilities

The assessment found that women bear a disproportionate share of climate-related burdens due to entrenched structural barriers that restrict their access to land, financial services, extension support, and positions of influence. These disadvantages are compounded by the fact that women are generally expected to manage those household resources most directly affected by climate variability, including water, food, fuel, and family health.

In practical terms, this means that climate shocks translate into longer working hours, heavier unpaid care burdens, greater food insecurity, and increased exposure to protection risks for women and girls. Climate-related displacement, for example, not only affects shelter and livelihoods, but also heightens risks of gender-based violence, poor sanitation, limited healthcare, and psychosocial distress.

Key Findings

Climate Vulnerability Patterns

Women bear disproportionate climate burdens due to systemic barriers limiting access to land, financial resources, and decision-making structures. Their primary responsibility for water, fuel, and food management—resources directly affected by climate variability—intensifies during climate shocks.

Key vulnerability statistics:

- **85% of women** report severe climate impacts vs. 70% of men
- **90% of women** face water scarcity challenges
- **45% of women** are illiterate, limiting access to climate information
- **22% land ownership** by women vs. 78% by men

B. Economic and Resource Disparities

Gender-based economic exclusion remains one of the strongest drivers of unequal climate vulnerability. The assessment shows that women are significantly disadvantaged in access to productive assets, credit, training, market participation, and leadership positions. These disparities limit women's ability to invest in climate adaptation measures, adopt improved agricultural practices, diversify livelihoods, or recover from losses after climate shocks.

Women are also more concentrated in lower-profit and lower-value agricultural activities, while men dominate more lucrative segments of value chains and control key productive resources. In practice, this means that even where women are heavily involved in agricultural production, they often capture a smaller share of the benefits and have less authority over how adaptation resources are used.

Gender-based economic exclusion perpetuates vulnerability cycles:

- **Credit Access Gap:** 65% men vs. 35% women access formal credit
- **Training Participation:** 70% men vs. 30% women in agricultural training
- **Decision-Making:** 85% male vs. 25% female leadership in climate governance
- **Market Participation:** Women engage in lower-profit activities with limited value chain access

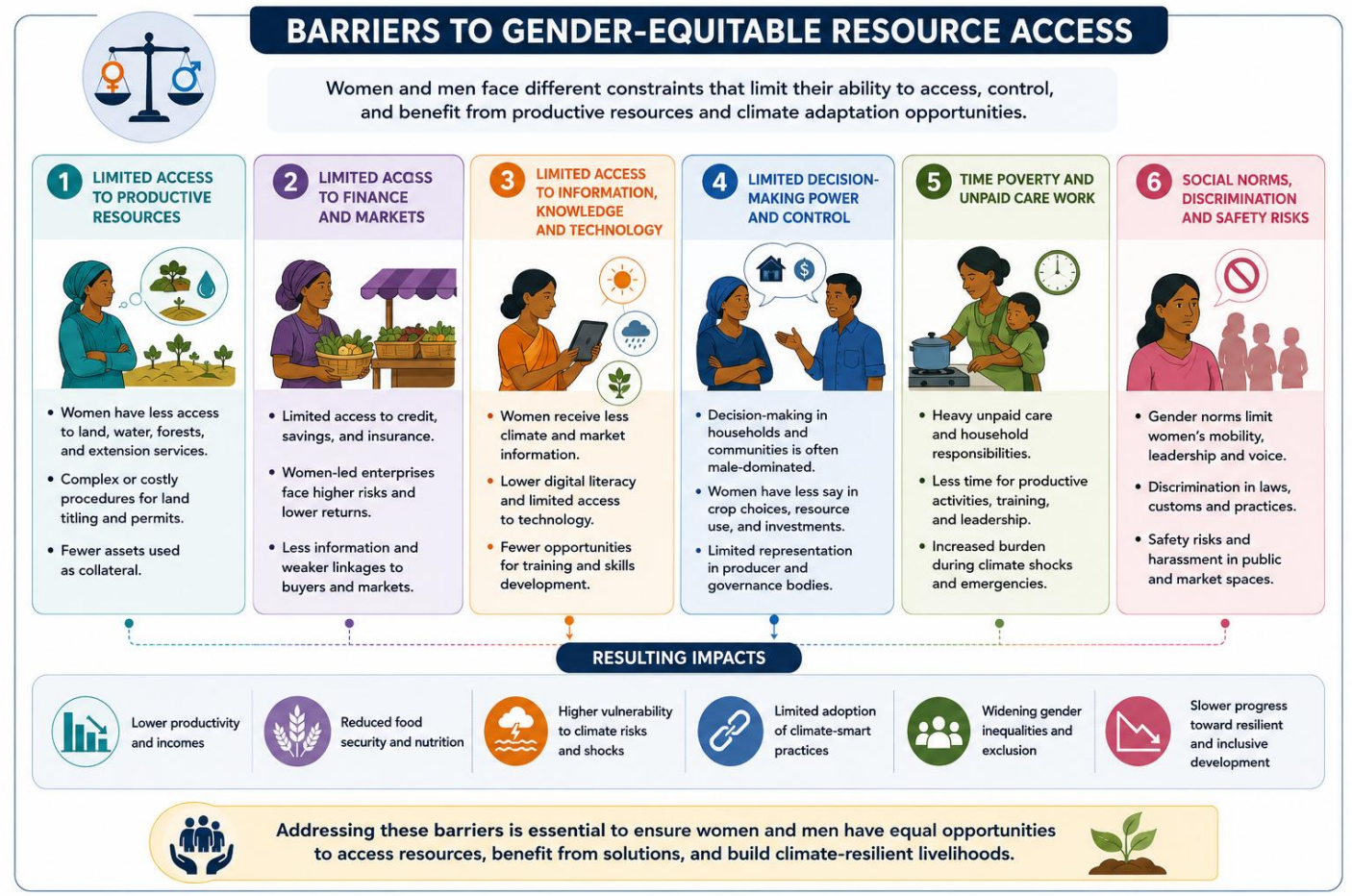
C. Educational and Capacity Constraints

Educational inequality significantly amplifies women's climate vulnerability. Limited female literacy constrains access to climate information, early warning messages, extension services, financial products, and technical training. This challenge is reinforced by low numbers of female teachers and agricultural extension workers, which further reduces the availability of gender-responsive support systems.

Educational disparities compound climate vulnerabilities:

- Significant female teacher shortages affect girls' educational aspirations
- Poor WASH facilities contribute to girls' school absenteeism during menstruation
- Limited access to climate-smart agriculture training for women
- Restricted information access during emergencies

Barriers to Gender-Equitable Resource Access



D. Climate Impact Differentiation by Province

Climate risks and gender impacts vary across provinces. However, in all locations, women, youth, persons with disabilities (PWDs), and other vulnerable groups face heightened exposure to climate shocks and more limited coping capacity.

ovince	imary Climate Risks	ost Affected Groups	y Gender Impacts
bitoke	il erosion, flooding	omen, Youth, PWDs	creased agricultural burden, limited land access
banza	frastructure damage, flooding	omen, Children, Elderly	rced displacement, caregiving burden
jumbura Rural	equent flooding, displacement	omen, Youth, PWDs	BV risks in IDP camps, health vulnerabilities
jumbura Mairie	rban flooding, overcrowding	omen, Youth, Elderly	fety concerns, limited economic opportunities
rundo	olonged droughts	omen, Youth, PWDs	ater collection burden, food insecurity managemer
yigi	npredictable rainfall, pests	omen, Youth, PWDs	op management challenges, limited extension acce
tana	ndslides, land loss	omen, Youth, PWDs	ss of livelihood base, displacement stress
ruri	eavy rainfall, deforestation	omen, Youth, PWDs	vironmental resource management burden

E. Displacement and Health Vulnerabilities

Climate-induced displacement emerged as a particularly important area of concern. The assessment found that where floods,

landslides, or drought-related livelihood collapse force households into temporary settlements or overcrowded living situations, women and children face compounded risks.

Climate-induced displacement creates compounded risks:

- **Overcrowded IDP camps** expose women and children to gender-based violence
- **Poor sanitation** increases waterborne disease risks
- **Limited healthcare access** during displacement
- **Psychological trauma** particularly affects children and elderly
- **Teenage pregnancies** increase in displacement settings

Critical Barriers Identified

Structural Inequalities

- **Land tenure systems** favor male inheritance and control
- **Financial institutions** require land collateral, excluding women
- **Cultural norms** restrict women's mobility and decision-making authority
- **Governance structures** lack gender representation

Institutional Gaps

- **Limited female extension agents** restrict women's access to training
- **Male-dominated cooperatives** exclude women from leadership
- **Inadequate early warning systems** fail to reach women effectively
- **Poor infrastructure** limits women's market access
- **60% gender gap** in leadership positions

Focus Group Discussion Participation

ovince	ale Participants	male Participants	ixed Groups	tal Participants
bitoke			groups	
ıbanza			groups	
ıjumbura Rural			groups	
ıjumbura Mairie			groups	
rundo			groups	
ıyigi			groups	
ıtana			groups	
ıruri			groups	
tal	5	5	groups	0

Key Informant Interview Distribution

- **Government Officials:** 6 interviews (3 male, 3 female)
- **Agricultural Extension Officers:** 4 interviews (2 male, 2 female)
- **Women's Cooperative Representatives:** 4 interviews (all female)
- **Community Elders:** 4 interviews (2 male, 2 female)

Gender-Disaggregated Baseline Data

Resource Access by Gender

The following data reveals systematic exclusion of women and youth from critical resources needed for climate adaptation and resilience:

source Category	en (%)	omen (%)	uth (%)	nder Gap
nd Ownership				%
cess to Credit				%
ricultural Training				%
arket Participation				%
cision-Making Roles				%
mate Information Access				%

Critical Analysis: The 56% gap in Land Ownership is the structural root cause of the 30% credit gap, since financial institutions require land collateral. The 60% gap in Decision-Making Roles means women have no voice in designing climate adaptation

programs that directly affect them. The 40% gap in Agricultural Training perpetuates knowledge deficits that reduce adaptive capacity.

Educational Attainment by Gender

ucation Level	ale (%)	male (%)	ender Gap
o formal education			%
imary education			%
condary education			%
rtiary education			%

Critical Analysis: The 20% gap in "No formal education" is foundational. Women with no education cannot access climate information (30% gap), cannot advocate for land rights (56% gap), and cannot participate in decision-making (60% gap). This is a cascade effect: educational exclusion at the base creates vulnerability at every level above it. The parity in tertiary education (5% each) is misleading — it represents only the tiny fraction who overcome all barriers, not systemic equality.

Climate Impact Assessment by Gender

The following assessment quantifies the differential impact of climate shocks on women and men across six critical dimensions. Severity scores (1-5) reflect the combined assessment of frequency, intensity, and recovery difficulty.

imate Impact	omen Affected (%)	en Affected (%)	verity Score (1-5)
op Loss			2
ater Scarcity			5
od Insecurity			0
splacement			8
ealth Issues			9
come Loss			1

Impact-by-Impact Analysis

Water Scarcity (Severity: 4.5/5)

The highest severity score and the largest gender disparity (90% women vs. 60% men). In drought-prone Kirundo and across all provinces, women bear the primary responsibility for water collection. As water sources dry up or become contaminated, women walk longer distances, face safety risks, and have less time for agricultural work or rest. This is a daily, life-consuming burden that intensifies with every climate shock.

Crop Loss (Severity: 4.2/5)

85% of women vs. 70% of men affected. Women are the primary cultivators of subsistence crops but lack access to improved seeds, irrigation, and climate-resilient farming techniques (40% training gap). When crops fail, women face the immediate burden of finding alternative food sources for their families while men may migrate for wage labor.

Income Loss (Severity: 4.1/5)

The only category where men are more affected (80% vs. 75%). This reflects men's dominance in cash crop production and market-oriented activities. However, women's lower absolute income loss masks a more severe impact: women have fewer alternative income sources and less savings to buffer shocks. A 75% income loss for a woman with minimal baseline income is more devastating than an 80% loss for a man with diversified income streams.

Food Insecurity (Severity: 4.0/5)

80% of women vs. 65% of men. Women are the primary food managers in households. When food is scarce, women reduce their own consumption first to feed children and men. This creates hidden nutritional deficits, particularly for pregnant and lactating women. The psychological burden of managing household food insecurity also falls disproportionately on women.

Health Issues (Severity: 3.9/5)

85% of women vs. 50% of men — the second-largest gender disparity. Women face reproductive health vulnerabilities (maternal

mortality, pregnancy complications) that are exacerbated by climate stress. Displacement increases exposure to waterborne diseases, and women's caregiving responsibilities multiply when family members fall ill. Mental health impacts from climate trauma are significant but underreported.

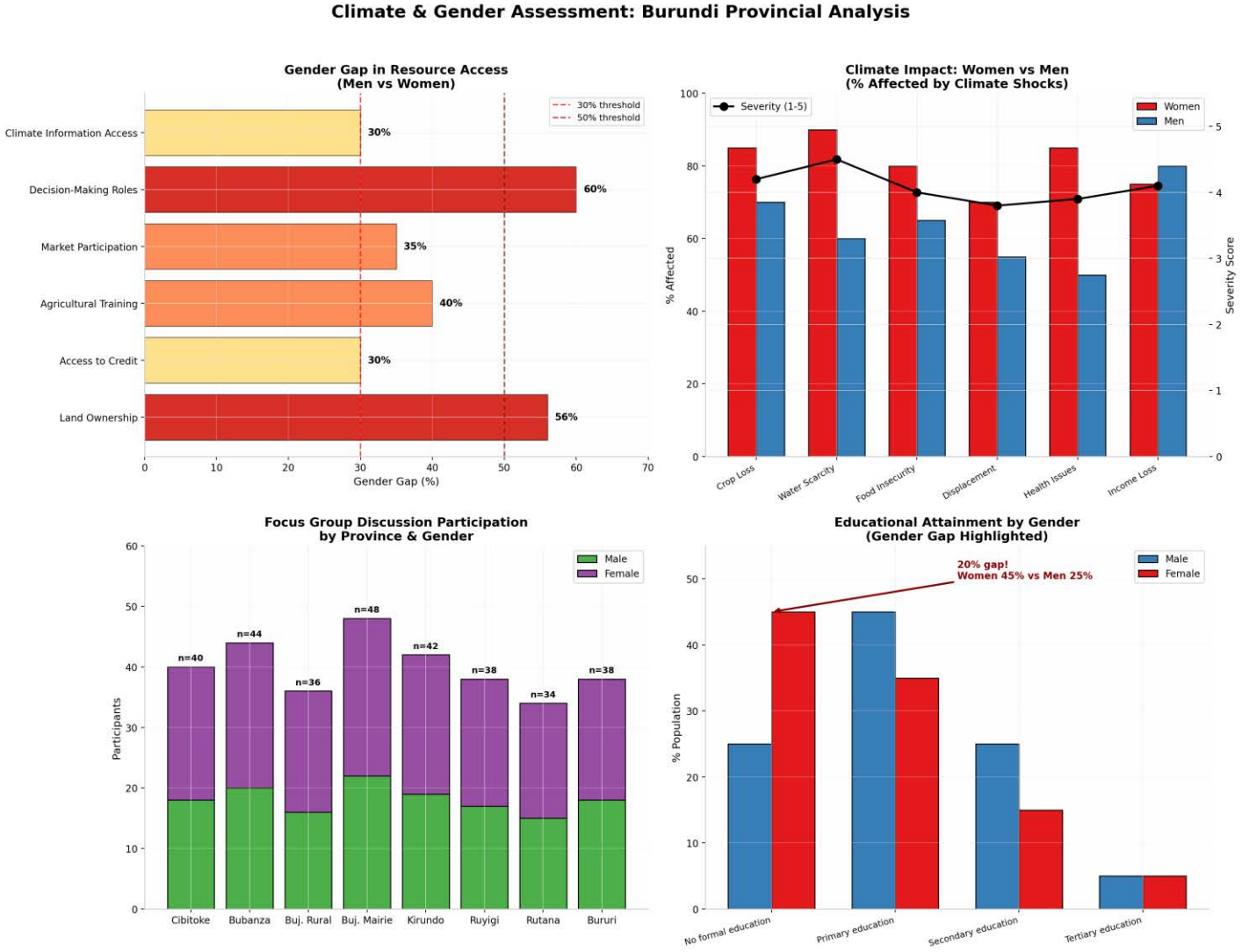
Displacement (Severity: 3.8/5)

70% of women vs. 55% of men. While displacement affects fewer people overall, its impacts are concentrated and severe for women. IDP camps lack gender-segregated facilities, female protection officers, and safe spaces. Women report increased GBV, loss of livelihood assets, and breakdown of social networks. The psychological stress of displacement is compounded by women's responsibility for maintaining family cohesion in crisis.

The following charts provide visual representations of the key findings from this assessment. These visualizations are designed to support programmatic design, advocacy, and resource mobilization.

Dashboard 1: Four-Panel Overview

This dashboard presents: (1) Gender Gap in Resource Access, (2) Climate Impact comparison between Women and Men, (3) FGD Participation by Province and Gender, and (4) Educational Attainment by Gender.



Dashboard 2: Risk Matrix & Vulnerability Bubble Chart

This dashboard presents: (1) Climate Risk Type by Province (heatmap), and (2) Climate Impact Vulnerability Bubble Chart showing the relationship between women's and men's affected percentages, with bubble size representing severity score and color representing gender gap intensity.

