ADAPTATION FUND

AFB/PPRC.36/Inf.11
15 September 2025

Adaptation Fund Board
Project and Programme Review Committee
Thirty-sixth Meeting
Bonn, Germany, 7-8 October 2025

PROPOSAL FOR BURUNDI

ADAPTATION FUND BOARD SECRETARIAT TECHNICAL REVIEW OF PROJECT/PROGRAMME PROPOSAL

PROJECT/PROGRAMME CATEGORY: Regular-sized Project Concept

Country/Region: Burundi
Project Title: Strengthening resilience to extreme weather events - drought and flooding - for smallholder farmers in the rural regions of Burundi
Thematic Focal Area: Agriculture, Food security, Forests, Nature-based solutions, and Ecosystem-based adaptation
Implementing Entity: Sahara and Sahel Observatory (OSS)
Executing Entities: Office Burundais pour la Protection de l'Environnement (OBPE), Africa Apiculture Consortium (AAC)
AF Project ID:
IE Project ID: **Requested Financing from Adaptation Fund (US Dollars):** 10,000,000
Reviewer and contact person: **Co-reviewer(s):** Naoki Uozawa
IE Contact Person:

Technical Summary	The project "Strengthening resilience to extreme weather events - drought and flooding - for smallholder farmers in the rural regions of Burundi" aims 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. This will be done through the four components below: Component 1: Establishment and strengthening of tools for the sustainable management of extreme weather events. (USD 2,200,000); Component 2: Enhance the resilience of ecosystems and the most vulnerable populations to the impacts of climate change through concrete adaptation measures (USD 3,950,000); Component 3: Develop and promote value-added products to expand income opportunities and improve market access for economic resilience and stability. (USD 1,650,000) Component 4: Enhancing knowledge Management, awareness creation and information sharing. (USD 700,000) <u>Requested financing overview:</u> Project/Programme Execution Cost: USD 731,000

	Total Project/Programme Cost: USD 9,231,000 Implementing Fee: USD 769,000 Financing Requested: USD 10,000,000 This proposal contains a project formulation grant of USD 50,000. The initial technical review highlighted several issues, such as the need to amend the financing overview, estimation of the environmental benefits, sustainability of initiative, full cost of adaptation reasoning and findings of the initial gender assessment as is discussed in the number of Clarification Requests (CRs) and Corrective Action Requests (CARs) raised in the review. This second technical review finds that some of the issues raised in the initial review were not thoroughly addresses such as project/programme cost-effectiveness, alignment with results framework of the adaptation fund, ESS issues in particular clarity on gender assessment and incorporation of discussion with indigenous people and clarifying the EE for the PFG as reflected in the remaining Clarification Requests (CRs) and Corrective Action Requests (CARs) included in the review. This third technical review still finds key issues such as the feasibility of the proposed solutions and Results Framework as reflected in the remaining Clarification Requests (CRs) and Corrective Action Requests (CARs) included in the review. Please be advised that the findings of the AFB Secretariat's review of the funding proposal(s) do not reflect, indicate, or prejudge the outcome of the reaccreditation process currently underway. The Implementing Entity (IE) shall acknowledge that the funding proposal will not be approved by the Board if the IE's accreditation has expired, and reaccreditation has not been achieved at the time of the Board's decision. Notwithstanding this potential risk, the IE has elected to proceed with the development of the funding proposal.
Date:	July 25 2025

Review Criteria	**Questions**	**First Technical Review Comments April 24, 2025**	**Second Technical Review Comments June 17, 2025**	**Third Technical Review Comments July 25 2025**

Country Eligibility	1. Is the country party to the Kyoto Protocol, and/or the Paris Agreement?	**Yes.**	-	-
	2. Is the country a developing country particularly vulnerable to the adverse effects of climate change?	**Yes.** The country is vulnerable to climate change and changes in precipitation patterns 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. 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.	-	-
Project Eligibility	1. Has the designated government authority for the Adaptation Fund endorsed the project/programme?	**Yes.** As per the Endorsement letter dated 23 January 2025.	-	-
	2. Does the length of the proposal amount to no more than Fifty pages for the project/programme concept, including its annexes?	**Yes.** **CR1:** In the project components and financing table please remove the USD in the amount column related to component 2.	**CR1: Cleared** as per information on page 15. **CR2: Not cleared.** The ToC is not legible. Perhaps switching the page from portrait to	**CR2: Not Cleared.** The revised Theory of Change in Annex 3 is appreciated; however, key assumptions behind the proposed solutions remain insufficiently substantiated. As noted in CR4, CR5, and

		CR2: Please ensure that there is a legible theory of change at Annex 3.	landscape will help increase visibility**.**	CR6, further clarification is needed to validate the feasibility of the underlying logic.
	3. Does the project / programme support concrete adaptation actions to assist the country in addressing adaptive capacity to the adverse effects of climate change and build in climate resilience?	**Yes.** The goal of the project is 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. Adaptation actions include 1) national parametric insurance scheme for resilience in the agriculture sector, 2) building adaptive capacity of farmers through training in use of climate information and risk management, and 3) establishing cooperatives and supporting opportunities for income diversification through value added products. Syntrophic agroforestry practices are also embedded to support agriculture and address land degradation issues.	**CR3: Cleared** as per information in paragraph 84. Outcome 4.1 clearly indicates the development of enabling policies. **CAR1: Cleared** as per information in paragraphs 83, 87- 88. The concept elaborates on activities to influence the current paradigm.	**-**

		These activities support two of the AF strategic objectives: action and innovation (e.g. parametric insurance for farmers). **CR3:** Component 4 appears to be a mixture of policy or strategy development and knowledge management. Please clarify if an adaptation strategy be developed or will these processes under this component only inform adaptation strategies or environmental policies that will be developed external to the project? **CAR1**: Please clarify how the project will address the "current paradigm" specifically related to changing attitudes and practices of the communities as none of the activities seem to specifically address this and can impact the sustainability of the project outcomes.		
	4. Does the project / programme provide	**Yes.**	**CAR2: Not Cleared.**	**CAR2: Not Cleared**

	economic, social and environmental benefits, particularly to vulnerable communities, including gender considerations, while avoiding or mitigating negative impacts, in compliance with the Environmental and Social Policy and Gender Policy of the Fund?	The project concept clearly identifies economic, social and environmental benefits, especially to vulnerable communities and groups. Estimated benefits are quantified for economic and social aspects. Women and youth are identified as the vulnerable groups and are targeted in the project. At least 60% of the activities will benefit women, including female youth in the design and adoption of innovative solutions. As per benefits, measures have been designed such as free childcare to allow women to participate in the training. The project therefore aligns with the Adaptation Fund's Gender Policy ensuring equal access, non-discrimination and empowerment. Gender-focused discussions and a gender assessment were conducted to tailor the project's strategies to support these groups	The information at Section J related to the types of risk related to Gender Equality and Women's Empowerment is noted. However, 1. Please clarify why the PFG is requesting US$ 8,500 to "Conduct participatory gender analysis and organize community consultations in the six provinces to validate project design and concreate community-based adaptation pathways." if a "A detailed Gender Analysis and Action Plan (GAAP) has already been conducted and will be fully integrated into the full proposal to guide implementation". 2. The risk categorization A, B or C is required for the overall project not the various ESS principles. Please delete the risk level column inserted into the table at Section J.	1. The proposal has not yet addressed this clarification on PFG for GAAP. Please address. In addition, the response provided in the response sheet does not appear to be reflected in the proposal itself. Please include the response in the review sheet, ensuring that it addresses the comment raised. 2. This aspect is addressed. The revised proposal include the risk categorization as B (para 154). The risk level column has deleted as requested.

		effectively. The project aims to achieve a gender balance of more women than men (57:43), particularly targeting female-headed households. It also aligns with the Environmental and Social Policy whereby a comprehensive Social and Environmental Safeguards assessment to mitigate negative impacts will be conducted. There are no concerns of negative development or maladaptation. **CAR2:** Please clarify the risk narrative associated with Gender Equality and Women's Empowerment. **CAR3: -** Please estimate/quantify the environmental benefits. **CAR4:** Page 39 states that "Gender-focused discussions and a gender assessment were conducted to tailor the project's strategies to support these groups	**CAR3: Cleared** as per information in paragraphs 103-109. The concept quantified environmental co-benefits linking to practices and more functional outcomes. **CAR4: Cleared** as per information in Annex 4: Gender Assessment Summary which confirms a gender assessment was conducted.	

		effectively" However in page 43 it states, "Further Gender Assessment will be integrated into the full proposal and will guide project implementation". It is not clear whether the gender assessment was already done or will be done. If it has already been done, please share in a brief statement the findings and if possible, include in the Annexes.		
	5. Is the project / programme cost effective?	The project explains clearly the appropriateness of the intervention based on risks and community needs. It also provides a logical explanation on the approach noting that '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.' However, further clarification is required.	**CAR5: Cleared** as per information in paragraph 115 for Component 2 and paragraph 119 for Component 4. **CR4: Not Cleared.** The revised proposal provides additional details on the blockchain-based traceability system (paras. 135–139). However, several critical gaps remain: **1. Data Accuracy and Farmer Incentives** The effectiveness of blockchain depends on the accuracy of initial data inputs. Without	**CR4: Not Cleared** Although the additional details provided in paras.145–149 are appreciated, it remains largely conceptual. The revision does not yet fully address the core concerns raised. Further detailed information and analysis are needed on, specifically: 1. How accurate data input will be ensured at the point of entry

		CAR5: Please provide alternative scenarios for components 2 to 4 to further justify the cost effectiveness of the proposal. **CR4:** The proposal introduces an ambitious blockchain-based traceability system for livestock, but further clarity is needed regarding its feasibility in rural Burundi, in relation to digital infrastructure, hardware, and technology partnerships. Please clarify the following: 1. How will infrastructure gaps (e.g. electricity, mobile/internet connectivity) in target communes be addressed? 2. What are the plans for procuring and maintaining essential tools such as RFID tags and mobile devices if needed?	reliable entry mechanisms—particularly in rural areas with low digital literacy—blockchain may simply preserve inaccurate records. In addition to training, farmers must perceive clear value or incentives for accurate data entry to ensure sustained engagement. Please clarify how the project will build this motivation and ensure data quality at the point of entry. **2. Clarification of Livestock and Farmer Profile** While the proposal refers to "livestock," it does not specify which species are targeted (e.g., cattle, goats, poultry). This information is essential, as the feasibility and design of traceability tools—such as RFID tags, vaccination records, and market linkage strategies—depend on species-specific requirements.	2. What concrete incentives will motivate farmers to engage with the system 3. Which livestock species and farmer profiles are targeted 4. How stakeholder roles and agreements will be clearly defined based on these profiles

		3. Has a local technology partner been identified to support platform development, contextual customization, and long-term technical support? **CR5**: The proposal outlines a national warehouse receipt system intended to support farmers with secure crop storage and price risk protection. However, further clarification is needed to assess the system's practicality and long-term sustainability. Specifically: 1. What types of agricultural products are expected to be stored? Some commodities may require advanced infrastructure, such as temperature and humidity control. How will the	Similarly, the profile of the target farmers remains unclear. Please provide more detail on their primary livelihoods, access to mobile technology, and level of digital literacy, as these factors are crucial to assessing the practicality of the proposed digital systems. **3. Cost for Establishing Basic Infrastructure** Please specify the estimated costs for improving internet connectivity (including tower installation and telecom fees), procuring essential tools (such as RFID tags and mobile devices), and deploying offline-capable blockchain nodes. If vendors have not yet been identified, please explain the planned procurement process and selection criteria. **CR5: Not Cleared.**	**CR5: Not Cleared.**

		system address these technical requirements? 2. Who will own and manage the upgraded or newly established warehouses? Will they be publicly operated, privately managed, or run by farmer cooperatives? How will accountability and operational sustainability be ensured? 3. What pricing mechanisms will be applied to protect farmers from market volatility, and how will the system determine fair and reliable reference prices for compensation or risk mitigation? **CR6**: The proposal mentions the establishment of online	The revised proposal provides additional details on the design and operation of the warehouse receipt system (paras. 52–54). However, successful implementation of such systems depends not only on infrastructure and design, but also on farmer trust, effective governance, strong financial linkages, and sustained operational capacity. In many contexts, similar systems have struggled due to unclear farmer incentives, limited accountability—particularly within public-private-parastatal arrangements—and insufficient institutional support. **How does the project plan to address these challenges in the Burundian context?** The proposal identifies a range of agricultural products, including non-perishable staple foods such as dried beans, maize, and processed cassava flour, as well as	While the additional paragraphs (58–59) provide expanded details, it remains largely conceptual. The proposed solution outlines an ambitious design, and does not yet fully demonstrate its practical feasibility. Further clarification is still needed on the following points: 1. **Implementation arrangements**: Please clarify the current status of partnerships. If not yet in place, outline how concrete partnerships with all stakeholders will be structured as part of the fully developed proposal. 2. **Regulatory alignment:** The proposal should demonstrate clear alignment with national grain reserve policies and broader food security strategies in Burundi. 3. **Operational and financial linkages**:

		platforms to support market linkages between farmers, cooperatives, and agribusinesses. To better assess the viability and impact of this intervention, further clarification is requested on the following: 1. Who will own and operate the online platform? Will it be public, private, or cooperative-led? What is the long-term strategy for platform maintenance, technical updates, and financial sustainability? 2. Beyond developing the platform, what is the envisioned mechanism to ensure active and meaningful market linkages between farmers, cooperatives, and agribusinesses? Is the platform intended to	bee products like honey and beeswax. Warehouses are to be operated under a hybrid public-private-cooperative model, with reference prices established to manage market risk. However, market volatility, price formation mechanisms, and distribution systems are inherently complex. Across Africa, many agri-logistics and digital aggregation startups have begun by focusing on a single product. In contrast, this proposal targets multiple commodities—each with distinct shelf lives, quality control requirements, pricing behavior, and market pathways. While warehousing may help manage supply volumes, it does not directly address product quality, or the logistical challenges involved in reaching markets efficiently. Since prices are ultimately determined by	Please provide a diagram that clearly illustrates the operational and financial structure of the warehouse receipt system. This should include all relevant actors, their respective roles, and the flow of goods, receipts, payments, financial flows, and others.

		complement or replace traditional intermediaries (e.g., aggregators, traders, local processors)? **CR7:** The proposal includes a wide range of products such as livestock, crops, bee products, and forestry food products. Each of these value chains has distinct characteristics—such as storage needs, perishability, processing requirements, market channels, and certification standards—that may influence the cost, suitability and impact under the proposed interventions. Please indicate if any prioritization of products been conducted based on the proposal's objectives, particularly in terms of their relevance to climate change adaptation?	the market, the effectiveness of warehouse receipts depends on strong distribution networks and reliable quality assurance systems. Additionally, for staple foods, alignment with national grain reserve regulations and broader food security policies will be essential to ensure legal and policy coherence. **Please provide a more detailed, product-specific analysis of market dynamics, pricing risks, logistics challenges, and relevant regulatory frameworks to demonstrate that the proposed system is technically feasible and appropriate to the local context.** **CR6: Not Cleared.** The revised proposal provides a more detailed explanation of the online platform's structure and	**CR6: Not Cleared.** The more detailed explanation provided regarding the platform's structure and intended

			operations (para. 77). However, it remains unclear which specific markets the platform intends to target. Simply establishing a platform does not guarantee meaningful market linkages. Market access must be grounded in a clear understanding of buyer requirements, transaction conditions, quality standards, and trust-building mechanisms. If the platform aims to reach broader local, regional, or international markets, it would benefit from drawing lessons from other successful platforms elsewhere — for example: which actors led those initiatives, how they were structured, and what mechanisms enabled sustained participation by both buyers and producers. **CR7: Not Cleared.** Please refer to comments under CRs 4-6.	operations is appreciated; however, the proposal remains largely conceptual. While the platforms cited as examples were developed by dynamic startups that grew rapidly by leveraging market forces rather than relying primarily on grant-based support, their success was shaped by commercial incentives - which may not fully align with the institutional and operational realities of this project's context. Further clarification is still needed on several key aspects, including: 1. The proposed governance model for platform ownership, oversight, and long-term accountability 2. A clearer understanding of target markets, including buyer requirements, transaction conditions, and quality standards

				3. Mechanisms for building trust and ensuring sustained participation among both farmers and buyers
	6. Is the project / programme consistent with national or sub-national sustainable development strategies, national or sub-national development plans, poverty reduction strategies, national communications and adaptation programs of action and other relevant instruments?	**Yes.** **However, more updated information is required.** The project concept makes reference to national policies, programmes and sector strategies/strategic plans, though some are outdated such as the e.g. Strategic plan: National Action Plan for Adaptation (NAPA), and Strategic plan: National Climate Change Strategy and Action Plan, 2012. While the poverty reduction strategy is not mentioned, the concept does address the national development plan which focuses on economic strengthening and generation of employment opportunities. The Ministry of Agriculture was consulted as part of the development of the concept note. Burundi has	**CAR6: Not cleared.** Although it is noted that amendments were made to Section C, it is not clear what amendments were made to section 1.5 Climate and Environment Context which requires strengthening. Please address.	**CAR6: Cleared (Page 3)** Additional explanation provided in para 6.

		an NDC published in 2021 with adaptation targets, although it does not have a National Adaptation Plan. **CAR6**: Please strengthen the alignment of the proposal at section 1.5 to The Third National Communications and the Strategic plan: National Agriculture Strategy (2018-2027) which are the most recent documents as well as the 2021 NDC for Burundi.		
	7. Does the project / programme meet the relevant national technical standards, where applicable, in compliance with the Environmental and Social Policy of the Fund?	**Yes.** **However additional information is required.** the project identified the national technical standards such as laws on EIA, forest, environmental code and water code. Compliance with EIA was elaborated. **CAR 7:** Please modify table 3 to reflect specifically, how this project will be responsive to the national standards. Please clarify fi there are no other national technical standards related to	**CAR7: Cleared** as per information in Table 3. The document relates how the various legislations will influence/guide components.	

		blockchain technology, insurance act etc. that should be complied with.		
	8. Is there duplication of project / programme with other funding sources?	**Unsure.** The introduction of index-based microinsurance, Warehouse Receipt System and Syntropic agroforestry for smallholder farmers are a novel initiative. Currently, there is no agricultural insurance nor Warehouse Receipt System in the country, so this initiative ensures there won't be any overlap with existing financial support mechanisms. The concept note highlights alignment and or complementarity with existing projects. However, further revision is required. **CAR 8:** Please specify in "Table 4: Ongoing and planned initiatives related to Agriculture and Restoration in Burundi" whether projects are GEF, GCF, or AF funded. Please also include an	**CAR8: Cleared as per information in Table 4.** The project donors have been listed and the new GCF project -SAP045: Scaling up Climate Resilience Solutions for Burundian Smallholders, has been included. An assessment has been provided on alignment with the current project. **CAR9: Cleared** as per information in Table 4. A lesson-learned section has been included for each project that informs us of this new initiative. **CR8: Cleared as per information in paragraph 47.** ACRE Africa will serve as a technical advisory partner in the steering committee. **CR9: Not cleared.** Given there are no activities related to infrastructure upgrade, it is assumed that infrastructure will not	**CR9: Not Cleared.** The proposal states that it will utilize existing climate data infrastructure operated by IGEBU and the Burundi Meteorological Service (paras. 51–52). If formal access agreements are not yet in place, please clarify the current status and provide a strategy for securing such agreements in coordination with relevant national institutions. While paras. 51–52 state that no new infrastructure will be created, the proposed blockchain systems appear to require supporting infrastructure. This inconsistency should be clarified.

		assessment of the project's alignment with GCF project-SAP045: Scaling up Climate Resilience Solutions for Burundian Smallholders. **CAR 9:** Please indicate the lessons learned from existing projects listed during design and or implementation that can inform this new initiative. **CR8:** Component 1 seeks to build on ACRE Africa's expertise, please clarify the role that ACRE Africa will play in this project (if any), since they are not identified as an EE and or how the project will build on this work. Please also clarify if there is any possible duplication of efforts. **CR9:** Component 1 also indicates "upgraded climate date infrastructure…" please clarify if the if the project is building on an existing system and provide details of how the project will not	be upgraded. The proposal is indicating the Burundi Met Services is using an upgraded climate data infrastructure. Please confirm yes or no as this would mean no duplication of efforts.	

		duplicate efforts if this is the case.		
	9. Does the project / programme have a learning and knowledge management component to capture and feedback lessons?	**Yes.** **However, amendment is required.** The concept has a single component on knowledge management, awareness and information sharing (Component 4). It includes several activities inclusive of a knowledge sharing platform to promote strategies and best practices. A valuable central repository will be created for disseminating cutting-edge research, innovative adaptation strategies, and successful practices - this can allow for capturing traditional knowledge and intergenerational knowledge exchange. **CAR 10:** Component 4, Outcome 4.1 refers to the "number of policies being adjusted to address climate risk" as an indicator. Therefore, it appears to be more accurately categorised as a policy-related component. Component	**CAR10: Not cleared.** As currently presented, the alignment table contains 5 objectives with outcomes associated. These do not align with the outputs selected in the bottom part of the table. The table should be prepared such that the outcomes identified in the top part of the table, should correspond to the outputs identified in the bottom part of the table. Therefore, if outcome 5 is selected up top, the outputs corresponding should be identified in the bottom part of the table. 1. To be consistent with the template, the first row of the alignment table should capture the project's overall objective **only.** 2. Although the second row can include a sub-objective, the following rows should each contain the various project components. In the second column project outcome	**CAR10: Not Cleared.** The revised results table in Part III lacks target figures for the listed indicators. The total grant amount appears to exceed the USD 10 million requested by the project. Please address.

		4, Outcome 4.2 can then focus solely on knowledge management. Please note this comment is also related to CR1 above. Please amend.	indicator should be included. Columns 3 and 4 should contain AF outcomes and outcome indicators respectively and the final column should contain the grant amount associated with each Fund outcome indicate. The same format should be adopted for the outputs section- Second part of the table. That way the top half and the bottom half corresponds, and the totals should be the totals of the project activities. **3.** Please ensure that the fund outcomes and fund outcome indicators are correctly numbered and worded. Eg. The fund outcome indicator associated with Outcome 5 is wrongly labelled as 5.1 please correct. Also, the fund outcome indicator associated with Outcome 7 is wrongly labelled as 7.1 please correct. Also check wording on	

			output 1.2, output indicator 2.1.1.; There is no output 5.1 rather output 5 with output indicator 5.1 etc.	
	10. Has a consultative process taken place, and has it involved all key stakeholders, and vulnerable groups, including gender considerations in compliance with the Environmental and Social Policy and Gender Policy of the Fund?	**Yes.** However additional information is required. **CAR11:** 1. The concept provides a summary of a comprehensive gender-responsive process that took place during project design. Although reference was made to a gender study, please incorporate the findings into the proposal at Part II Section B of the proposal under Social sub-section. 2. The project concept also includes the target areas where marginalized and vulnerable groups have been identified and consulted and takes into account their interests or concerns in designing the project concept. Please clarify if there	**CAR11: Not cleared** as per information in paragraph 94**.** The proposal now makes reference to the gender assessment under social co-benefits. It further clarifies that there are three indigenous people and ethnic groups which were consulted in targeted focus groups and concerns incorporated. However, it is unclear where this information was integrated. Discussion with indigenous people should be included in the section on consultation as with similar vulnerable stakeholders (Table 7)	**CAR11: Cleared** Additional explanation is provided in paragraph 142. At the fully developed proposal stage, please provide detailed information on the consultation process, including stakeholders engaged, methods used, and key outcomes.

		were any indigenous people groups in the project area, if there were consulted and how these findings were integrated in the design of the concept note.		
	11. Is the requested financing justified on the basis of full cost of adaptation reasoning?	**Yes.** The project concept demonstrates that the activities are relevant in addressing its adaptation objectives and it also shows that taken solely, without additional funding from other donors, they will help achieve these objectives.	**-**	**-**
	12. Is the project / program aligned with AF's results framework?	**No.** **CAR12:** 1. The Alignment Table (Table A) has to be revised to ensure that the project objectives are better aligned with the indicators. For example, Project Objective 1. which speaks to improvement of ecosystem health and agricultural productivity, seems to be better aligned with	**CAR12: Not Cleared.** Please refer to **CAR10.**	**CAR12: Not Cleared.** Please refer to **CAR10.**

		the Indicator for Objective 2. Similarly, Project Objective 2. is better aligned with Project indicator 3. since they both address market access and linkages. Likewise, Objective 3 is better aligned with Indicator 1 since they speak to traceability and insurance. 2. In addition, Fund Outcomes must coincide with the Outcomes listed in Annex 5 (Amended version). Thus, Fund Outcome 3 should be: Strengthened awareness and ownership of adaptation and climate risk reduction processes at local level and not Reduced risk exposure through innovative financial solutions which is stated in Table A. 3. Please also ensure that the outcomes selected correspond are aligned		

		with the output selected. As each outcome has corresponding outputs.		
	13. Has the sustainability of the project/programme outcomes been taken into account when designing the project?	**Yes.** **However, further revision is required.** The project addresses some of the key areas of sustainability - economic, social, environmental, institutional, and financial, outlining some of the ways in which the main challenges will be addressed – through governance, capacity building, and improved climate-smart technologies. It also cites examples of successes in the application of blockchain applications in agriculture and parametric schemes in other African countries, based on studies by the World Bank and other agencies such as ITU and FAO. **CAR13:** The dependence on internet connectivity and mobile technology creates access gaps, especially by vulnerable groups which must be	**CAR13: Cleared** as per information in paragraphs 135-139. The projects will use strategies to address the digital divide, and provision of user interfaces in local languages and training youth as digital literacy facilitators etc. Please ensure this is adequately budgeted for in the proposal.	-

		factored in by the project. Infrastructure maintenance to overcome some of the technological challenges must also be considered. In addition, low adoption rates by farmers could also threaten long term sustainability. Strategies to deal with these challenges should be included in the sustainability plan.		
	14. Does the project / programme provide an overview of environmental and social impacts identified / risks, in compliance with the Environmental and Social Policy and Gender Policy of the Fund?	**Yes.** **However additional information is required.** The potential environment and social risks have been identified against each of the ESP principles and the checklist completed, considering all potential impacts. The risks that require further assessment and management for compliance and those that do not require further assessment have also been identified. **CAR14:** Please categorize the risks (A, B or C) and	**CAR14: Cleared** as per information in Section J. The risk level for each principle has been assigned and summaries provided for all. **CAR15: Cleared** as per information in Section J. The gender assessment undertaken has been included under Gender Equality and Women's Empowerment. **CR10: Cleared** as per second column of Table in Section J. **CAR16: Cleared** as per information for principle	-

		summarize the conclusions presented in the risk table. **CAR15**: Please include an initial gender assessment (if it has already been done) providing qualitative and quantitative data for gender roles, activities, needs, and available opportunities and challenges or risks for men and women. **CR10:** Please remove the "X" under the Potential impacts and risk-further assessment and management required for compliance. **CAR16:** 1. Please confirm that the indigenous groups/ethic groups of Twa, Tutsi and Hutu are not present in the 12 communes and 6 provinces in which the project will be undertaken. IF they are present, please amend Part II under ESP 7- Indigenous Peoples appropriately.	related to Indigenous Peoples, and mitigation measure for Cultural Heritage has been amended**.**	

		2. Under Physical and Cultural Heritage please relocate the risk mitigation measure into the appropriate column.		
Resource Availability	1. Is the requested project / programme funding within the cap of the country?	**Yes.**	-	-
	2. Is the Implementing Entity Management Fee at or below 8.5 per cent of the total project/programme budget before the fee?	***Yes.***	-	-
	3. Are the Project/Programme Execution Costs at or below 9.5 per cent of the total project/programme budget (including the fee)?	**CAR17:** Please ensure that the Project execution costs is listed in the summary of the project component and financing table as required by the AF template.	**CAR17 Cleared. Project** Execution Cost has been added, valued at US$731,000**.** **CRNEW1:** Please confirm if the PFG will be executed by Office Burundais pour la Protection de l'Environnement (OBPE); Africa Apiculture Consortium (AAC) as currently indicated in the PFG. If it is the intention for OSS to execute the PFG please indicate this in the PFG form and remove the EEs who will support the	-

			implementation of the full proposal.	
Eligibility of IE	1. Is the project/programme submitted through an eligible Implementing Entity that has been accredited by the Board?	**No.** OSSs accreditation Expired on 22 January 2024 and is undergoing re-accreditation. Please be advised that the findings of the AFB Secretariat's review of the funding proposal(s) do not reflect, indicate, or prejudge the outcome of the reaccreditation process currently underway. The Implementing Entity (IE) shall acknowledge that the funding proposal will not be approved by the Board if the IE's accreditation has expired, and reaccreditation has not been achieved at the time of the Board's decision. Notwithstanding this potential risk, the IE has elected to proceed with the development of the funding proposal.	**No.**	**No.**
	1. Is there adequate arrangement for	n/a at concept stage		

Implementation Arrangements	project / programme management, in compliance with the Gender Policy of the Fund?			
	2. Are there measures for financial and project/programme risk management?	n/a at concept stage		
	3. Are there measures in place for the management of for environmental and social risks, in line with the Environmental and Social Policy and Gender Policy of the Fund?	n/a at concept stage		
	4. Is a budget on the Implementing Entity Management Fee use included?	n/a at concept stage		
	5. Is an explanation and a breakdown of the execution costs included?	n/a at concept stage		
	6. Is a detailed budget including budget notes included?	n/a at concept stage		
	7. Are arrangements for monitoring and evaluation clearly defined, including budgeted M&E plans and sex-	n/a at concept stage		

	disaggregated data, targets and indicators, in compliance with the Gender Policy of the Fund?			
	8. Does the M&E Framework include a break-down of how implementing entity IE fees will be utilized in the supervision of the M&E function?	n/a at concept stage		
	9. Does the project/programme's results framework align with the AF's results framework? Does it include at least one core outcome indicator from the Fund's results framework?	n/a at concept stage		
	10. Is a disbursement schedule with time-bound milestones included?	n/a at concept stage		

ADAPTATION FUND

CONCEPT NOTE PROPOSAL FOR SINGLE COUNTRY

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:	Office Burundais pour la Protection de l'Environnement (OBPE); Africa Apiculture Consortium (AAC)
Amount of Financing Requested:	10,000,000 in U.S Dollars Equivalent
Letter of Endorsement (LOE) signed:	Yes ☒ No ☐

Stage of Submission:

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:

[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

PART I: PROJECT INFORMATION

1. Project Background and Context

1.1. 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.

1.2. 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]).

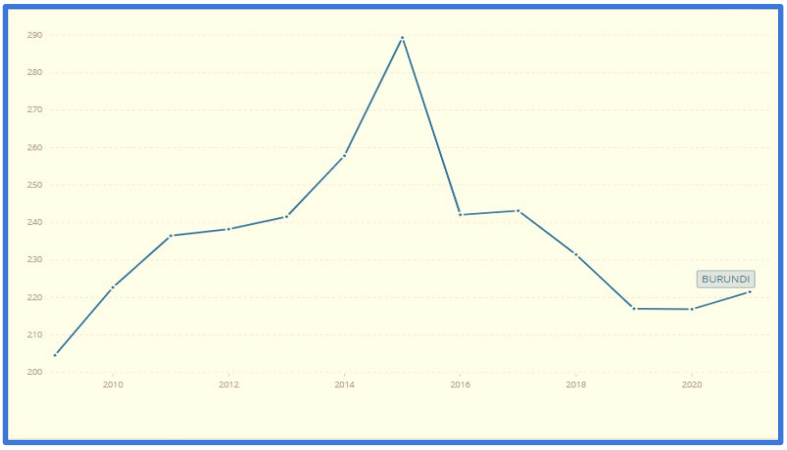

Figure 1: Burundi's GDP per capita trend from 2010 to 2020 (World Bank, 2021).

This makes the integration of traceability, insurance, and finance using blockchain technology even more important, as it can help address these challenges and provide smallholders with greater economic stability and access to resources. 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%

[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

of the credit portfolio, and 66.2% of 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

4. 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).

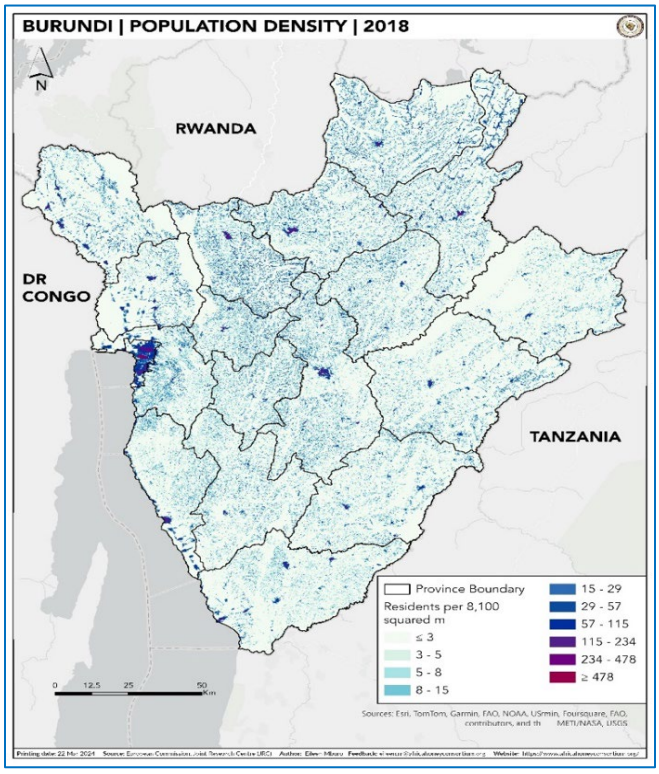

Figure 2: Population density of Burundi.

Smallholder farmers in Burundi are typically poor and vulnerable, with limited access to education, health care, and other social services (IFAD, 2019[15]). Women and youth are particularly vulnerable, as they often face barriers to accessing resources and decision-making processes in the agricultural sector (FAO, 2021[16]). 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.

a. Development Context

5. 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

[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

country faces numerous development challenges, including poverty, food insecurity, 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]).

1.3. Climate and Environmental Context

6. 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 blockchain traceability, parametric insurance, and syntropic agroforestry components (Republic of Burundi NDC, 2021).

i). Land Degradation

7. 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

[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

in agricultural land, with a loss of soil evaluated at 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)

8. 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

[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.

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 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

9. 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.

10. 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

[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

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. 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].

11. 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)

12. 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.

13. 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

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

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 seasons, reduced river flow, and erosion.

14. 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)

15. 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

[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.

value chains for high-value crops," directly supporting this project's focus on beekeeping integration, syntropic agroforestry, and blockchain 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).

16. Climate projections indicate a precipitation increase of up to 10%, that will be particularly important in the 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

17. 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

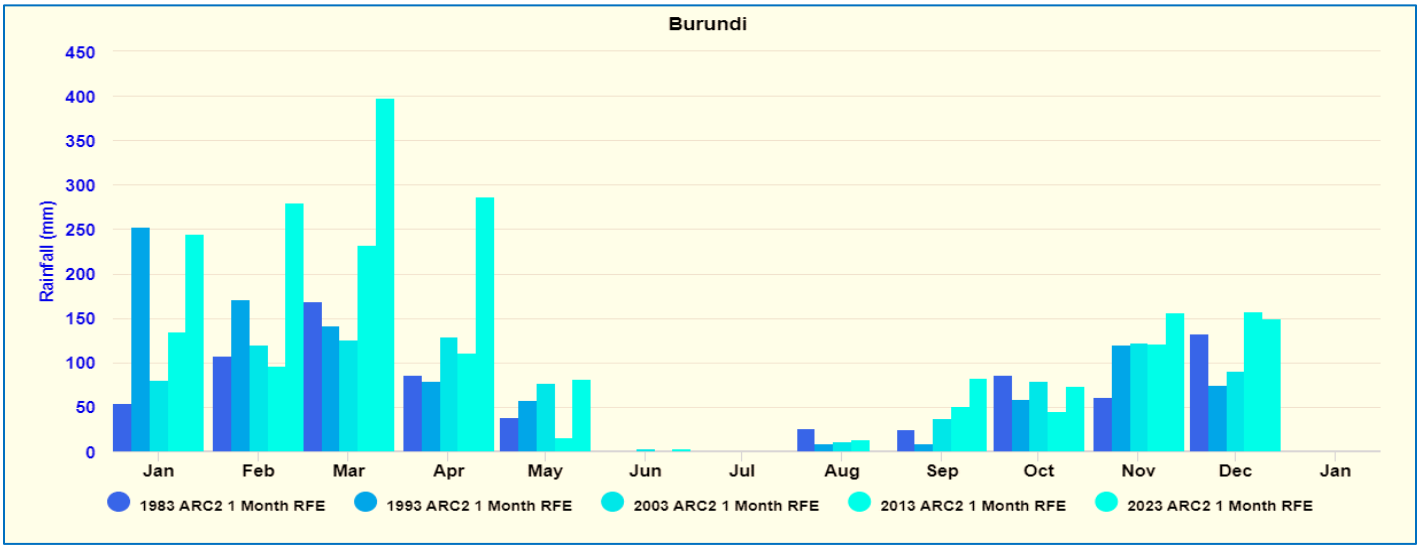

Figure 3: Changes in Rainfall Pattern in Burundi

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

18. 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

[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.

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 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.

19. 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).

20. 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

21. 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.

22. 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

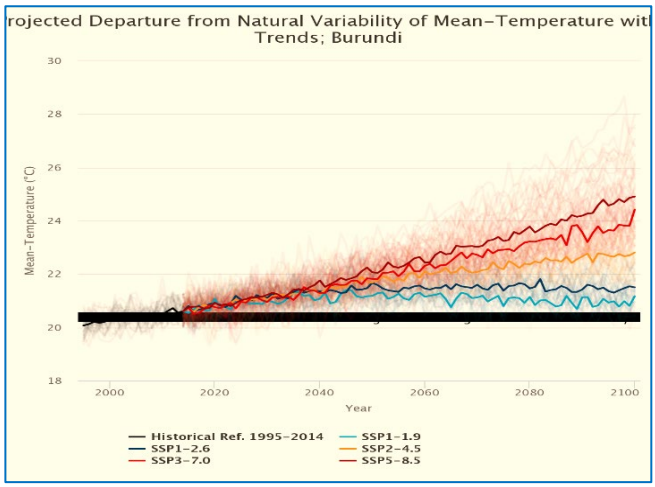

Figure 4: Mean temperature changes in Burundi

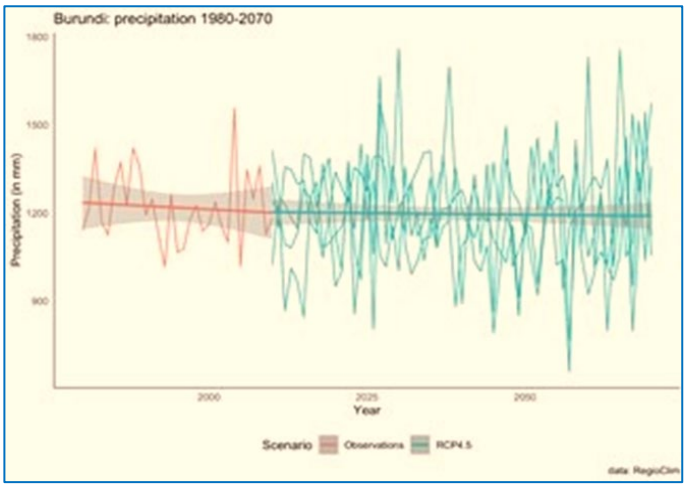

Figure 5:Precipitation changes in Burundi

that reflects the needs and capacities of all stakeholders.

23. 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.

24. 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

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.

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 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 blockchain 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

25. 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.
26. 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.
27. 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.

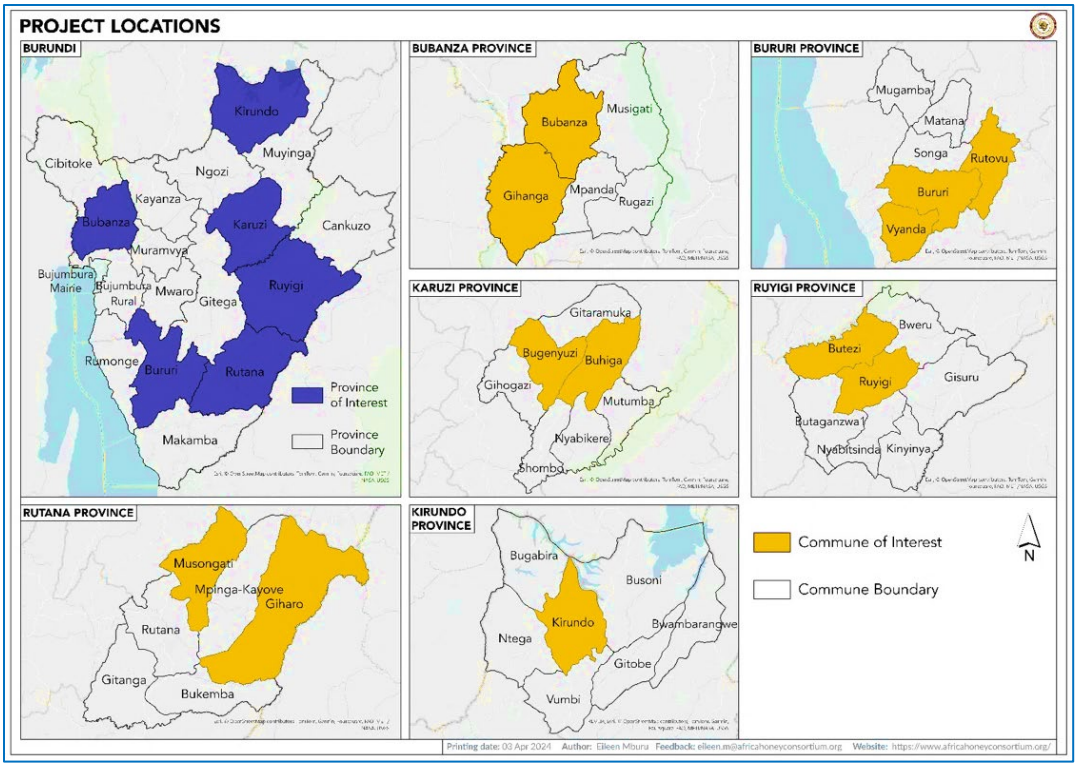

Figure 6: Project Locations

a. Project Impacts

28. 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 introduction of blockchain traceability and parametric insurance systems is a novel approach to manage risks associated with market risk and climate variability respectively. Blockchain technology, will enable market access ensuring products meet the SPS standards and offers Price Risk-Protected Warehouse Receipt System. Parametric insurance, in particular, offers a financial safety net against extreme weather events, thus improving the resilience of the farming community. These technologies will enable farmers to have better access to climate information, thereby making informed decisions.

(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 km²				
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**

29. 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 km² 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.

2. Project Objectives

30. The project will roll out the primary innovation designed to significantly increase the adaptive capacity of the farmers in rural areas of Burundi, predominantly women, to respond to the negative impacts of climate change stated above. The overall goal of the project *is 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.* The overarching aim is to build the capacity of rural communities to withstand and thrive in the face of environmental and climate challenges, thereby enhancing their overall well-being and reducing vulnerability to climate-related impacts. 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 Economic Diversification**: Boost economic diversification and market access for smallholder farmers to improve livelihoods and ensure food security in the context of climate variability.
3. **Build Resilience to Climate Risks**: Increase resilience to climate variability and extreme weather events for small-scale farmers and communities by leveraging innovative solutions such as blockchain traceability, parametric insurance technologies, and enhanced access to climate information.
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

[55] Global Data Lab: https://globaldatalab.org/areadata/table/hhsize/BDI/

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.

31. 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.

2.1. Current Paradigm

32. The current paradigm in Burundi is characterized by a series of challenges that pertain to climate change adaptation activities. 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 as 30 tonnes per hectare per year in some regions (FAO, 2021[58]).

33. 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.

34. 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

[56] Ministry of Environment, Burundi. (2020). National Report on the State of the Environment.
[57] United Nations Environment Programme (UNEP). (2022). Global Environment Outlook.
[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.

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.

35. 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.

36. 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]).

i). Food Insecurity and Climate Risk

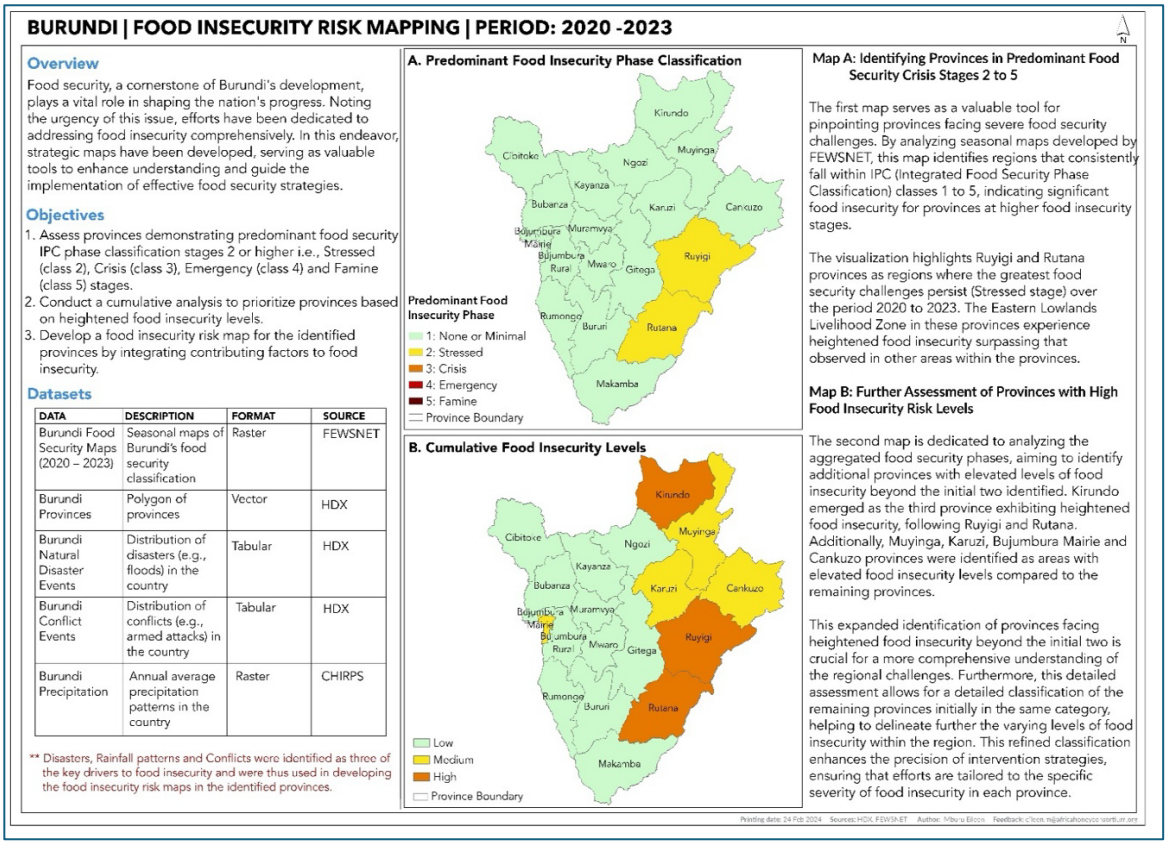

Figure 7:Burundi Food Insecurity Mapping

37. 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,

[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.

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].

38. 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].

39. 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 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

40. 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].

41. 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

42. 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

[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
[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

needs (WFP, 2022)[75].

43. 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].

2.2. Desired paradigm

44. The project's desired paradigm focuses on collective management of natural and rural land resources to enhance the adaptive capacity of rural landscapes and vulnerable households. This paradigm aims to provide diversification and alternative income sources, as well as agriculture contributions to food security. It represents a significant shift in addressing the complex challenges posed by climate change and land degradation in Burundi.

45. The project's primary goals are twofold: empowering vulnerable households with increased adaptive capacity and optimizing land and agriculture practices for climate resilience and food insecurity reduction. This paradigm goes beyond mere conceptualization and requires a comprehensive restructuring of governance, farming methods, and community engagement. It adopts an approach that prioritizes climate-resilient agricultural practices, informed decision-making, and sustainable land management. This shift sets the stage for greater economic security and ecosystem conservation.

46. To achieve these goals, the project will implement several key initiatives: a) Improving Governance and Information Availability: This aligns with the grant's priority on adaptation. The project aims to enhance governance structures and information availability to facilitate climate-responsive agriculture planning[79]. This includes measures to improve ecosystem productivity and foster informed decision-making in rural communities; b) Institutionalizing Communal Adaptive Management: The project seeks to institutionalize adaptive management in communal agricultural production systems. This involves aspects such as crop rotation, farm/crop health, crop composition, record-keeping, and off-take, all of which are crucial for climate-resilient agriculture[80]; and c) Rewarding Collective Action and Market Access: The project aims to reward collective action that leads to improved ecosystem health. It achieves this by unlocking market access and enterprise development opportunities. It also aims to raise awareness within the industry and among consumers for regenerative agriculture products, which contributes to adaptation while ensuring income security for vulnerable farming households and maintaining low-emission production systems.

47. 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

[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/P176820078885e00780b1cc093a09277df1a.pdf

[79] https://www.fao.org/3/i3325e/i3325e.pdf

[80] https://www.fao.org/3/i7931e/i7931e.pdf

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.

48. Additionally, the project seeks to establish fund and insurance mechanisms that support the sustainability of healthy rural lands under climate change. Through these diverse approaches, the project seeks to transition Burundi towards a climate-resilient and sustainable development paradigm that emphasizes adaptation, benefits rural communities, and promotes the conservation of natural resources and ecosystems. The theory of change diagram in annex 3 illustrates how the Project will overcome key obstacles to attain its objectives taking into account that **IF** rural communities in Burundi—especially smallholder farmers vulnerable to climate extremes—are provided with timely climate information, sustainable agricultural practices, diversified income opportunities, and supportive policy and knowledge systems, **THEN** their capacity to adapt to the impacts of extreme weather events such as droughts and floods will be significantly strengthened, **BECAUSE** they will be better equipped to manage climate risks, protect their natural resources, sustain their livelihoods, and engage in informed decision-making that enhances long-term resilience and food security.

3. 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: Blockchain-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.	250,000.00
		2.1.2: Demonstration sites showcasing effective integration of apiculture with syntropic agroforestry techniques developed.	700,000.00
	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.	3,000,000.00
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 Management, awareness creation and information sharing.	4.1: Enabling policies, strategies, and legal frameworks developed and adopted, enhancing project sustainability.	4.1.1: Policy advocacy campaigns and stakeholder engagement meetings conducted.	125,000
		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**

4. Projected Calendar

Milestones	Expected Dates
Start of Project Implementation	2026.01.01
Mid-term Review (if planned)	2028.01.01
Project Closing	2029.12.01
Terminal Evaluation	2030.03.01

PART II: PROJECT JUSTIFICATION

A. Description of the project components

49. The project is organized into four distinct components, each with a specific focus and set of activities aimed at enhancing climate resilience in Burundi. These components collaborate to address the challenges posed by climate change and promote sustainable agricultural practices. Component 1 focuses on establishing and strengthening tools for managing extreme weather events. Component 2 aims to enhance the resilience of ecosystems and vulnerable populations to the impacts of climate change through concrete adaptation measures. Component 3 involves developing and promoting value-added products to expand income opportunities and improve market access for economic resilience and stability

while strengthening the capacities of the various stakeholders. Component 4 focuses on enhancing knowledge management, awareness creation, and information sharing. These four components work together to create a holistic approach to building climate resilience in Burundi, encompassing governance, agriculture, economic development, and disaster preparedness. Through this integrated strategy, the project seeks to empower local communities, protect ecosystems, and ensure a sustainable, low-emissions future in the face of climate change.

50. The key actors and key adaptation activities of the program are illustrated in the graphic below (Fig 8):

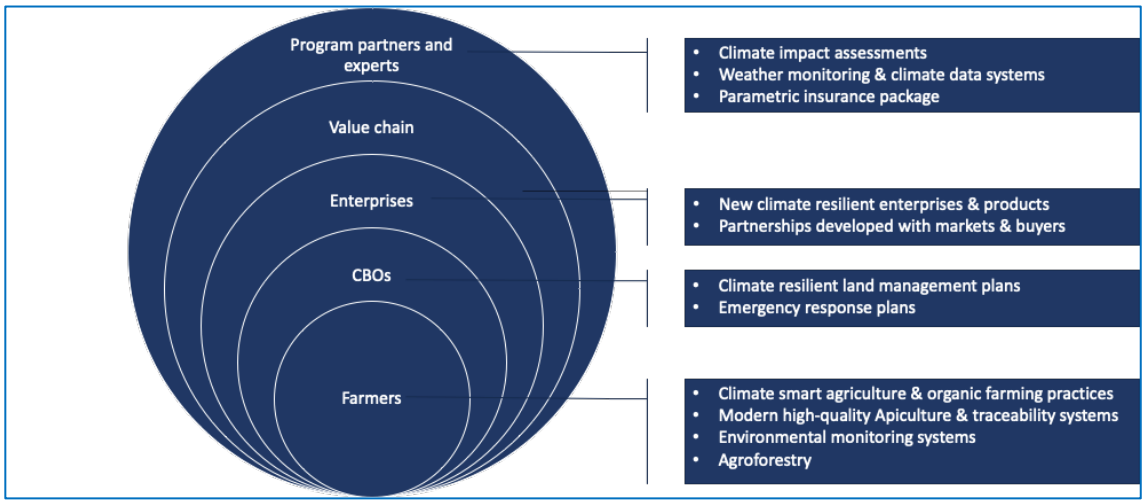

Figure 8: Project stakeholder ecosystem.

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*

51. This component focuses on using innovative solutions, such as blockchain-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. The project will exclusively utilize existing infrastructure and data streams from Burundi Meteorological Services, without creating parallel or duplicate infrastructure. Coordination meetings have confirmed access and interoperability, ensuring complementary use of climate information without overlap or redundancy. Thus, the project explicitly confirms no infrastructure upgrades will be undertaken, and therefore, duplication of efforts is entirely avoided. 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 blockchain 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.

52. Drawing on ACRE Africa's expertise, the project will implement index-based microinsurance, 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 payouts on regional crop yields, ensuring transparent, cost-effective compensation mechanisms. The Africa Apiculture Consortium's blockchain 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 modeling, 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.

53. The study emphasizes integrating blockchain 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 microinsurance 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.

54. 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: Blockchain-Based Traceability System for Livestock developed implemented

55. The launch of a blockchain traceability system in the agricultural sector, particularly for livestock, is a monumental technological advancement. 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.

56. .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 blockchain-based traceability system in collaboration with technology providers and stakeholders.
- Activity 1.1.1.3: Train livestock producers, processors, and stakeholders on using the blockchain 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

57. The warehouse receipt system for the crop value chain establishes a standardized method for storing and managing crops, integrating a price risk-protected feature to safeguard farmers from market price fluctuations. This system not only provides secure receipts for stored crops but also ensures financial protection by locking in prices or offering compensation in the event of price drops. 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.
58. 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 month 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.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 blockchain 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 blockchain-verified quality data.
59. 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, a one-year fee discount and first access to premium buyer contracts, creating demonstration effects that accelerate wider uptake.
60. 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 blockchain-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.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.

61. 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.

62. 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.

63. 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 blockchain 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 blockchain 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.

64. 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.

65. 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.*

66. 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.
67. 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[81].
68. 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.
69. 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.

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

Through these efforts, Component 1 lays the foundation for resilient agricultural practices and sustainable livelihood development in the face of climate challenges. Activities for this component are highlighted under outcomes 2.1 and 2.2 in outputs 2.1.1, 2.1.2, 2.1.3, 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.

70. 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:

- Activity 2.1.1.1: Develop integrated strategies and operational guidelines combining syntropic agroforestry principles with sustainable apiculture practices.
- Activity 2.1.1.2: Conduct participatory field assessments across representative agro-ecological zones to adapt and contextualise the guidelines.
- Activity 2.1.1.3: Facilitate expert reviews to incorporate the latest research and emerging innovations.
- Activity 2.1.1.4: Convene multi-stakeholder workshops including local practitioners… to validate and finalise the strategy.

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

71. 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:

- Activity 2.1.2.1: Identify and prepare site locations for establishing demonstration sites in collaboration with local communities.
- 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.
- 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.
- 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.

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.

72. 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.
- Activity 2.2.1.2: Implement surface water harvesting and water retention features within agro-ecological systems.
- Activity 2.2.1.3: Produce and educate stakeholders on organic matter retention for soil health and water conservation.
- 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.

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*.

73. 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.
74. 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.
75. 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.
76. 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.
77. 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.
78. 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.

79. 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.

80. 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.

81. 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.

82. 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. This initiative aims to create direct market linkages that can provide farmers with stable and lucrative outlets for their products. An e-commerce platform dedicated to connecting farmers with consumers directly will be developed, enabling farmers to tap into the burgeoning online market. The enhanced visibility and market presence of bee products, facilitated through participation in trade fairs and engagement with online market platforms, will not only increase income for farmers but also promote SLM that contribute to climate adaptation and resilience.

83. 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.

84. 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 blockchain-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 .

85. 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 Coopérative (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 blockchain 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.

86.

87. 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 to achieve 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.

88. 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.

89. 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.

90. 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 catalyzing behavioral change, co-developing inclusive policy frameworks, and embedding adaptive learning systems across institutions and communities.*

91. This component is restructured into two outcomes that together shift the “current paradigm” from reactive, top-down practices to proactive, participatory climate governance. It addresses key barriers to sustainability—namely, entrenched unsustainable behaviors, limited institutional memory, and weak linkages between policy and local knowledge systems.

92. 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, and preference for traditional methods through two complementary approaches: (1) institutionalizing successful innovations through formal policy adoption, and (2) systematically changing community attitudes and practices through targeted knowledge management and behavioral change interventions. 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.

93. 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.

94. 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.

95. 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).

96. 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 behavioral 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.
97. These trained individuals will further educate their communities. The ToT model specifically incorporates behavioral 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 behavioral change methodologies to address community resistance, establish peer-to-peer learning networks, and create community champion systems that demonstrate tangible benefits of blockchain 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.

B. Section Economic, social and environmental benefits

98. 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

99. 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.
100. **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.
101. **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 favorable 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.

102. **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 microinsurance doubles women's savings in various countries. Receipts and microinsurance as collateral for loans increase access to financial services. In Kenya, Uganda, and Tanzania, credit access doubled after five years of ACRE Africa's microinsurance 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

103. 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 microinsurance, blockchain 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.

104. 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).

105. 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

106. 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.

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.

107. 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.

108. 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.

109. 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.

110. 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

111. 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[82], 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.

112. 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

[82] Global Forest watch

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.

113. *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.
114. *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.
115. *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.
116. *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.
117. *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.
118. *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 blockchain 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

119. 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.

120. 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.

121. 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 5: 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 blockchain 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

Strategic plan	Year	Priorities	Project alignment
National Adaptation Plan (NAP) Process (Initiated 2014)[83]		• 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 blockchain 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

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

			insurance and childcare during trainings. • Introducing micro-loans, digital value chains, and private-sector engagement to mobilize green finance.
Strategic plan: Third national communication on climate change (TNCCC). [84]	2019	• Strengthening skills in weather forecasting and climate risk modelling, along with providing comprehensive 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.	• Rolling out information services that encompass climate risk modelling software, alongside training for local personnel on its use. • 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)[85]	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.[86]	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 microinsurance 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

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

			and physical infrastructure. • Integrating financial inclusion and risk protection mechanisms, especially for youth and women
Strategic plan: National Agriculture Strategy 2018-2027.[87]	2018	• Sustainable and efficient use of natural resources, especially focusing on land and water. • Strengthening resilience against climate change impacts. • Enhancing the capabilities of institutional and organizational frameworks.	• Introducing innovative adaptation strategies, tools, and technologies (such as information services and microinsurance) 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, blockchain-enabled traceability, and microinsurance. • 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.[88]	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[89]	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 blockchain 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	**2011**	• **Enhancement of soil fertility and restoration of ecological balance in areas affected by degradation.** • **Strengthening the capabilities of both**	• 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.

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

Combat Soil Degradation 2011-2016.[90]		**institutions and communities in effective soil management practices.**	• Promotion of intelligent agricultural practices alongside capacity-building efforts to improve soil 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

122. 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.

123. **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 blockchain traceability, Warehouse Receipt System and index-based microinsurance 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 microinsurance 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 microinsurance 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.

124. **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

[90] http://obpe.bi/images/pdf/Strategie_Degration_des_terres.pdf

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)[91], 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.

125. **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.

126. Component 3 employs a value chain development strategy that includes product processing infrastructure, digital traceability tools (via blockchain), 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[92]). 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.

127. **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

[91] FAO. (2020). The State of the World's Forests: Forests, biodiversity and people. Rome.
[92] World Bank. (2021). Unlocking Markets for Agricultural Value Chains in Africa: The Role of Digital Platforms. Washington, D.C.

large farming community. The estimated 500 individuals who 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.

128. 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 behavior 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[93]). 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[94]). 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.

129. 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 subregion. 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 blockchain 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.

E. Alignment with national technical standards

130. 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 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 blockchain traceability and mobile payment system.*

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

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

- *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 blockchain and mobile applications for traceability and climate services.*

131. No additional national technical standards currently exist in Burundi that regulate blockchain 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.

132. 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 6: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.
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.
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.
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.
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.
Financial Services Law 2017, No. 1/12	Governs digital finance and financial consumer protection. Applies to Component 1's blockchain traceability and microfinance access systems, ensuring compliance with digital finance laws and user safety.
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.
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.
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.
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.

Project duplication with other funding sources

133. In Burundi, the introduction of index-based microinsurance, 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.

134. 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.

135. 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 7: Ongoing and planned initiatives related to Agriculture and Restoration in Burundi

Project	Objective(s)	Scope	No Duplication/alignment
Community Disaster Risk Management in Burundi.[95] *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 emergency preparedness and reconstruction efforts in these regions over the long term.	**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 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	No Duplication • Focuses on agroforestry and beekeeping, not solely on disaster risk management. • Emphasizes economic diversification through market access, unlike emergency preparedness. • Utilizes blockchain for traceability and insurance, different from early warning systems. • Promotes policy advocacy and governance for climate adaptation, beyond emergency responses. 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[96]	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.	No Duplication • Focuses on enhancing agricultural productivity through beekeeping and agroforestry. • Leverages blockchain 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

[95] https://www.thegef.org/projects-operations/projects/4990
[96] https://www.thegef.org/projects-operations/projects/8010

Approved 2019 *Funder : AF*		• 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.	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[97] *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) Cankuzo, Ruyigi and Muyinga Province	No Duplication • Introduces integrated beekeeping with agroforestry, not just land restoration. • Promotes blockchain 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 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.[98] *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 blockchain 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.

[97] https://documents1.worldbank.org/curated/en/408471487004538339/pdf/ITM00184-P160613-02-13-2017-1487004534488.pdf
[98] https://www.greenclimate.fund/sites/default/files/document/sap017-ifad-burundi.pdf

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 - blockchain 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		

F. Learning and Knowledge management

136. 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, totaling 24,000 farmers.

137. 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 rainfed 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.

138. 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[99]. 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[100].

139. 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.

G. Consultative process

140. 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. Various engagement activities and stakeholder workshops were undertaken to gather information as presented in the table below:

Table 8: Stakeholder Engagement Activities

Consultations	Description
National-Level Stakeholder Consultation Workshops	The project team organized three major stakeholder workshops at key stages of the Concept Note development. These workshops engaged a diverse range of stakeholders, including government agencies, insurance companies, development partners, civil society organizations, and representatives from the agricultural sector. Each workshop focused on specific aspects of climate risk management, crop insurance,

[99] 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

[100] Groot et al., 2012

	and adaptation needs, allowing for a thorough exploration of the challenges and opportunities within the project's scope.
Focused Validation Workshop	A specialized workshop was convened to validate the project's outcomes and outputs, ensuring alignment with stakeholder inputs and the project's overarching objectives. This session was crucial for refining the Concept Note and meeting the expectations of the Adaptation Fund.
Bilateral and Community Consultations	In-depth bilateral consultations were conducted with government agencies, development partners, insurance institutions, and civil society organizations to gain nuanced insights into ongoing programs, challenges, and opportunities relevant to the project's focus on index-based micro-insurance and climate resilience.
Community Consultation Meetings	A series of twelve community meetings were held to directly engage with smallholder farmers to understand their climate risks, adaptation needs, and the socio-economic factors influencing their livelihoods. These meetings provided valuable insights into the ground-level realities and helped integrate community voices into the project design.

141. 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.

142. 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, Annex 2.

143. 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.

H. Justification of funding request

144. 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 additionalities each component brings, as detailed below:

	Baseline Scenario	Additionality

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[101].	The introduction of blockchain 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 blockchain, 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 overcultivation 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[102].	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[103].	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.

[101] 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).

[102] 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).

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

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.

I. Project Sustainability

145. Integrating blockchain technology with microinsurance significantly enhances the project's sustainability. By promoting climate-resilient agricultural practices and implementing improved irrigation systems, the project boosts agricultural productivity and farmer incomes, thereby enhancing food security and offering alternative livelihood opportunities through Income-Generating Activities (IGAs) targeted at women and youth. This inclusive approach addresses critical development challenges, empowering marginalized groups and ensuring equitable participation. 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.

146. 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.

147. At this stage, the project has identified The Source Plus as a project partner following initial discussions, for primary technology development with expertise in agricultural blockchain solutions in East Africa has been initiated. Additionally, preliminary agreements are in place with local ICT and Insurance firm INKINZO and regional partner Alliance Bioversity-CIAT for platform customization, local language adaptation, and ongoing technical support, ensuring contextually

appropriate solutions and long-term sustainability beyond the project period.

148. 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.

149. 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 microinsurance process. It offers a more secure and equitable platform for risk management. The project uses blockchain technology to establish a decentralized ledger recording all transactions related to climate-resilient agricultural practices and microinsurance 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 blockchain 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.

150. A study by the World Bank (2019) highlighted the potential of blockchain 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. Blockchain’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’ microinsurance premiums and claims is strengthened by blockchain technology. For example, blockchain can reduce insurance processing times by up to 50% by automating claims based on data like weather conditions and crop yields recorded on the blockchain. The project’s insurance graduation strategy is significantly enhanced by blockchain. By recording and verifying farmers’ commitments to sustainable practices, blockchain 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 blockchain provides. This approach has been shown to enhance smallholders’ savings capacity, as evidenced by a study where farmers involved in blockchain-tracked agriculture reported a 38% increase in their income (Blockchain for Agriculture, 2021). Blockchain traceability not only supports the project’s microinsurance 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 blockchain pilot program (FAO & ITU, 2020) further supports the sustainability of the microinsurance scheme. Farmers are better positioned financially to cover their premiums through this access. Integrating blockchain and microinsurance 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).

151. 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 microinsurance scheme.

152. Accessibility to insurance is crucial for the project's sustainability. Establishing a comprehensive insurance ecosystem ensures that microinsurance 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).

153. 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).

J. 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 blockchain 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. A detailed Gender Analysis and Action Plan (GAAP) has already been conducted and will be fully integrated into the full proposal to guide implementation.
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.

154. 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)[104]	Project Objective Indicator(s)	Fund Outcome	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	Increased adoption of climate-smart and ecosystem-friendly agricultural practices.	Outcome 5: Increased ecosystem resilience in response to climate change and variability-induced stress	5.1: 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	Outcome 6: Diversified and strengthened livelihoods and	6.1: Percentage of households and	3,950,000

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

climate change and land degradation.	income opportunities and market linkages.	sources of income for vulnerable people in targeted areas	communities having more secure (increased, diversified, and sustainable) access to livelihood assets	
	Number of farmers using blockchain traceability systems and parametric insurance products.	Outcome 1: Reduced exposure to climate-related hazards and threats	1.1: 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	7.1: 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
Component 1: Establishment and strengthening of tools for the sustainable management of extreme weather events.				
Outcome 1.1: Improved resilience to climate variability and extreme weather events through access to climate information and insurance products.	Number of farmers accessing insurance products and real-time climate data.	Output 1.1: Risk and early warning information disseminated	1.1: Number of early warning systems (by scale) and number of beneficiaries covered	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: Targeted institutions have access to relevant tools, information, and training for climate risk management	2.1.1: No. of staff trained to respond to, and mitigate impacts of, climate-related events.	1,000,000
Component 2: Enhance the resilience of ecosystems and the most vulnerable populations to the impacts of climate change through concrete adaptation measures.				
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: Number of natural resource assets created, maintained, or improved to withstand conditions resulting from climate variability and change	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: Number of natural resource assets created, maintained, or improved to withstand conditions resulting from climate variability and change	3,000,000
Component 3: Develop and promote value-added products to expand income opportunities and improve market access for economic resilience and stability.				
Outcome 3.1: Enhanced income diversification for smallholder farmers	Number of smallholder farmers trained in processing and value addition for	Output 6: Targeted individual and community livelihood strategies strengthened in	6.1.1: Number and type of adaptation assets (tangible and intangible) created or	1,100,000

through value-added livestock and crop food value chains products.	agroforestry and bee products.	relation to climate change impacts, including variability	strengthened in support of individual or community livelihood strategies	
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 scenarios	550,000
Component 4: Enhancing knowledge Management, awareness creation and information sharing.				
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: Number of policies introduced or adjusted to address climate change risks	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	3.1.1: No. of news outlets in the local press and media that have covered the topic	350,000

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

A. Record of endorsement on behalf of the government

Liévin NDAYIZEYE, National Designated Authority Ministry of Environment, Agriculture and Livestock, BURUNDI.	Date*: May 30th, 2025*

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: *July 11th, 2025*	Tel. : (+216) 71 206 633 Email:nabil.benkhatra@oss.org.tn; boc@oss.org.tn
Project Contact Person: **Ms. Khaoula JAOUI**	
Tel.: (+216) 71 206 633 Email: khaoula.jaoui@oss.org.tn	

Annex 1: Endorsement Letter

REPUBLIQUE DU BURUNDI

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

Bujumbura, le 30 /05/2025

Office Burundais pour la Protection de l'Environnement

Letter of Endorsement by Government

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 designated authority 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 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 **Sahara and Sahel Observatory (OSS)** and executed by **Office Burundais pour la Protection de l'Environnement (OBPE) and Africa Apiculture Consortium (AAC).**

Sincerely,

Liévin Ndayizeye

National Designed Authority for the Adaptation Fund

Bujumbura-Burundi, Téléphone : +257 79 697 988 / 66 609 247, B.P. 2757 Bujumbura
Email : ndayizeyelievin@yahoo.com

REPUBLIQUE DU BURUNDI

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

Bujumbura, le 30 /05/2025

Office Burundais pour la Protection de l'Environnement

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Sincerely,

Liévin Ndayizeye

National Designed Authority for the Adaptation Fund

Bujumbura-Burundi, Téléphone : +257 79 697 988 / 66 609 247, B.P. 2757 Bujumbura
Email : ndayizeyelievin@yahoo.com

Revised PFG Submission Form[1]

Project Formulation Grant (PFG)

Submission Date:

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)

A. Project Preparation Timeframe

Start date of PFG	December, 2025
Completion date of PFG	May 2026

B. Proposed Project Preparation Activities (US$)

List of Proposed Project Preparation Activities	Output of the PFG Activities	US$ Amount	Budget note
1. Technical Feasibility and Design Studies	• Crop vulnerability and Food Insecurity assessments • Technology Assessment (Blockchain)	8,000	Technical consultants, field assessments, Weather analysis, and GIS mapping Conduct detailed studies on agroecological suitability for syntropic agroforestry and integrated apiculture; assess infrastructure and operational viability of blockchain traceability and warehouse receipt systems.
2. Environmental and Social Safeguards	• Environmental and Social Management Plan (ESMP)	8,500	Environmental/social specialists. Prepare a full ESIA and updated Environmental and Social Management Plan (ESMP) in line with Adaptation Fund's ESP and Gender Policy.
3. Gender Analysis	• Gender Assessment and Action Plan (GAAP)	8,500	Conduct participatory gender analysis and organize community consultations in the six provinces to validate project design and co-create community-based adaptation pathways.

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

4. Institutional and Partnership Assessment	• Technology partnership agreements • Private sector engagement strategy	2,500	Institutional assessment, partnership negotiations, and capacity building plans Assess capacities of executing entities (OBPE, AAC), finalize roles and coordination mechanisms, and structure execution/monitoring arrangements.
5. Economic and financial analysis	• Cost-effectiveness study • Full Budget development	5,000	Financial analysts, economic modeling, and market research Undertake cost-effectiveness, economic viability, and sustainability assessment of proposed adaptation interventions and value chains.
6. Stakeholder consultations	• Consultations report • Stakeholder engagement plan	8,000	Undertake stakeholder mapping and community consultations taking into account FPIC process as well as initial KAP survey.
7. Full Proposal Development	• Complete Full Proposal document • Implementation plan and timeline • Results framework and M&E plan	6,000	Project design specialists Draft the full proposal and organize a national validation workshop to ensure alignment with national policies and stakeholder ownership.
8. IE Management Fee (7.0%)	• OSS oversight and quality control • Technical backstopping	3,500	IE management fee for supervision and technical support
Total Project Formulation Grant		50,000	

Total Project Formulation Grant: **$50,000**

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 outputs 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 Analysis

A gender analysis will assess differential vulnerabilities, needs, roles, and capacities of women, men, and marginalized groups in relation to climate change and adaptation. This includes both qualitative and quantitative data collection. Particular attention will be paid to indigenous peoples' rights, ensuring proper Free, Prior, and Informed Consent (FPIC) processes for Twa communities. Towards its justification, it will integrate gender considerations which is critical for achieving equitable adaptation outcomes. Gender analysis ensures the proposal aligns with the Adaptation Fund’s Gender Policy and Action Plan, addressing systemic inequalities and promoting gender-responsive adaptation. The expected outputs will include:

1. Gender Assessment Report
2. Gender Action Plan
3. Integration of gender-responsive indicators

4. Institutional and Partnership Assessment

This activity will establish the foundational partnerships and institutional arrangements necessary for successful project implementation. The assessment will evaluate the capacity of executing entities OBPE and AAC, identifying specific technical and operational strengths and gaps that need to be addressed through capacity building initiatives. Technology partnership agreements will be negotiated with blockchain service providers, ensuring sustainable technical support and maintenance beyond the project period. Private sector engagement strategies will be developed to create market linkages for bee and agroforestry products, including negotiations with potential buyers and certification bodies. The team will assess local government capacity in target provinces and develop collaborative frameworks for project implementation. Partnership negotiations will focus on creating win-win arrangements that ensure project sustainability while building local institutional capacity. Capacity building plans will be developed to strengthen executing entities' ability to manage innovative technology components and ensure effective project delivery. A strong institutional framework is vital for effective execution and sustainability. 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 mapping through a stakeholder engagement plan to establish protocols for meaningful participation of all groups, especially women, youth, and marginalized communities. The consultations will engage stakeholders from 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 design of the project. Particular attention will be paid to indigenous peoples' rights, ensuring proper Free, Prior, and Informed Consent (FPIC) processes for Twa communities. Community consultations will be conducted in local languages with culturally appropriate methods to ensure genuine participation. Towards its justification, 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 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, ensure compliance with the Adaptation Fund's Gender and Environmental and Social Policies, and support the co-creation 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 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, 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 baseline 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:

5. Complete draft and final full proposal
6. All required annexes (budget, ESMP, gender plan, etc.)
7. 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 six-month PFG implementation will follow an efficient timeline maximizing synergies between activities. **Months 1-2** will focus on technical feasibility studies and environmental assessments, establishing the foundation for detailed design. **Months 3-4** will emphasize institutional assessments and partnership development while continuing stakeholder engagement. **Months 5-6** will concentrate on financial modeling and Full Proposal development, ensuring all components are integrated into a comprehensive implementation strategy. This accelerated timeline leverages existing relationships and preliminary work conducted during concept note development, enabling rapid but thorough project preparation that will position the Full Proposal for successful implementation upon approval.

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 BEN KHATRA *– Executive Secretary of the Sahara and Sahel Observatory (OSS) as the Implementing Entity Coordinator*		*July 11th, 2025*	*Ms. Khaoula JAOUI*	*(+216) 71 206 633*	*nabil.benkhatra@oss.org.tn; boc@oss.org.tn*

Annex 2 : Stakeholders Consultation

The project was designed in continuous consultation with stakeholders from community level to the national level. The design of the project was done in a hybrid manner. From March 2021 to June 2024 virtual meetings were held with country national and subregional counterparts (table of consultation is included below). In September 2022 - December, January 2023 and the whole of October in 2024, an in-country mission took place for five weeks and a 3-days, 4 days and 27 days respectively, with OSS, 4 online meetings, and 3 physical meetings, 1 day at UNFCCC COP27, 1 day at UNFCCC COP 28 and 1 day at UNFCCC COP 29. The continuous remote consultation process was fully complementary enabled to have very effective consultations in-person, as remote consultations had paved the identification of key climate risks and other issues.

Table 9: 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	Mr. Nduwarugira Déogratias	Professor	**Male**
	Mr. Nkengurutse Jacques	Professor	**Male**
	Mr. Bukuru Anatole	Research Fellow	**Male**
	Ms. 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	Geospartial Information Science	**Female**
	Ms. Aida Bakri	East Africa Programme Officer	**Female**
	Ms. Gladys Bichang	Quality Assuarance Officer	**Female**
	Mr. Erick Kioko	Culture and Social Impact Officer	**Male**
ACRE Africa	Mr. Ewan Wheeler	Chief Executive Officerr	**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**
	Ms. 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**
	Mr. Francois Iradukunda	Gender and Social Inclusion Specialist	**Male**

	Mr. 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**
	Ms. Joslyn Muthio	Gender and Climate Officer	**Female**
	Ms. Cecilia Moraa	SPS and Trade Officer	**Female**

The consultations aimed at the following:

i. Verifying alignment with national and sub-national priorities. The proposed project activities and targeted areas have been prioritized / selected with these stakeholders, and in line with national priorities.
ii. Avoiding duplication with other projects and initiatives: systematic screening for other relevant ongoing or past initiatives was conducted when meeting stakeholders, to ensure complementarity, synergies, and relevance of project interventions.
iii. Shifting of use of traditional knowledge to scientific based weather forecasting or their use in conjunction.
iv. Identifying crops, specific needs and possible concerns of vulnerable groups. In line with AF ESP and GP, consultations with local stakeholders, targeted communities, and specific groups representatives (especially women, youth, and most vulnerable producers) took place to identify specific needs and possible concerns regarding the proposed project activities.
v. Identifying potential environmental and social risks and impacts. Related to above and in line with AF ESP and GP, consultations took place to identify potential risks and impacts of proposed project activities.

Consultation techniques with local stakeholders included: (i) use of semi-structured interviews to ensure coverage of key themes (listed above); (ii) organization of focus discussion groups, and subsequent division into sub-groups to ensure separate consultation with more vulnerable/marginalized individuals (women, youth) and give them the time and space to express their specific needs. Special attention was given to ensuring a gender and youth focus in these engagements. It must be recognized that given the specific context in Burundi, a region dominated by patriarchal gender norms and witnessing a significant out migration of youth from the rural areas, it was not always easy to mobilize women and youth. Nevertheless, special efforts were made to ensure their involvement in the consultations. As such, male and female potential beneficiaries and stakeholders were consulted both separately and in mixed groups. Moreover, institutions

dealing with gender and youth issues, both public and from civil society, were consulted. Finally, the appropriateness of time and location of consultation meetings, especially for women, was systematically taken into account.

i. Discussion

Table 10: 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. • Degraded infrastructures lead to production loss and isolation in case of weather extremes	• 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 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

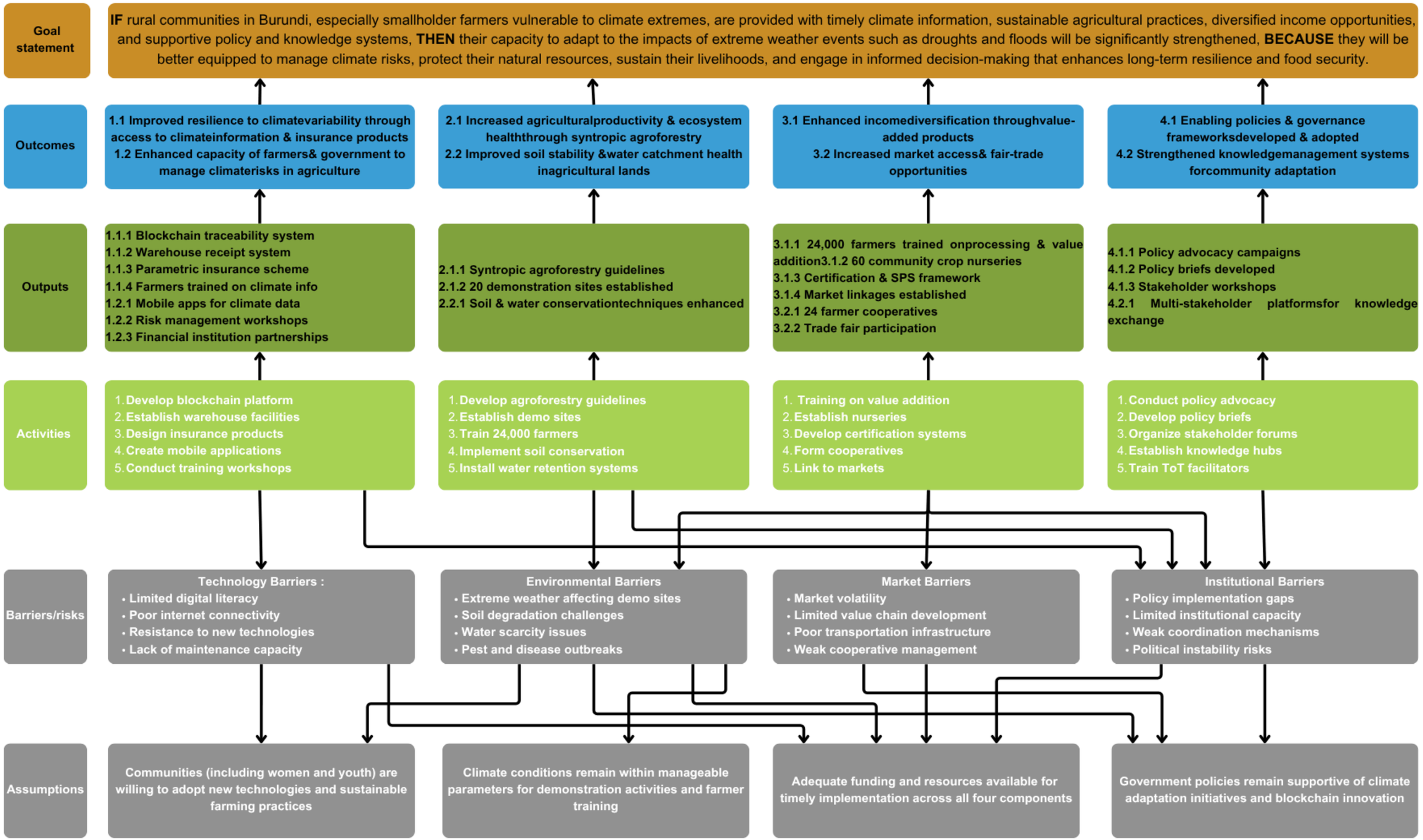
Youth	• Limited opportunities for youth in rural areas	• Project will build and create opportunities for youth (e.g. through technical support, community centres, mentoring opportunities, etc.).

ii. Community Consultations

Table 11:Community Consultation

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**

Annex 3: Theory of Change

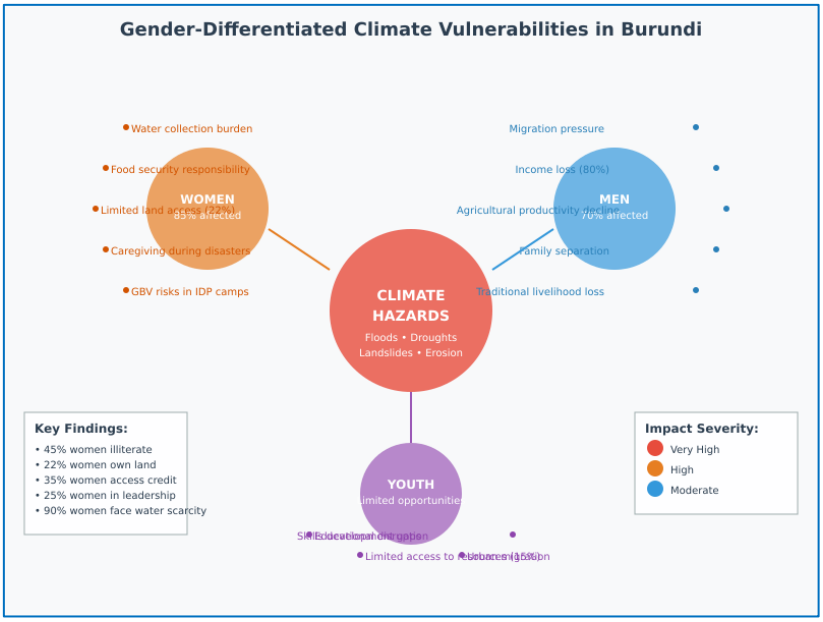


Annex 4 : Gender Assessment Summary

Background and Context

The **Gender Analysis and Action Plan (GAAP) for Enhancing Resilience in Burundi** examines gender dynamics in climate adaptation across eight provinces: Cibitoke, Bubanza, Bujumbura Rural, Bujumbura Mairie, Kirundo, Ruyigi, Rutana, and Bururi. This assessment reveals how gender inequalities intensify climate vulnerabilities and limit adaptive capacity across rural communities. The study employed mixed-method approaches including 16 Focus Group Discussions with 320 community members and 18 Key Informant Interviews.

→ Gender-Differentiated Climate Vulnerabilities



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

Economic and Resource Disparities

Gender-based economic exclusion perpetuates vulnerability cycles:

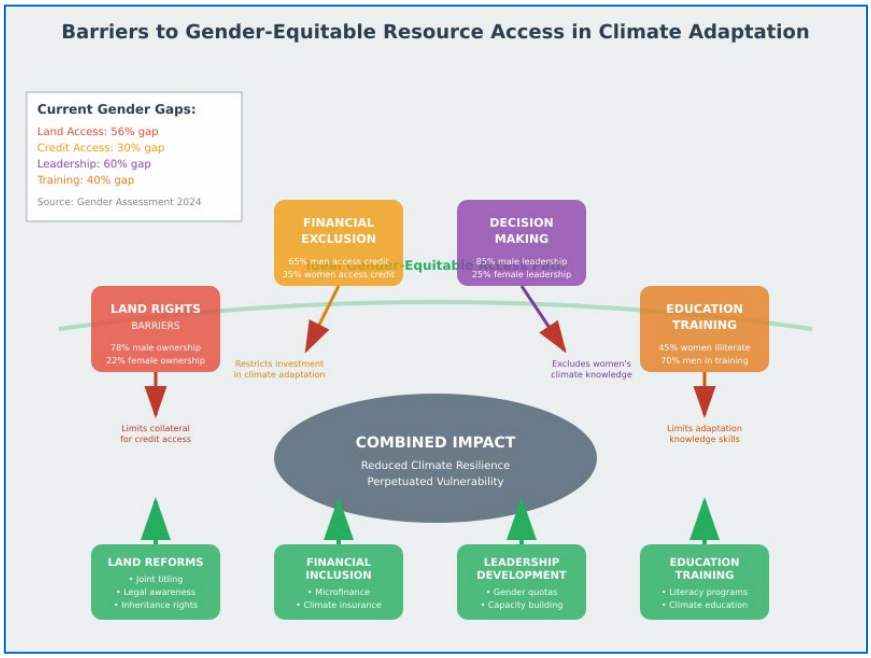
- **Credit Access Gap:** 65% men vs. 35% women access formal credit
- **Training Participation:** 70% men vs. 30% women in agricultural training
- **Decision-Making:** 85% male vs. 25% female leadership in climate governance
- **Market Participation:** Women engage in lower-profit activities with limited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

Educational and Capacity Constraints

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



Climate Impact Differentiation by Province

Province	Primary Climate Risks	Most Affected Groups	Key Gender Impacts
Cibitoke	Soil erosion, flooding	Women, Youth, PWDs	Increased agricultural burden, limited land access
Bubanza	Infrastructure damage, flooding	Women, Children, Elderly	Forced displacement, caregiving burden
Bujumbura Rural	Frequent flooding, displacement	Women, Youth, PWDs	GBV risks in IDP camps, health vulnerabilities
Bujumbura Mairie	Urban flooding, overcrowding	Women, Youth, Elderly	Safety concerns, limited economic opportunities
Kirundo	Prolonged droughts	Women, Youth, PWDs	Water collection burden, food insecurity management
Ruyigi	Unpredictable rainfall, pests	Women, Youth, PWDs	Crop management challenges, limited extension access
Rutana	Landslides, land loss	Women, Youth, PWDs	Loss of livelihood base, displacement stress
Bururi	Heavy rainfall, deforestation	Women, Youth, PWDs	Environmental resource management burden

Displacement and Health Vulnerabilities

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

Province	Male Participants	Female Participants	Mixed Groups	Total Participants
Cibitoke	18	22	4 groups	40
Bubanza	20	24	4 groups	44
Bujumbura Rural	16	20	3 groups	36
Bujumbura Mairie	22	26	4 groups	48
Kirundo	19	23	4 groups	42
Ruyigi	17	21	3 groups	38
Rutana	15	19	3 groups	34
Bururi	18	20	4 groups	38
Total	**145**	**175**	**29 groups**	**320**

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

Resource Category	Men (%)	Women (%)	Youth (%)	Gender Gap
Land Ownership	78	22	8	56%
Access to Credit	65	35	15	30%
Agricultural Training	70	30	20	40%
Market Participation	80	45	25	35%
Decision-Making Roles	85	25	10	60%
Climate Information Access	60	30	35	30%

Educational Attainment by Gender

Education Level	Male (%)	Female (%)	Gender Gap
No formal education	25	45	20%
Primary education	45	35	10%
Secondary education	25	15	10%
Tertiary education	5	5	0%

Climate Impact Assessment by Gender

Climate Impact	Women Affected (%)	Men Affected (%)	Severity Score (1-5)
Crop Loss	85	70	4.2
Water Scarcity	90	60	4.5
Food Insecurity	80	65	4.0
Displacement	70	55	3.8
Health Issues	85	50	3.9
Income Loss	75	80	4.1

Critical Findings Summary

Women bear disproportionate climate burdens due to systemic barriers limiting access to land, financial resources, and decision-making structures. Key vulnerability patterns show:

- **85% of women** report severe climate impacts vs. 70% of men
- **90% of women** face water scarcity challenges vs. 60% of men
- **45% of women** are illiterate, limiting access to climate information
- **56% gender gap** in land ownership (78% men vs. 22% women)

Economic and Resource Disparities

Gender-based economic exclusion perpetuates vulnerability cycles:

- **30% credit access gap** (65% men vs. 35% women)
- **40% training participation gap** (70% men vs. 30% women)
- **60% leadership gap** (85% male vs. 25% female)
- Women engage in lower-profit activities with limited value chain access

Displacement and Health Vulnerabilities

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

Recommended Interventions

1. Strengthen Women's Land Rights & Resource Access

- Advocate for gender-equitable land policies and legal reforms
- Support joint land titling initiatives
- Establish women's resource centers in target provinces
- Promote inheritance rights awareness campaigns

2. Expand Financial Inclusion

- Develop microfinance programs tailored for women and youth
- Create alternative credit mechanisms not requiring land collateral
- Introduce parametric insurance for women farmers
- Strengthen Village Savings and Loan Associations (VSLAs)

3. Enhance Capacity Building & Education

- Provide gender-sensitive training on climate adaptation
- Develop leadership programs for women and youth
- Improve WASH facilities in schools to support girls' education
- Recruit and train female agricultural extension agents

4. Promote Gender-Inclusive Climate Adaptation

- Integrate gender considerations in early warning systems
- Develop climate-smart agriculture programs for women
- Create gender-sensitive disaster risk reduction plans
- Establish women-friendly climate information dissemination

5. Increase Women's Representation in Decision-Making

- Implement gender quotas in local climate governance
- Support women's participation in climate committees
- Strengthen women's cooperatives and producer groups
- Promote women's leadership in community-based adaptation

Expected Outcomes

Short-term (1-2 years)

- Increased women's participation in climate training programs
- Enhanced access to financial services for women and youth
- Improved representation in local climate decision-making bodies
- Strengthened early warning system coverage

Medium-term (3-5 years)

- Increased women's land ownership and control
- Reduced gender gaps in agricultural productivity
- Enhanced women's leadership in climate governance
- Improved household resilience to climate shocks

Long-term (5+ years)

- Transformed gender norms supporting women's agency
- Sustainable and inclusive climate adaptation systems
- Reduced climate vulnerability for all community members
- Enhanced economic empowerment and food security

Implementation Framework

The Gender Action Plan emphasizes **gender-transformative approaches** that actively challenge systemic inequalities rather than merely addressing symptoms. This requires:

- **Multi-stakeholder collaboration** across government, civil society, and communities
- **Intersectional analysis** considering age, disability, and socioeconomic status
- **Community-based adaptation** that builds on local knowledge and leadership
- **Continuous monitoring and evaluation** with gender-sensitive indicators