**Funding Proposal Template**

Application Template for Fully-Developed Proposal and Project Concept Proposal[1]




# PROGRAMME ON INNOVATION: LARGE GRANTS PROJECTS

## REQUEST FOR PROJECT FUNDING FROM THE ADAPTATION FUND

The annexed form should be completed and transmitted to the Adaptation Fund Board Secretariat by email.

Please type in the responses using the template provided. The instructions attached to the form provide guidance to filling out the template.

Please note that a project must be fully prepared when the request is submitted.

Complete documentation should be sent to:

The Adaptation Fund Board Secretariat
1818 H Street NW
MSN N7-700
Washington, D.C., 20433
U.S.A
Fax: +1 (202) 522-3240/5
Email: afbsec@adaptation-fund.org

[1] Single Country and Regional Concept proposals should complete Part I and Part II of the Project Proposal Template.

ADAPTATION FUND

SINGLE COUNTRY/ REGIONAL INNOVATION PROJECT/PROGRAMME PROPOSAL

## PART I: PROJECT/PROGRAMME INFORMATION

| | |
|---|---|
| Title of Project/Programme: | Enhancing resilience to flood and drought through a unique combination of innovative climate adaptation tools, technologies, and practices in Burundi |
| Country: | Burundi |
| Thematic Focal Area: | Disaster risk reduction |
| Type of Implementing Entity: | Multilateral Implementing Entity (MIE) |
| Implementing Entity: | United Nations Environment Programme (UNEP) |
| Executing Entity: | Office Burundais pour la Protection de l'Environnement (OBPE) |
| Amount of Financing Requested: | 5,000,000 US Dollars |

*Figure 1 Dual-purpose mobile flood barrier and water storage & irrigation system*



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# List of Acronyms and Abbreviations

| No. | Acronym | Full Form |
|---|---|---|
| 1 | AAC | Agricultural Advisory Centre |
| 2 | ADEPH | Association of Disabled Persons |
| 3 | ADISCO | Support for Integrated Development and Community Solidarity |
| 4 | AF | Adaptation Fund |
| 5 | AFB | Adaptation Fund Board |
| 6 | AFCIA | Adaptation Fund Climate Investment Acceleration Programme |
| 7 | AHAGUEBU | Association of War Disabled of Bubanza |
| 8 | AU | African Union |
| 9 | AVEDEC | Village Association for Mutual Aid and Community Development |
| 10 | BEPAE | Provincial Office of the Environment, Agriculture and Livestock |
| 11 | BIF | Burundian Franc |
| 12 | BMP | Biodiversity Management Plan |
| 13 | CAP | Common Alert Protocol |
| 14 | CBA | Cost-Benefit Analysis |
| 15 | CBEWS | Community-Based Early Warning Systems |
| 16 | CCDRR | Communal Committees for Disaster Risk Reduction |
| 17 | CGC | Colline Grievance Committee |
| 18 | CHIRPS | Climate Hazards Group InfraRed Precipitation with Station Data |
| 19 | CIS | Climate Information Services |
| 20 | CLO | Community Liaison Officer |
| 21 | CNIDH | National Commission for Human Rights |
| 22 | CO2 | Carbon Dioxide |
| 23 | CRB | Burundi Red Cross |
| 24 | CSO | Civil Society Organization |
| 25 | CTC | Communal Technical Committee |
| 26 | CTCN | Climate Technology Centre and Network |
| 27 | DA | Designated Authority |
| 28 | DPEE | Regional Water Directorate |
| 29 | DRM | Disaster Risk Management |
| 30 | DRR | Disaster Risk Reduction |
| 31 | EAC | East African Community |
| 32 | EAP | Early Action Protocol |
| 33 | EE | Executing Entity |
| 34 | EIA | Environmental Impact Assessment |
| 35 | EPDM | Ethylene Propylene Diene Monomer |
| 36 | EPR | Emergency Preparedness Response |
| 37 | ESCP | Erosion and Sediment Control Plan |
| 38 | ESES | Environmental, Social and Economic Sustainability |
| 39 | ESIA | Environmental and Social Impact Assessment |
| 40 | ESMP | Environmental and Social Management Plan |
| 41 | ESMS | Environmental and Social Management System |
| 42 | ESP | Environmental and Social Policy |
| 43 | ESRM | Environmental and Social Risk Management |
| 44 | ESSF | Environmental and Social Sustainability Framework |
| 45 | EU | European Union |
| 46 | EWS | Early Warning Systems |
| 47 | FAO | Food and Agriculture Organization |
| 48 | FbF | Forecast-Based Financing |
| 49 | FFS | Farmer Field Schools |
| 50 | FHH | Female-Headed Households |
| 51 | FPIC | Free, Prior, and Informed Consent |
| 52 | GAP | Gender Action Plan |
| 53 | GBV | Gender-Based Violence |
| 54 | GCF | Green Climate Fund |
| 55 | GDP | Gross Domestic Product |

| | | |
|---|---|---|
| 56 | GEF | Global Environment Facility |
| 57 | GEF-LDCF | Global Environment Facility – Least Developed Countries Fund |
| 58 | GIIP | Good International Industry Practice |
| 59 | GIS | Geographic Information Systems |
| 60 | GP | Gender Policy |
| 61 | GPS | Global Positioning System |
| 62 | GRM | Grievance Redress Mechanism |
| 63 | HACT | Harmonized Approach to Cash Transfers |
| 64 | HDDS | Household Dietary Diversity Score |
| 65 | HEC-HMS | Hydrologic Engineering Center – Hydrologic Modeling System |
| 66 | ICT | Information and Communication Technology |
| 67 | IDA | International Development Association |
| 68 | IDP | Internally Displaced Persons |
| 69 | IE | Implementing Entity |
| 70 | IFAD | International Fund for Agricultural Development |
| 71 | IFRC | International Federation of Red Cross and Red Crescent Societies |
| 72 | IGAD | Intergovernmental Authority on Development |
| 73 | IGEBU | Institut Géographique du Burundi |
| 74 | IK | Indigenous Knowledge |
| 75 | ILO | International Labour Organization |
| 76 | IMERG | Integrated Multi-satellite Retrievals for GPM |
| 77 | IP | Indigenous Peoples |
| 78 | IPM | Integrated Pest Management |
| 79 | IPP | Indigenous Peoples Plan |
| 80 | IPPF | Indigenous Peoples Planning Framework |
| 81 | IPV | Intimate Partner Violence |
| 82 | KPI | Key Performance Indicator |
| 83 | LBW | Low Birth Weight |
| 84 | LMP | Labor Management Procedures |
| 85 | LTI | Lost Time Injury |
| 86 | LTIFR | Lost Time Injury Frequency Rate |
| 87 | M&E | Monitoring and Evaluation |
| 88 | MAE | Ministry of Environment (Ministère de l'Environnement) |
| 89 | MEL | Monitoring, Evaluation, and Learning |
| 90 | MHM | Menstrual Hygiene Management |
| 91 | MIE | Multilateral Implementing Entity |
| 92 | MINEAGRIE | Ministry of Environment, Agriculture and Livestock |
| 93 | MoU | Memorandum of Understanding |
| 94 | NAGURA | Burundi Colline Climate Resilience Project |
| 95 | NAP | National Adaptation Plan |
| 96 | NAPA | National Adaptation Programme of Action |
| 97 | NBI | Nile Basin Initiative |
| 98 | ND-GAIN | Notre Dame Global Adaptation Initiative |
| 99 | NDC | Nationally Determined Contribution |
| 100 | NDVI | Normalized Difference Vegetation Index |
| 101 | NFI | Non-Food Item |
| 102 | NGO | Non-Governmental Organization |
| 103 | NSC | National Steering Committee |
| 104 | O&M | Operation and Maintenance |
| 105 | OBPE | Office Burundais pour la Protection de l'Environnement |
| 106 | OCHA | Office for the Coordination of Humanitarian Affairs |
| 107 | OHS | Occupational Health and Safety |
| 108 | OPEC | Organization of the Petroleum Exporting Countries |
| 109 | OSS | Sahara and Sahel Observatory |
| 110 | PADANE | Programme d'Appui au Développement Agricole, à la Nutrition et à l'Entrepreneuriat |
| 111 | PBF | Performance-Based Financing |
| 112 | PCA | Project Cooperation Agreement |
| 113 | PDNA | Post-Disaster Needs Assessment |
| 114 | PMU | Project Management Unit |

| | | |
|---|---|---|
| 115 | PFNPRGC | National Platform for Risk Prevention and Disaster Management |
| 116 | PGIS | Preparedness and Risk Management Plans / Hazard Risk Management Plans |
| 117 | PIU | Project Implementation Unit |
| 118 | PND | National Development Plan (Plan National de Développement) |
| 119 | PNPRGC | Plateforme Nationale pour la Prévention de Risques et Gestion des Catastrophes |
| 120 | PPE | Personal Protective Equipment |
| 121 | PPR | Project Performance Report |
| 122 | PRODEFI | Value Chain Development Programme (Programme de Développement des Filières) |
| 123 | PSC | Project Steering Committee |
| 124 | PV | Photovoltaic |
| 125 | QA | Quality Assurance |
| 126 | R&D | Research and Development |
| 127 | RAP | Resettlement Action Plan |
| 128 | RCA | Root Cause Analysis |
| 129 | RCP | Representative Concentration Pathway |
| 130 | ROI | Return on Investment |
| 131 | RPF | Resettlement Policy Framework |
| 132 | RTNB | National Radio and Television of Burundi |
| 133 | SDG | Sustainable Development Goal |
| 134 | SEA | Sexual Exploitation and Abuse |
| 135 | SEAH | Sexual Exploitation, Abuse, and Harassment |
| 136 | SEAP | Simplified Early Action Protocol |
| 137 | SEP | Stakeholder Engagement Plan |
| 138 | SIA | Social Impact Assessment |
| 139 | SLAMDAM | Portable/Mobile Water-Filled Flood Barrier |
| 140 | SMS | Short Message Service |
| 141 | SNV | Netherlands Development Organisation (Stichting Nederlandse Vrijwilligers) |
| 142 | SOP | Standard Operating Procedure |
| 143 | SROI | Social Return on Investment |
| 144 | TAP | Technology Action Plan |
| 145 | TEK | Traditional Ecological Knowledge |
| 146 | TNA | Technology Needs Assessment |
| 147 | ToC | Theory of Change |
| 148 | TPM | Third-Party Monitor |
| 149 | TV | Television |
| 150 | UN | United Nations |
| 151 | UNCCD | United Nations Convention to Combat Desertification |
| 152 | UNDP | United Nations Development Programme |
| 153 | UNDRIP | United Nations Declaration on the Rights of Indigenous Peoples |
| 154 | UNEP | United Nations Environment Programme |
| 155 | UNFCCC | United Nations Framework Convention on Climate Change |
| 156 | UNFPA | United Nations Population Fund |
| 157 | UNIPROBA | Unissons-nous pour la Promotion des Batwa (Let Us Unite for the Protection of the Batwa) |
| 158 | UPHB | Disability Organization (Union pour la Promotion des Handicapés du Burundi) |
| 159 | USA | United States of America |
| 160 | USAID | United States Agency for International Development |
| 161 | USD | United States Dollar |
| 162 | VHI | Vegetation Health Index |
| 163 | VSLA | Village Savings and Loan Association |
| 164 | WASH | Water, Sanitation, and Hygiene |
| 165 | WB | World Bank |
| 166 | WFP | World Food Programme |
| 167 | WMO | World Meteorological Organization |
| 168 | WMP | Waste Management Plan |

# Project / Programme Background and Context

## 1. National development and climate context

Burundi is a small, densely populated, landlocked country in the East African Great Lakes region with a population of over 14 million people.[2] The country ranks among the most climate-vulnerable globally, being the 23rd (164 out of 187) most vulnerable and 12th (180 out of 192) least ready to respond to climate change impacts according to the Notre Dame Global Adaptation Initiative (ND-GAIN) Index. [3]

The nation faces serious development challenges. Around 70 percent of the population lives below the poverty line (USD 3/day-2024).[4] The economy is overwhelmingly dependent on rain-fed agriculture, which employs around 70-85 percent of the population and accounts for approximately 32 percent of GDP.[5] The average land holding for rain-fed farmers is approximately 0.5 hectares, but many households operate smaller plots. This heavy agricultural dependence creates extreme vulnerability to climate shocks. Any disruption to rainfall patterns or increased flooding directly threatens the livelihoods and food security of the majority population.

**Economic context:** GDP per capita has followed a declining trend despite rapid population growth. Agricultural productivity per capita has declined.[6] Agricultural production often takes place on marginal lands vulnerable to both flooding and drought. Food insecurity affects large segments of the population.[7]

**Demographic pressure**: Burundi has one of the highest population growth rates in sub-Saharan Africa with a high population density of over 500 per km² in 2026[8], intensifying pressure on land, water, and forest resources. This rapid population growth directly increases climate vulnerability through resource scarcity and environmental degradation.

**Geopolitical context:** Burundi's development context is shaped by persistent political, institutional and economic fragility, compounded by instability in the Great Lakes region. The country hosts around 90,000 refugees, over 90% from the Democratic Republic of Congo[9], reflecting continued regional displacement pressures that can place additional strain on institutions, livelihoods and public resources.

## 2. Climate change trends and projections

Since the 1930s, Burundi has experienced an estimated increase of 0.7-0.9°C in average annual temperature. More recently, significant shifts in rainfall seasonality have been observed: the wet season now typically starts later (October) and ends sooner (April). Total precipitation has declined during traditional growing seasons, while high-intensity rainfall events have intensified. This pattern creates a dual climate hazard—more severe droughts during dry seasons, coupled with more destructive flooding during rainy periods. [10]

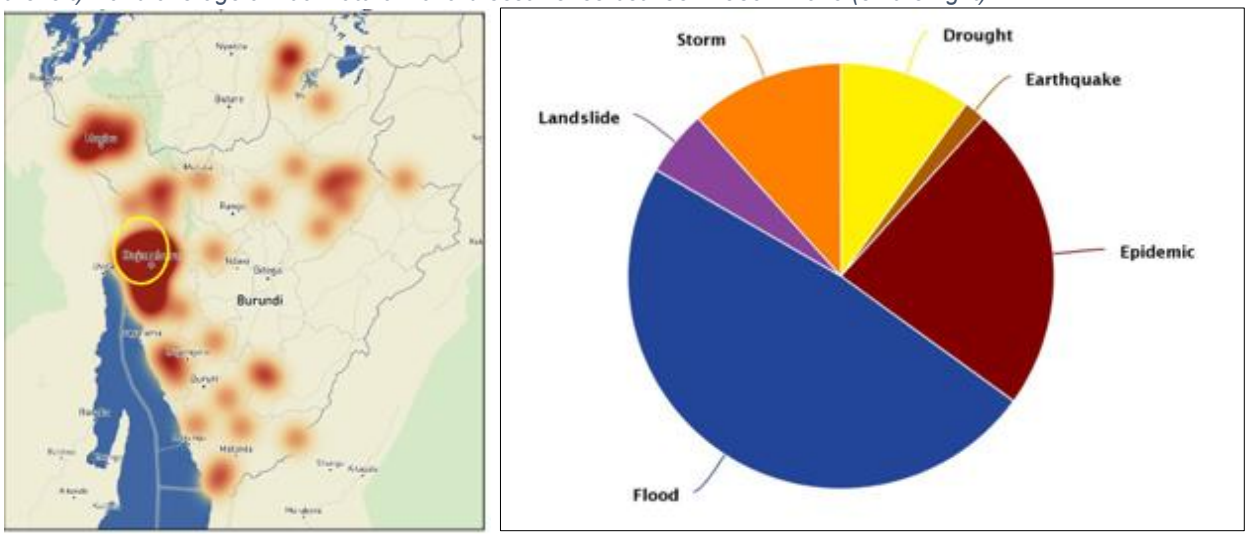
By 2050, mean annual temperature is expected to increase by between 1.5 and 2.5°C, and mean annual rainfall is projected to increase. This projected increase in rainfall is strongly associated with an increase in high-intensity rainfall events. Rainfall patterns are likely to be altered such that there will essentially be two six-month seasons: one rainy season from November to April and a dry season from May to October[11], with increased variability and unpredictability within seasons, making agricultural planning increasingly difficult.

Natural hazards have a destructive impact on the socioeconomic wellbeing of Burundi and its population. Besides temperature and precipitation first-order hazards, Burundi is vulnerable and historically affected by multiple compounded climate change hazards including floods, landslides triggered by intense precipitation events, droughts, storms and wildfires[12], with hotspots and the project target area shown in Figure 2. Historical data from 1980-2020 shows floods constitute the most frequent natural hazard, as also shown in

[2] Data Reportal. (2025). Digital 2025: Burundi. ; UNFPA. (2024). World Population Dashboard - Burundi
[3] Notre Dame Global Adaptation Initiative (ND-GAIN). (2025). Country Index – Burundi online (ranking as per 13 November 2025)
[4] World Bank. (2024). *Macro Poverty Outlook for Burundi: October 2024*.
[5] World Bank. (2023). *Employment in Agriculture (% of total employment) - Burundi*. World Bank Data Indicators.
[6] World Bank. 2024). Agriculture, forestry, and fishing, value added (% of GDP) – Burundi
[7] World Bank. (2020). Burundi Poverty Assessment.
[8] United Nations Population Fund (UNFPA). (2024). World Population Dashboard – Burundi
[9] World Bank. (2024). Refugees as Catalysts for Local Development in Burundi. Washington, D.C.: World Bank.
[10] UNEP GRID-Geneva. (2019). Climate Change Burundi – Temperature and Precipitation Trends. Digital Information Centre for Flood
[11] Idem
[12] World Bank. (2024). Tackling Climate Change, Land Degradation and Fragility: Diagnosing Drivers of Climate and Environmental Fragility in Burundi.

Figure 2. Extreme floods and droughts are estimated to cause a yield decline of 5-25 percent in the coming decades and reduce long-term growth by 2.4 percent of GDP per year.[13]

*Figure 2 Climate change hazards including floods, landslides, droughts, storms and wildfires hotspots in Burundi (on the left)[14] and average annual natural hazard occurrence between 1980 – 2020 (on the right)[15]*




## 3. Target communes: selection justification and profile

The project targets three communes in the Imbo Basin and adjacent lowlands: Bubanza, Mpanda, and Bukinanyana (Bujumbura province); see Figure 3 for the target area. Within these target communes, the most vulnerable areas / Collines (35 out of 121) have been selected for this project. These communes, vulnerable areas / Collines were selected based on:

- **Severe and recurring flood and drought exposure**: Historical records show these zones experience severe and frequent climate-induced hazards.
- **High population vulnerability**: 358,116 selected population living in 35 targeted Collines (administrative sub-divisions) with 32 percent youth (15-34 years) and 51 percent women.
- **Agricultural dependence**: 83 percent of households depend on agriculture; vulnerability is amplified by climate sensitivity of livelihoods.
- **Critical data gaps:** Limited climate monitoring infrastructure and climate services coverage.
- **Technical feasibility**: Relatively flat terrain and soil conditions allow deployment of innovative mobile flood barriers.
- **Strategic complementarity**: Target areas avoid duplication with other development projects (mostly focused on agriculture resilience interventions) while complementing national DRR efforts.

*Figure 3 New provinces in Burundi per 2025 and target area*




Target population profile:

[13] KU Leuven. (2019). Climate Change Profile – Burundi. KLIMOS Toolkit.
[14] Burundi Climate and Fragility Advisory Services and Analytics (ASA) : "Diagnosing Drivers of Climate and Environmental Fragility in Burundi's Colline Landscapes."
[15] WB climate change knowledge portal

- Total population: 358,116 across 35 Collines.
- Women: 51 percent (181,421).
- Youth (15-34 years): 32 percent (113,527).
- Elderly and disabled: 5.6 percent (20,052).
- Farmers: 83 percent (298,390 people).
- Batwa and other minorities: 3,579 people (1 percent).
- Agricultural land affected: 598 hectares in flood-prone areas.

The table below provides an overview of community organizations in the target communes.

*Table 1 Target population by commune, zone*

| Communes | Target zone | Collines / flood prone areas | Population affected | Women | Youth (15-34 yrs) | Farmers | Disabled / elderly | Batwa and other groups | Affected agricultu re (ha) |
|---|---|---|---|---|---|---|---|---|---|
| **Mpanda** | Musenyi | Musenyi | 23022 | 11741 | 7298 | 17612 | 1289 | 230 | 36 |
| | | Nyamabere | 14428 | 7358 | 4574 | 11037 | 808 | 144 | 19 |
| | | Rugenge | 5644 | 2878 | 1789 | 4318 | 316 | 56 | 12 |
| | | Rubira | 8428 | 4298 | 2672 | 6447 | 472 | 84 | 30 |
| | Butanuka | Butanuka | 4963 | 2531 | 1573 | 3797 | 276 | 50 | 14 |
| | | Ruziba | 3630 | 1851 | 1151 | 2777 | 203 | 36 | 32 |
| | | Kivyibusha | 3838 | 1957 | 1217 | 2936 | 215 | 38 | 16 |
| | Gihanga | Gihanga | 20355 | 10381 | 6453 | 15572 | 1140 | 204 | 9 |
| | | Murira | 9131 | 4657 | 2895 | 6985 | 511 | 91 | 6 |
| | | Buramata | 9627 | 4910 | 3052 | 7365 | 539 | 96 | 8 |
| | Mudubugu | Cabiza | 10542 | 5376 | 3342 | 8065 | 590 | 105 | 20 |
| | | Rugunga | 9868 | 5033 | 3128 | 7549 | 553 | 99 | 12 |
| | | Busongo | 5324 | 2715 | 1688 | 4073 | 296 | 53 | 8 |
| | | Muyange | 4224 | 2154 | 1339 | 3231 | 237 | 42 | 13 |
| | Mpanda | Gifurwe | 20233 | 10319 | 6414 | 15476 | 1133 | 202 | 18 |
| | | Gahwazi | 14671 | 7482 | 4651 | 11223 | 822 | 147 | 38 |
| | Muzinda | Mutara | 7765 | 3960 | 2462 | 5940 | 435 | 78 | 8 |
| | | Kibenga | 7696 | 3925 | 2440 | 5887 | 431 | 77 | 14 |
| Mpanda subtotal | | 18 collines | 183,389 | 93,526 | 58138 | 140,290 | 10,266 | 1,832 | 313 |
| **Bubanza** | Bubanza | Bubanza | 20101 | 10252 | 6372 | 18835 | 1126 | 201 | 12 |
| | | Giko | 6317 | 3222 | 2002 | 5919 | 354 | 63 | 21 |
| | Buvyuko | Rugunga | 4254 | 2170 | 1349 | 3986 | 238 | 43 | 26 |
| | | Rurabo | 3823 | 1950 | 1212 | 3582 | 214 | 38 | 14 |
| | Mitakataka | Mitakataka | 8106 | 4134 | 2570 | 7595 | 454 | 81 | 11 |
| | | Gatura | 4026 | 2053 | 1276 | 3772 | 225 | 40 | 13 |
| | | Kagirigi | 3318 | 1692 | 1052 | 3109 | 186 | 33 | 9 |
| Bubanza Subtotal | | 7 collines | 49,945 | 25,473 | 15833 | 46,798 | 2,797 | 499 | 106 |
| **Bukinanyana** | Ndava | Ndava | 22585 | 11295 | 7159 | 20146 | 1265 | 226 | 22 |
| | | Nyamitanga | 15297 | 7652 | 4849 | 13645 | 857 | 153 | 16 |
| | | Muremera | 5176 | 2591 | 1641 | 4617 | 290 | 52 | 18 |
| | | Kansenga | 5839 | 2922 | 1851 | 5208 | 327 | 58 | 19 |
| | | Mwunguzi | 1688 | 848 | 535 | 1506 | 95 | 17 | 11 |
| | | Nimba | 946 | 477 | 300 | 844 | 53 | 9 | 17 |
| | Buganda | Gasenyi | 45784 | 22894 | 14514 | 40836 | 2564 | 458 | 4 |
| | | Kaburantwa | 13105 | 6557 | 4154 | 11690 | 734 | 131 | 29 |
| | | Ruhagarika | 9801 | 4902 | 3107 | 8742 | 549 | 98 | 36 |
| | | Cunyu | 4561 | 2284 | 1446 | 4068 | 255 | 46 | 21 |
| Bukinanyana Subtotal | | 10 collines | 124,782 | 61,896 | 39556 | 111,438 | 6,993 | 1,248 | 193 |
| Total | | 35 | 358,116 | 181,421 | 113527 | 298,390 | 20,052 | 3,579 | 612 (598 most affected) |

## 4. Climate hazards exposure, sensitivities and barriers to adapt

**Flood hazards and impacts**:

Target communes experience severe flooding during intense rainfall seasons (historically March-May and September-December). The 2023-2024 floods were among the most severe on record[16] with Imbo Basin



[16] CityNews Ottawa. (2024). Flooding wreaks havoc across East Africa. Burundi is especially hard-hit.

communes hit hard by floods.[17] Since 1980, more than 28 major flood events have been recorded in Burundi. More recent data from 2018-2023 documented 878 torrential rain and flood incidents. The western provinces bear the heaviest burden, with almost 40 percent of flood events concentrated in Bujumbura.[18] The operational early warning system for Burundi establishes a critical rainfall threshold of 25 mm in 24 hours as the level that triggers flood risk alerts. Floods cause 20–30 percent crop losses and infrastructure damage affecting 70 percent or more of assets.

**Flood impacts include:**

- Crop losses and agricultural destruction.
- Infrastructure damage: Roads, bridges, schools, and health facilities.
- Disease outbreak: Flooding contaminates water sources and increases waterborne diseases.
- Asset destruction and displacement: houses flooded.
- Livelihood disruption: Farmers lose productive assets and income sources.

**Drought hazards and impacts:**

Droughts occur during extended dry seasons (historically June-August and January-February), with the dry season extending from 4 to 6 months in some lowland regions.[19] Drought impacts follow a cyclical pattern, with major events occurring approximately every 5-7 years. Water scarcity thresholds used in monitoring indicate that when soil moisture drops below 20 percent deviation from the benchmark, significant agricultural impacts begin, with up to 20 percent of the vulnerable population affected at severe drought levels (80 percent of benchmark)[20] Impacts include:

- Crop failure and causing 25–40 percent yield reductions: Maize, beans, rice, and other crops fail due to water stress.
- Drinking water shortages: Wells and water sources dry up, creating severe water stress for households and livestock.
- Food insecurity and malnutrition: Crop failures and livestock losses eliminate primary food sources and income. Food price increases can be 20 percent after weather events affecting household food security (as mentioned during community consultations).
- Economic hardship and distress migration: Rural populations may be forced to migrate to cities seeking wage labor.

The table below provides a summary of the thresholds and return periods of floods and droughts.

*Table 2 Summary of thresholds and return periods[21]*

| Hazard Type | Current Threshold | Return Period | Population Typically Affected | Future Trend |
|---|---|---|---|---|
| Flooding (early warning trigger) | 25 mm in 24 hours | 2-5 years | 40,000-200,000 per event | Increasing intensity and frequency |
| Severe drought | 20% below rainfall benchmark | ~5-7 years | 1.6 million+ (severe events) | More frequent in southern regions |

Table 3 presents the primary flood hazard impacts by zone, highlighting the specific vulnerabilities that project interventions will address.

**Compounded vulnerabilities**: Many zones face both flood and drought threats in rapid succession or overlapping, creating a "double squeeze" on agricultural production and food security.

*Table 3 Summary Flood hazard impacts in target zones*

| Commune | Zone / Collines | Population | Primary Hazard impacts | Key Vulnerabilities |
|---|---|---|---|---|
| Mpanda | Musenyi, Gihanga, Mudubugu, Mpanda, Muzinda, Butanuka | 183,389 | Severe flooding from Rusizi River; seasonal droughts | High agricultural dependence; proximity to river; poor drainage infrastructure; location makes area especially vulnerable with slope barely reaching 2 degrees[22] |

[17] IFRC. (2024). Burundi Floods and Landslides DREF Final Report Emergency Plan of Action
[18] EGUsphere (2025) Comprehensive multi-hazard risk assessment in data-scarce regions. A study focused on Burundi
[19] Ndayizigiye, T. (2009). Case Study of Mugerero in Imbo Lowland Region in Burundi. Swedish University of Agricultural Sciences, DIVA Portal.
[20] ARC Secretariat Technical Team. Africa RiskView Methodology Technical Note: Drought
[21] EGUsphere (2025) Comprehensive multi-hazard risk assessment in data-scarce regions. A study focused on Burundi
[22] Development and Cooperation. (2025). Persistent flooding in Burundi threatens lives and livelihoods – Lack of dike on Rusizi River

| | | | | |
|---|---|---|---|---|
| Bubanza | Bubanza, Buvyuko, Mitakataka | 49,945 | Flooding esp. impacting urban area; seasonal inundation; waterlogging | High agricultural dependence; dense settlement; inadequate drainage; limited flood preparedness |
| Bukinanyana | Ndava, Buganda | 124,782 | Flooding impacting infra and agriculture; prolonged droughts; Soil erosion | High agricultural dependence; deforestation; seasonal water shortages |

**Sensitivities related to gender and vulnerable and marginalized groups**– see ANNEX 5 — Gender Action Plan (GAP) - for detailed information.

**Gender dynamics:**

Community consultations revealed that women provide most of the agricultural labor (especially in rice cultivation and vegetable farming) and bear primary responsibility for household food and water security. Yet women face systematic exclusion from adaptation opportunities:

- **Land access:** Limited land ownership; access depends on husbands or male relatives.
- **Credit and finance**: Cultural norms and formal requirements restrict women's access to loans.
- **Decision-making**: Women rarely participate in community meetings or household decisions about agricultural investment. Traditional governance operates through male chiefs and elders.
- **Technical training**: Women have limited access to agricultural extension services and technology training.
- **Leadership**: Few women hold positions in community committees or governance structures.

These barriers mean women are disproportionately vulnerable to climate impacts while being excluded from adaptation solutions.

Other vulnerable groups:

- **The Batwa (indigenous minority):** Representing 1 percent of target population, the Batwa experience marginalization. Community consultations revealed they have limited access to land and resources, often living in peripheral areas susceptible to flooding. Cultural exclusion limits their participation in adaptation planning. The Batwa speak Kirundi, the national language.
- **Persons with disabilities and elderly (5.6% of population):** These groups face mobility challenges and are often overlooked in emergency response planning. Older persons may have limited ability to relocate during floods; disabled persons may lack physical access to safe zones or adapted information channels.
- **Youth** (32% of population): While numerous (although this includes age 15-34), youth often lack leadership opportunities and voice in adaptation decisions. Unemployment rates have climbed.[23]
- **Female-headed households**: These households face multiple vulnerabilities: limited access to credit, male labor, and land.

**Human rights:** Climate vulnerability can reinforce existing inequalities in access to climate information, disaster protection, water and adaptation benefits. Women, Batwa communities, persons with disabilities and other vulnerable groups face particular risks of exclusion and discrimination. These include constraints on Batwa access to land and resources, GBV/SEAH risks affecting women, and accessibility barriers for persons with disabilities. The project addresses these risks through inclusive participation, FPIC, accessible early warning and grievance mechanisms, and the GAP and IPPF/IPP.

5. **Barriers to adapt**

Several interconnected barriers prevent communities and institutions from adapting to climate change:

Institutional and policy barriers:

- **Fragmented mandate**: Climate services responsibility is split across multiple institutions (IGEBU for forecasting, Civil Protection for response, OBPE for environment) with weak coordination mechanisms and no integrated early warning system legal framework.[24]

[23] Burundi Times (2024). Burundi's 2024 census

[24] International Federation of Red Cross and Red Crescent Societies (IFRC). (2023). Burundi Early Warning Early Action Case Study – Enhancing Emergency Alerting Systems to Save Lives. PREPARE Center.

- **Centralized systems**: All forecasting occurs at national level with no provincial or communal analysis capacity, preventing localized forecasts relevant to specific flood/drought risks.
- **Inadequate legal framework**: No formal directive mandates forecast-to-action linkages or defines institutional responsibilities for alert generation at sub-national levels.[25]

Technical and infrastructure barriers:

- **Sparse monitoring network**: Limited hydrological and meteorological stations; no real-time monitoring in Mpanda, Bubanza, Bukinanyana communes.
- **Limited forecasting tools**: Hydrological modeling relies on limited software platforms with severe capacity constraints and insufficient computing infrastructure.
- **Absence of standardized protocols**: No Common Alert Protocol (CAP) implementation; alert formats and triggers are undocumented and inconsistently applied.
- **Poor communication infrastructure:** Limited internet connectivity at provincial/communal levels prevents real-time data sharing; alert dissemination relies on intermittent national radio with only approximately 20% population coverage.

Financial barriers:

- **Limited resources for adaptation**: Government budgets for climate adaptation are minimal; communities lack capital for protective infrastructure or irrigation systems.
- **High upfront costs**: Mobile barriers and irrigation infrastructure require initial investment beyond community means.
- **Maintenance funding gaps**: Even where some infrastructure exists, lack of maintenance budgets leads to deterioration, especially irrigation channels.[26]

Capacity and knowledge barriers:

- **Limited technical knowledge**: Communities lack understanding of flood/drought preparedness; farmers do not know how to operate or maintain complex water management systems.
- **Weak institutional capacity**: Personnel at provincial and communal levels receive minimal training on climate data interpretation, alert generation, or emergency coordination.
- **Gender and inclusion gaps**: Women and vulnerable groups can be excluded from technical training; decision-making remains male-dominated.
- **Low literacy in target zones**: Many community members have limited formal education, requiring visual/oral communication about climate risks. Fewer than half of children complete primary school.[27]

Social and cultural barriers:

- **Traditional gender norms**: Women often require husband permission to access credit or markets, limiting their participation in adaptation.
- **Exclusion of minorities**: Batwa and other minority groups are often excluded from community decision-making.
- **Competing priorities**: Immediate survival and livelihood needs take precedence over long-term adaptation planning for many poor households.
- **Poor land-use planning**: Construction in buffer zones continues despite laws, and land-use planning does not adequately account for areas at very high risk of flooding.[28]

## 6. Project problem statement

**A multi-dimensional adaptation challenge:** Approximately 358,116 people are identified as the most climate vulnerable in Burundi's Imbo Basin, predominantly smallholder farmers. They face intensifying floods and droughts driven by climate variability. Yet exposure to floods and droughts alone do not determine their vulnerability. This proposal addresses seven interconnected root causes that transform climate hazards into crisis situations and proposes integrated innovative and community and institutional adaptation solutions to break cycles of climate-driven poverty and food insecurity.

## 7. Root causes of climate vulnerability

[25] idem
[26] As mentioned by IFAD during consultation
[27] World Bank. (2025). Burundi Macro Poverty Outlook
[28] African Arguments. (2024). Poor land-use planning does not consider areas at very high risk of flooding.

- **Entrenched poverty** (majority lives below poverty line): Communities lack the financial capacity to invest in flood protective measures or recover from shocks, especially women and vulnerable groups. Community consultations indicated that food prices can rise by around 20 percent after extreme events, further constraining poor households.
- **Extreme agricultural dependence** (83 percent employed in agriculture): Farming systems remain rain-fed with limited irrigation. Without protection and irrigation of agriculture areas, floods cause 20-30 percent crop losses and droughts cause 25-40 percent yield reductions.
- **Environmental degradation & demographic pressure**: High population growth intensifies pressure on land, water, and forest resources. Vulnerable groups farm increasingly on marginal lands; floods wash away topsoil or destroy assets; deforestation removes flood buffers.
- **Limited, slow and fragmented climate information and early warnings:**[29] the government has limited and inadequate monitoring systems. Forecasts are not linked to response protocols; multi-channel dissemination is limited; rural areas have severe information gaps. Communities cannot adjust planting dates, select crop varieties, or protect assets before hazards strike, responding reactively rather than proactively.[30]
- **Absent innovative adaptation technologies & local capacity**: No flood protection infrastructure exists;[31] no water storage systems; no irrigation capacity. Communities lack climate-specific training; no decision trees link forecasts to flood measures.
- **Gender inequality & social exclusion**: Women, youth, elderly, disabled, and Batwa minorities are often excluded from information, early warnings, technical training, and decision-making.
- **Institutional fragmentation, governance and capacity gaps**: Multiple institutions operate independently with limited integration of early warning system or forecast-to-action linkage. Disaster response is reactive; contingency plans ignore climate projections. Projects lack integration into government budgets, creating sustainability risks.

In this baseline scenario, climate impacts will intensify, pushing more people into poverty and malnutrition. Repeated climate shocks will undermine long-term development gains. Migration pressures will continue as rural populations lose adaptive capacity. Climate change-related events are estimated to result in a loss of 5-17 percent of the country's GDP per event.[32]

For a detailed analysis of the governance and institutional baseline and climate information and early warning gaps and needs, **see ANNEX 1: Governance and institutional baseline and in-depth assessment of climate services and early warning systems**.

**The compounding problem**: Without climate information, forecast, early warnings and response protocols, communities cannot adequately respond to flood and drought threats. Without flood protection measures, improved information alone provides limited protection. Without institutional capacity, climate information and early warnings do not reach communities or trigger local action. Without gender-responsive approaches, information and technologies do not reach women and vulnerable groups.

**Project response**: the project aims to have an integrated adaptation approach through innovations.

*Table 4 Overview integrated adaptation mechanism*

| Climate Forecast | Trigger | Technology Response |
|---|---|---|
| Rainfall: 25+ mm/24h (48-72h forecast) | Flood alert threshold | Activate barrier deployment; mobilize teams |
| River level: Rising above critical stage | Location-specific threshold | Deploy barriers; coordinate evacuation |
| Drought: Soil moisture <20% benchmark | 2–4-week drought forecast | Activate irrigation water extraction |
| Extended dry season: 4-6 months projected | Seasonal forecast | Fill water storage; activate irrigation scheduling |

The root causes of climate vulnerability, including barriers to adapt, in the project target area - entrenched poverty, agricultural dependence, environmental degradation, limited climate information, forecasts and warnings, triggering local action to protect the community and adapt to droughts, institutional fragmentation, gender and vulnerable groups inequality and limited learning - create mutually reinforcing cycles. These cycles cannot be broken through single interventions. The integrated project approach simultaneously:

- Strengthens climate information systems and early warnings, enabling communities to anticipate and prepare for shocks and trigger action below.

[29] International Federation of Red Cross and Red Crescent Societies (IFRC). (2023). Burundi Early Warning Early Action Case Study – Enhancing Emergency Alerting Systems to Save Lives. PREPARE Center.
[30] International Federation of Red Cross and Red Crescent Societies (IFRC). (2023). Burundi Early Warning Early Action Case Study – Enhancing Emergency Alerting Systems to Save Lives. PREPARE Center.
[31] Development and Cooperation (2025). Persistent flooding in Burundi threatens lives and livelihoods - Lack of dike on Rusizi River.
[32] UNEP GRID-Geneva (2019). Climate change / Burundi. Digital Information Centre for Flood

- Deploy innovative technologies to protect vulnerable people, assets and ecosystems from floods and enabling drought adaptation.
- Build institutional capacity for sustainable operation and maintenance of interventions.
- Ensures gender-responsive, inclusive implementation so adaptation benefits reach vulnerable populations and women participate in decision-making.
- Set up an enabling environment for innovation adoption, diffusion and replication.

By addressing the root causes of climate vulnerability and barriers to adapt, this project enables vulnerable communities to anticipate, prepare for, and adapt to climate shocks while maintaining livelihoods, food security, and dignity. The table below provides an overview of the root causes of vulnerability, specific challenges and the project response.

*Table 5 Overview root Causes of Vulnerability → Technology Responses*

| Root Cause Category | Specific challenge | Linked response | component |
|---|---|---|---|
| Limited climate information, forecast and warnings | limited understanding flood and drought vulnerabilities; Only 20 percent receive alerts on floods and droughts; no forecast-to-action linkage | Climate monitoring and information network + forecasting, warnings and response protocols | Component 1 (Outputs 1.1, 1.2, 2.1) |
| Institutional Fragmentation | Responsible entities operate independently; limited coordination | Coordination protocols linking forecasting and warnings to communal barrier deployment; decision trees for response | Component 1 (Output 3.1 and 3.2) |
| Technology Absence | No flood barriers as response to warnings; no irrigation capacity; no water storage | Water-filled mobile flood barriers; water storage in flood barriers; gravity-fed & solar PV irrigation with flexible / mobile use | Component 2 (Output 4.1) |
| Agricultural Vulnerability | Dependence rain-fed agriculture; no adaptive capacity; 20-40% yield losses during floods and droughts | | |
| Gender and vulnerable groups Inequality | Women and vulnerable groups often excluded from climate information and early warnings, technical training, decision-making | Gender and vulnerable groups-responsive climate information, early warning dissemination; 50 percent women in barrier deployment teams; 50 percent women in committees | Components 1 & 2 (Outputs 1.2, 3.1, 3.2, 4.1) |
| Environmental Degradation | Land degradation; forest pressure; water resource depletion | Mobile irrigation system | Component 2 (Output 4.1) |
| Extreme Poverty | Majority live below poverty line; lack recovery capacity; food price shocks | Irrigation enabling diversified income sources; year-round food self-sufficiency (10-12 months) reducing dependence on single crop | Component 2 (Output 4.1) |
| Knowledge Gaps | Limited evidence base on dual-purpose mobile flood barriers and water management system; no replication mechanism | Demonstration sites, peer-learning exchanges, replication toolkits, multi-stakeholder knowledge products | Component 3 (Outputs 4.2, 4.3) |

## 8. Preferred adaptation innovation

**Innovative water-filled mobile flood barrier technology:**

The innovative technology of water-filled mobile flood barriers is a proven technology validated through the Adaptation Fund's Climate Investment Acceleration Programme (AFCIA). For more information see here and here.

*Figure 4 Mobile flood barrier deployed*



Water-filled mobile flood barriers are modular, deployable flood defense and drought-resilient water storage systems. They can be easily and rapidly deployed when flood threats arise (alerts given). The system can be deployed at any location along a river or lake (when relatively flat) and filled with water from the river, lake, or any other source with hoses and mobile pumps. Barriers can be 'deflated' after a flood event if early in the rainy / flood season to be used somewhere else. They can stay in place for future irrigation purposes at the end of the rainy / flood season, but still 'deflated' when needed somewhere else.

In summary, the system consists of:

- **Modular design:** Self-contained units rapidly deployed to strategic locations to block floodwater entry.
- **Dual-purpose configuration**: Flood protection during rainy seasons; water storage in the flood barriers during droughts and flexible / mobile use of irrigation and solar pumps (with gravity system or mobile pumps and hoses).
- **Rapid deployment:** activation within 1.5-2 hours of warning.
- **Local operation:** Designed for community-based operation with basic mechanical training; standardized, locally sourced spare parts.
- **Climate resilience**: to withstand 1:20 to 1:50-year flood events while remaining manageable by communities with limited resources.

**Barrier operational cycle:** Barriers are expected to be deployed 1–3 times per flood season (October–April), triggered by IGEBU rainfall forecasts exceeding 25 mm/24h.[33] Each deployment lasts 3–14 days. At season end (~April), the CCDRR community team—guided by the Simplified Early Action Protocol (EAP)—decides whether barriers remain inflated as irrigation reservoirs or are deflated and stored. The seasonal decision calendar (April assessment → irrigation/deflation decision → September readiness check) will be formalized in the O&M protocol under Output 4.1, Activity 3. Decision rule: barriers are retained as irrigation storage if (i) the flood season hydrograph has receded below the 25 mm/24h alert threshold for >14 consecutive days, AND (ii) the CCDRR community team has agreed retention based on the dry-season cropping calendar; otherwise they are deflated and returned to the storage facility. This will be codified in the O&M Protocol (Output 1.2, Year 1).

Published rainfall statistics for the Imbo plain indicate[34] that ~1.1% of daily precipitation at Bujumbura Airport (1960–2010) exceeded 30 mm (≈4 days/yr > 30 mm), and the sEAP records 277 torrential-rain and flood incidents across the Imbo provinces (Bubanza, Bujumbura Rural, Cibitoke) over 2018–2023 (≈46/yr

[33] The 25 mm/24h trigger is the threshold formally adopted by the **Burundi Simplified Early Action Protocol (sEAP)** for floods, jointly developed by IGEBU, the Burundi Red Cross and the IFRC/Red Cross Red Crescent Climate Centre, which establishes that the threshold corresponds to a **2-to-5-year return period** based on IGEBU's analysis of daily rainfall: *Burundi Simplified Early Action Protocol for Extreme Floods (IFRC/CRB/IGEBU) — https://www.anticipation-hub.org/Documents/EAPs/sEAP_Burundi_Extreme_Floods.pdf*

[34] *Nkunzimana et al. (2019), Diagnosis of meteorological factors associated with recent extreme rainfall events over Burundi — https://www.sciencedirect.com/science/article/abs/pii/S0169809519317417; Bigirimana et al. (2025), Comprehensive multi-hazard risk assessment in data-scarce regions (Burundi) — https://egusphere.copernicus.org/preprints/2025/egusphere-2024-3445/egusphere-2024-3445.pdf; IGEBU station-level daily rainfall series to be obtained via the official data-request procedure — https://www.igebu.bi/demande-de-donnees/*

provincially). On this basis, the proposal's working assumption is indicatively 1-3 barrier deployments per year and 3-9 across the three communes in the flood seasons; this range will be calibrated in Year 1 against the daily rainfall series obtained from IGEBU (Bujumbura, Cibitoke and Bubanza synoptic stations) via the official data-request procedure.

**Solar-pump alternative — technical feasibility:** A high-flow solar-pump feasibility check was performed during proposal design. Filling 11,050 m³ within the 1.5–2-hour emergency window requires a sustained pumping rate of ~5,525–7,367 m³/h across the system. The largest commercially available solar surface pumps deliver ~9 m³/h per unit (e.g. ennos 1.5 HP Sunlight pump at 147 L/min; LARENS 600 W at 90 L/min), implying more than 600 solar pumps would be required versus a fleet of ~60 petrol pumps (each ~98 m³/h). Solar filling is further constrained by the fact that flood events typically occur under low-irradiance storm conditions. Petrol pumps are therefore the only technically viable option for the emergency-fill window. Solar-powered pumps will be used for dry-season irrigation, where flow requirements are far lower, and the petrol fleet is dedicated exclusively to the 1.5–2-hour deployment window. Lifecycle GHG emissions of the petrol fleet (estimated < 15 $tCO_2e$/yr across the three communes) are negligible against the adaptation benefit.

9. **AFCIA Validation (Burundi 2023-24)**

Comprehensive testing of the flood barriers in Gahwazi in Burundi confirmed the following:

- **Technical performance**: Barriers successfully acted as barriers to floodwater in simulated and actual events; 1–2-hour deployment achieved. The height of the flood barriers is 67 cm with effective flood defense height of 50 cm. Units are 3 meters and can be connected. The barriers were filled with water from the river using mobile pumps Unit weight is 55 kg and can be carried by two people.
- **Protection**: The pilot at Mpanda Commune benefited 2,500 people from a water security perspective, protected key agricultural areas, and demonstrated that the barriers could be deployed to provide 200 meters of protection within 1.5-2 hours.
- **Community acceptability**: High enthusiasm; technicians successfully trained; cost-effectiveness validated (lower capital than dikes; lower maintenance than dams).
- **Institutional integration**: Early warning systems successfully linked to barrier deployment protocols; communities demonstrated willingness to contribute to maintenance costs.
- **Dual-purpose**: Flood barriers also function as water storage for irrigation (see figure below) which was identified as a strong co-benefit by local users and authorities, a solution worth further piloting. During the first pilot, the community customized the mobile barriers themselves for irrigation use, which shows there was a real local demand for that function.
- **Puncture/failure data**: No structural failures or punctures occurred during the AFCIA pilot at Gahwazi/Mpanda (2023–24) during the two actual flood events.[35] Barriers are EPDM synthetic rubber, rated for 120–150-year flood events.

For more details on the results, see **ANNEX 2: Overview results testing of mobile flood barrier in Gahwazi, Burundi**

*Figure 5 Irrigation from flood barriers*



[35] *ZEPHYR/SLAMDAM Final Implementation Report (ADPC, 2022) — https://www.adpc.net/cic/wp-content/uploads/2022/07/10-ZEPHYR-Final-output-Report-SLAMDAM-revised.pdf; WaveSave Burundi case study — https://wavesave.com/case-studies/project-slamdam-burundi-unep-2022/; APRN-BEPB monitoring — https://bi.chm-cbd.net/news/renforcer-resilience-communautaire-aprnbepb-wavesave-projet-bi*

The table below provides an overview of the key advantages compared to alternatives, which is also further discussed in section II.C of this proposal.

*Table 6 Key advantages of the proposed interventions over alternatives*

| Characteristic | Mobile Barriers | Traditional Dikes | Sand Barriers | Sandbags |
|---|---|---|---|---|
| Deployment Speed | 1.5-2 hours | Months-years | 4-6 hours | 8-12 hours |
| Capital Cost | Low-moderate | Very high | Moderate | Low |
| Maintenance | Quarterly | Continuous (expensive) | Monthly | Per-flood replacement |
| Dual-Purpose | Yes (flood + water) | Limited | No | No |
| Community Operation | Feasible | Engineers required | Limited | Limited |
| Lifespan | >20 years | 30+ years (costly) | 3-5 years | 1-5 years |
| Community Acceptance | High | Moderate | Low | Very low |

10. **Alignment with Adaptation Fund Innovation Programme**

This proposal demonstrates innovation by: (1) integrating proven mobile barrier technology with real-time climate information systems to create forecast-to-action mechanisms; (2) addressing interconnected flood and drought hazards through flexible, dual-purpose technology; (3) ensuring gender-responsive, inclusive implementation where vulnerable populations participate in decision-making and capacity building; (4) producing evidence-based replication toolkit for adoption in additional climate-vulnerable contexts.

The technology has been validated through AFCIA testing, demonstrating technical viability, community acceptability, and institutional feasibility in Burundi's climate and socioeconomic context.

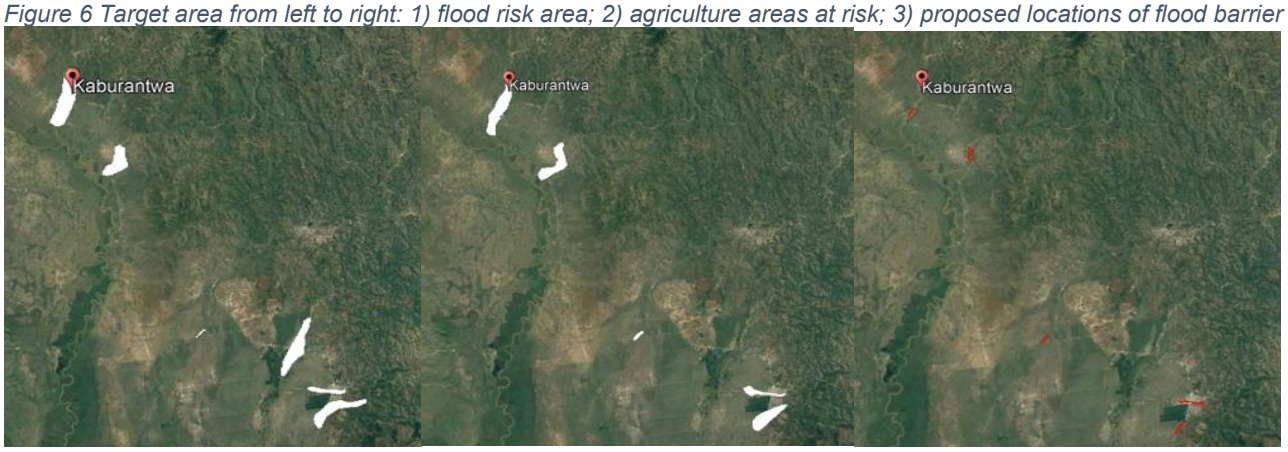
11. **Dimensions and locations of the proposed flood barriers required to withstand floods in the target communities.**

Table 7 shows the length of flood barriers required to protect the project target communities and agricultural areas (598 ha) from flooding and Figure 6 provides an overview of the target areas, flood-prone areas, and the proposed locations of the flood barriers.

*Table 7 Flood locations, required flood barrier length, and areas protected by flood barriers*

| Location | Length of barrier (km) | Agricultural area at flood risk and protected by barriers (ha) | Target community area with buildings and infrastructure at flood risk and protected by barriers (ha) |
|---|---|---|---|
| In Bubanza commune | | | |
| 1. River Kajeke | 1.07 | 84 | 136 |
| In Mpanda commune | | | |
| 2. River Gifurwe | 1.23 | 131 | 10.9 |
| 3. River Musenyi | 1.78 | 76.4 | 68 |
| In Bukinanyana commune | | | |
| 4. River Kagunuzi | 1.58 | 67.2 | 158 |
| 5. River Kaburantwa | 0.84 | 240 | 138 |
| **Total** | **6.5** | **598** | **511** |

*Figure 6 Target area from left to right: 1) flood risk area; 2) agriculture areas at risk; 3) proposed locations of flood barrier*




12. **Theory of change**

The desired adaptation outcomes/results of the proposed approach include:

Flood protection & risk reduction:

- Direct protection of 358,116 vulnerable people, 598 ha of agricultural land, and related irrigation infrastructure from flood exposure.
- Communities and critical infrastructure (schools, health centers, water sources) protected.
- Reduction in flood-related crop losses from 20-30 percent to <5 percent in protected areas.
- Reduction in flood-related mortality through early warning + physical protection.

Drought resilience & food security of the most vulnerable (small scale):

- 3.5 ha fully irrigated during the whole yearly dry season or 24.5 ha if once a week (depending on community decision on distribution).
- Year-round food self-sufficiency increased from 4-6 months to 10-12 months.
- Agricultural productivity increases; 25-40 percent yield losses eliminated through irrigation.
- Household income increases from irrigated agriculture.
- Reduced distress migration driven by drought-induced food insecurity.

Institutional & community capacity:

- Government and community staff trained in climate information interpretation and barrier operation.
- Early warning systems, preparedness plans, and water management integrated into government budgets.
- Gender-responsive adaptation: 50 percent women in decision-making; 40 percent or more of benefits accruing to women.

Innovation & scaling:

- Documented evidence of integrated climate information + mobile barrier effectiveness.
- Replication toolkit enabling adoption in additional climate-vulnerable regions.
- Regional knowledge network established for sustained innovation dissemination.

13. The Theory of Change (ToC) below shows the inputs required under this project and the proposed components with outputs leading to the anticipated outcomes.

    The Goal Statement is: IF climate information and early warning systems are strengthened with real-time monitoring and specialized forecasting, and if communities are engaged in disaster preparedness and if water-filled mobile flood barriers and irrigation systems are deployed and maintained by trained communities, THEN target communes will have enhanced resilience and reduced flood and drought losses BECAUSE climate-risk informed preparedness is strengthened and livelihoods are protected from floods and droughts.

    The Theory of Change is based on four interlinked pathways. First, localized climate-risk mapping, improved early warning dissemination and climate-informed preparedness arrangements enable communities to anticipate flood and drought risks and take action before impacts occur, thereby reducing exposure. Second, expanded monitoring infrastructure, together with strengthened forecasting and technical capacity at national and subnational levels, improves the quality and use of climate information. Third, commune preparedness and response plans, combined with strengthened CCDRRs, translate climate information into locally owned preparedness and response processes, strengthening awareness, participation and ownership of adaptation and climate risk reduction. Fourth, deployment of the dual-purpose mobile flood barriers and irrigation systems directly protects lives, assets and livelihoods, while evidence generation, knowledge products and peer-learning support continued improvement, replication and scale-up of the innovation.

    These pathways also respond to the institutional, policy, financial, capacity and social barriers identified in the project baseline, although the project does not aim to resolve all of these barriers comprehensively within the available grant. Institutional and policy constraints are addressed through strengthened forecast-to-action coordination, subnational capacity and locally owned DRR structures, while project evidence and policy-relevant knowledge products will be linked to relevant planning, policy review and dialogue processes. Financial barriers are partly addressed through the project's investment in the initial technology and development of sustainable O&M arrangements, while longer-term financing for operation, maintenance and wider replication remains an assumption for sustained impact beyond the project. The causal pathways are also supported by the external country-context drivers identified below.

*Table 8 ToC diagram*

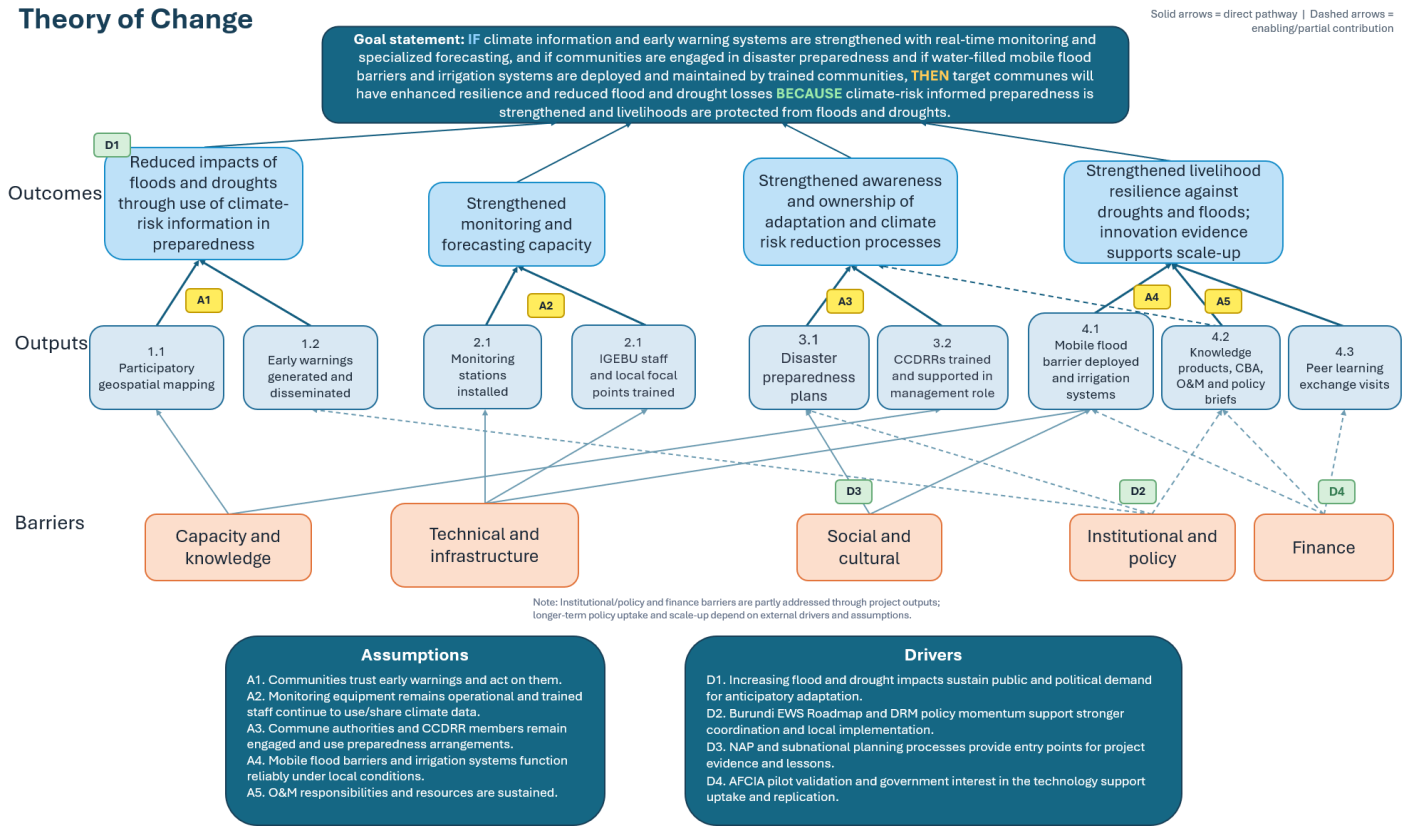



*Table 9 critical assumptions & mitigation*

| Assumption | Mitigation | Success Indicator |
|---|---|---|
| Communities trust early warnings | Participatory design; transparent reporting | >50 percent rate accuracy as "good"; >50 percent respond |
| Monitoring systems remain operational and data are used | Maintenance, training and data-sharing protocols | Stations operational; data routinely used |
| Commune authorities and CCDRRs remain engaged | Clear roles, training and regular drills | 3 CCDRRs strengthened in the target communes |
| Barriers function reliably | AFCIA testing; factory QA; inspections | ≥50 percent deploy within 2 hours |
| Local maintenance sustained | Trainings and committees strengthened | Trainings conducted and committees strengthened with guidelines. |

# Project objectives

14. **Overall project objective**: to enhance the resilience of vulnerable communities and institutions in Burundi to climate change-induced flood and drought events by deploying innovative adaptation technologies, strengthening climate information systems and early warning capacities, and promoting gender and vulnerable groups-responsive community empowerment and institutional capacity building.

    The sub-objectives below align with the AF outcomes 1, 2, 3, 6 and 8:

    1. Reduce the exposure of vulnerable communities in three target communes to climate-related flood and drought hazards through the generation and dissemination of actionable climate risk information and early warning systems (in line with AF outcome 1).
    2. Strengthen the institutional capacity to monitor, forecast, and respond to climate-induced flood and drought risks in the three target communes (in line with AF outcome 2).
    3. Strengthen community awareness and ownership of climate adaptation and risk reduction processes at local level in three target communes, ensuring inclusive participation of indigenous peoples and vulnerable groups (in line with AF outcome 3).
    4. Support the development and diffusion of the innovative dual-purpose mobile flood barrier technology and integrated water systems, generating evidence and enabling replication and scale-up at subnational and national levels (in line with AF outcome 8), securing climate resilient livelihoods for vulnerable communities (in line with AF outcome 6).

**Gender equality and social inclusion** will be ensured throughout project design, implementation, and monitoring, with targeted actions to empower women, youth, ethnic minorities, and persons with disabilities. See ANNEX 5 — Gender Action Plan (GAP) - for details.

## Project components and financing

*Table 10 Project components, outcomes, outputs and budget.*

| Project Components | Expected Outputs | Expected Outcomes | Amount (US$) |
|---|---|---|---|
| **Component 1:** Climate information and warning systems and responses to flood and drought risks/threats | **Output 1.1.** Geospatial flood and drought hazard maps and risk profiles for three (3) target communes developed (to verify the most suitable locations for the dual-purpose mobile flood barriers)<br><br>Consideration: gender and vulnerable groups-sensitive; to include sex-disaggregated data | **Outcome 1:** Reduced exposure of vulnerable communities in three target communes to flood and drought hazards through the generation and dissemination of actionable climate risk information<br><br>*Aligns with AF Outcome 1* | 318 000 |
| | **Output 1.2:** Early warning dissemination and communication systems strengthened (to inform the deployment of the dual-purpose mobile flood barriers)<br><br>Consideration: gender and vulnerable groups-sensitive; to include sex-disaggregated data | | 240 000 |
| | **Output 2.1:** Climate monitoring network and forecasting capacity expanded (to inform timely deployment of the dual-purpose mobile flood barriers)<br><br>Consideration: gender and vulnerable groups-sensitive; to include sex-disaggregated data | **Outcome 2:** Strengthened institutional capacity covering the three target communes to reduce climate-induced flood and drought risks through expanded climate monitoring and improved forecasting.<br><br>*Aligns with AF Outcome 2* | 325 000 |
| | **Output 3.1**: Climate-informed preparedness/response plans developed and operationalized for three (3) target communes (to prepare for the deployment of the dual-purpose mobile flood barriers)<br><br>Consideration: gender and vulnerable groups-sensitive; to include sex-disaggregated data | **Outcome 3:** Strengthened awareness and ownership of adaptation and climate risk reduction processes, especially climate-informed preparedness and response processes at local level in three target communes, including indigenous peoples, to enable timely and inclusive deployment of the dual-purpose mobile flood barriers.<br><br>*Aligns with AF Outcome 3* | 150 000 |
| | **Output 3.2:** CCDRRs trained and supported in technical and management functions for climate-informed preparedness and response in the three target communes | | 30 000 |
| **Component 2:** Innovative flood and drought risk reduction practices and technologies | **Output 4.1.** Mobile flood barrier technology and integrated water systems deployed and operational and maintained in three (3) target communes to protect lives, assets, and agricultural land from intensified flooding and to irrigate agriculture<br><br>Consideration: use information from Component 1 for deployment details. | **Outcome 4:** Innovation for effective, long-term adaptation to climate change accelerated, encouraged, and enabled to scale up through the dual-purpose mobile flood barrier technology and integrated water systems -enhancing ecosystem resilience and natural resource management, securing climate-resilient livelihoods for vulnerable communities<br><br>*Aligns with AF Outcome 8 and 6* | 2 348 000 |
| **Component 3:** Results tracking and knowledge management for post-project sustainability and innovation diffusion | **Output 4.2.** A strong evidence base on the benefits of the innovative dual-purpose mobile flood barriers and integrated water systems produced and disseminated | | 808 600 |
| | **Output 4.3** Demonstration sites, peer-learning exchanges, and knowledge-sharing platforms established to facilitate replication by other communes and institutions | | 82 000 |
| Project Execution cost | | | 306 700 |
| Total Project Cost | | | 4,608,300 |
| Project Cycle Management Fee charged by the Implementing Entity | | | 391,700 |
| Amount of Financing Requested | | | 5,000,000 |

## Projected Calendar

*Table 11 Project Calendar*

| Milestones | Expected Dates |
|---|---|
| Start of project implementation | Jan 2027 |
| Mid-term review | March 2029 |
| Project completion | December 2030 |

| | |
|---|---|
| Project Closing | June 2031 |
| Terminal Evaluation | October 2031 (latest) |

**Timeline extension to 48 months and sequencing risk mitigation.** The proposal is (a) strengthened on timeline justification and (b) extended from 42 to 48: (i) MINEAGRIE permitting risk — the pre-implementation phase (already completed) included advance engagement with MINEAGRIE on Water Code authorizations and OBPE on EIA screening; the project benefits from simplified environmental screening under Decree 100/22 (2010) for low-impact installations. Bilateral agreement with MINEAGRIE commits to a 90-day decision window from complete-file submission. Mitigation: (a) permits filed in Months 1–3 (Year 1 Q1) in parallel with technical-specs work; (b) if the MINEAGRIE decision takes more than 120 days from filing, the Project Steering Committee escalates to the inter-ministerial PFNPRGC platform; (c) Component 2 procurement of long-lead barrier units is sequenced to begin upon EIA clearance (target Month 4–5) rather than awaiting full permitting completion. (ii) Two-flood-season evidence requirement — accepted. The original 18–24-month physical-deployment window provided only one full flood season of operational data. Revised plan: (a) project duration extended to 48 months (January 2027 – December 2030) to capture two full flood seasons (Oct–Dec 2028 and Mar–May 2029, plus Oct–Dec 2029 and Mar–May 2030); (iii) Component 3 South–South engagement window, Component 3 is now two-tranche staged (Approach and Design Exchange in Year 2–3, Performance Exchange in Year 3.5–4.5). The 48-month timeline provides at least 18 months for substantive Component 3 delivery (vs. 12 months in the original plan). Budget impact: the 6-month extension carries no incremental MIE fee (already capped at 8.5%) and no increase in PMU/operational costs.

# PART II: PROJECT / PROGRAMME JUSTIFICATION

## A. Project components

15. **Overview**

The project components are designed to address critical adaptation needs in Burundi's target communes (Mpanda, Bubanza, and Bukinanyana) where climate-induced floods and droughts pose severe threats to the 358,116 most vulnerable people. For the selection criteria for the communities see paragraph 3. These interventions directly respond to identified gaps in climate information services, early warning systems, and flood/drought risk reduction capacities while aligning with the Adaptation Fund's Results Framework and operational policies.

16. **Climate change context and adaptation rationale**

The proposed interventions address the climate threats as described in Part I of this proposal. Component 1 strengthens the ability to detect, forecast, and communicate climate hazards intensifying under climate change scenarios and informs Component 2. Component 2 deploys innovative adaptation technologies that

protect communities and agriculture from both floods and droughts. Component 3 ensures lessons learned are documented and disseminated for replication and scale-up. Without adaptation interventions, communities will remain unable to anticipate intensifying climate hazards, lack protection against floods, and (for the most vulnerable) be unable to irrigate crops during increasingly prolonged droughts.

17. **COMPONENT 1: Climate Information and Warning Systems and Responses to Flood and Drought Risks/Threats.**

This component strengthens institutional and community capacity to understand, monitor, forecast, and respond to climate-induced flood and drought risks, also with the purpose of accurate barrier siting and deployment. It addresses critical gaps in Burundi's climate information value chain—from observation and data collection through forecasting, alert dissemination, and preparedness and responses—with a focus on three target communes. These gaps are identified in the Burundi Roadmap for Operationalizing a Multi-Hazard Early Warning System for All (2024-2027) for which IGEBU is responsible. Component 1 directly implements priority actions across the four EWS Roadmap pillars where the outputs (1.1; 1.2; 2.1; 3.1. and 3.2) are directly linked to the pillars. The background analysis (Part I) also identifies several interconnected barriers this component addresses: fragmented institutional mandates, sparse monitoring infrastructure, absence of standardized alert protocols, and alert dissemination reaching only approximately 20 percent of the population in the target communes. Component 1 is also needed to inform Component 2, to verify the most suitable locations for the dual-purpose mobile flood barriers, to inform the timely deployment of the dual-purpose mobile flood barriers and to prepare for the deployment of the dual-purpose mobile flood barriers.

Component 1 encompasses three outcomes aligned with AF Outcomes 1, 2, and 3, delivered through five outputs.

18. **Outcome 1: Reduced exposure** of vulnerable communities in three target communes **to flood and drought hazards through** the generation and dissemination of **actionable climate risk information.**

*Aligns with AF Outcome 1*

19. **Output 1.1. Geospatial flood and drought hazard maps and risk profiles** for three (3) target communes developed (to verify the most suitable locations for the dual-purpose mobile flood barriers).

*Aligns with AF Output 1.1 (Risk and vulnerability assessments conducted and updated) and the Burundi Roadmap for Operationalizing a Multi-Hazard Early Warning System for All (2024–2027) Pillar 1: Knowledge of Disaster Risks*.[36]

**Climate Change Adaptation Rationale**

Current climate vulnerability and risk assessments in Burundi lack the climate-specific focus needed for effective adaptation planning. Existing assessments do not adequately account for projected changes in precipitation intensity, shifting rainfall patterns, or the compound effects of sequential floods and droughts on smallholder agriculture systems. As documented in the background (Part I), the target communes experience severe flooding during intense rainfall seasons, with more than 28 major flood events recorded since 1980 and 878 torrential rain and flood incidents documented from 2018–2023 alone. Drought impacts follow a cyclical pattern with major events approximately every 5–7 years, causing 25–40 percent yield reductions. Climate change is fundamentally altering hazard patterns: floods are becoming more intense and unpredictable, droughts more prolonged, and historical baselines no longer represent future risks.

This output will produce geospatial flood and drought hazard maps and risk profiles based on climate change vulnerability and disaster risk assessments incorporating future climate scenarios. Hydrodynamic modeling will simulate flood behavior under both current and future climate conditions and potential downstream impacts, informing optimal locations for deploying mobile flood barriers (Output 4.1) and avoiding any potential negative impacts downstream. Drought risk mapping will identify exact locations of drought hotspots for irrigation, incorporating projections of extended dry seasons and water stress impacts on key crops (rice, corn, tomatoes, beans, soybeans). The mapping will include ground-truthing walks by women and Batwa community members to verify the risks.

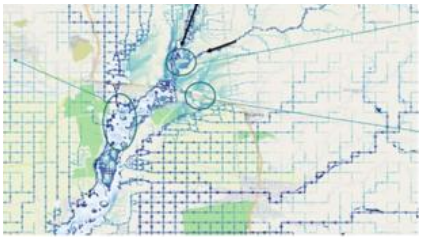
**Activities under Output 1.1:**

[36] Roadmap for Operationalizing a Multi-Hazard Early Warning System for All (2024-2027). This roadmap contains four main pillars where action is needed

1.1.1. **Conduct comprehensive and inclusive climate change vulnerability and hazard risk assessments for the three target communes**. This would include identifying vulnerable groups and critical infrastructure (schools, health centers, water sources, agricultural areas) exposed to flood and drought hazards and key ecosystem areas that play an important role in climate resilience through field assessment and extensive consultations with project beneficiary groups. This will also include mapping drought vulnerability zones under future climate scenarios based on projected precipitation changes, extended dry season scenarios, soil moisture deficits, and crop water requirements, including female-headed households hotspot analysis.

1.1.2. **Develop hydrodynamic flood models and mapping of flood risks for the target area (Rusizi River basin)** and other water bodies if needed, simulating flood extent, depth, and velocity under current and projected climate conditions (accounting for increased high-intensity rainfall events) and ensuring negative flood impacts will not occur downstream.

*Figure 7 hydrodynamic flood modeling*



1.1.3. **Produce high-resolution integrated hazard risk and vulnerability maps** combining all above information to inform targeted adaptation interventions, with gender- and vulnerable groups-sensitive data, information, and hotspots included. Ethnic/clan identifiers should be bypassed to avoid ethnic profiling risks. Consent should be obtained from women, vulnerable, and marginalized groups on the vulnerability assessment report and maps produced.

1.1.4. **Engage community-level disaster risk reduction committees (CCDRR) in target communes** to facilitate local participation (50 percent women, including leadership roles) in climate change vulnerability and hazard risk assessment, and integrate local knowledge into formal risk assessment processes (workshops/trainings).

**Contribution to Climate Resilience**

This output creates foundational climate intelligence by incorporating future climate scenarios rather than relying on historical data, enabling anticipatory adaptation. Hydrodynamic modeling under future climate conditions ensures flood protection measures are designed for tomorrow's climate. Gender-disaggregated vulnerability mapping ensures adaptation benefits reach those most affected, including women who provide most of the agricultural labor yet face systematic exclusion from adaptation opportunities through limited land access, restricted credit, and exclusion from decision-making (see Part I and ANNEX 5 — Gender Action Plan (GAP)).

20. **Output 1.2: Early warning dissemination and communication systems** strengthened (to inform the deployment of the dual-purpose mobile flood barriers).

*Aligns with AF Output 1.2 (Targeted population groups covered by adequate risk reduction systems) and the Burundi Roadmap for Operationalizing a Multi-Hazard Early Warning System for All (2024–2027) Pillar 3: Dissemination of Alerts and Communication*.

**Climate Change Adaptation Rationale**

Current alert dissemination reaches only approximately 20 percent of the population in target areas, with delays inadequate for rapid-onset flash floods. The background analysis (Part I) identifies poor communication infrastructure, no Common Alert Protocol (CAP) implementation, and no clear institutional responsibilities at provincial or communal levels as key barriers. The operational early warning system establishes a critical rainfall threshold of 25 mm in 24 hours as the level triggering flood risk alerts. As climate change intensifies rainfall variability and flood/drought frequency, this output establishes standardized, comprehensive alert dissemination systems creating a "forecast-to-action" linkage essential for climate-informed adaptation.

**Activities under Output 1.2:**

1.2.1. **Pilot the Common Alert Protocol (CAP)** for standardized alert formatting and dissemination across all channels, ensuring consistent, interoperable warnings reach multiple stakeholders (Civil Protection, Red Cross, local authorities, communes) simultaneously.

**1.2.2.** **Implement the Simplified Early Action Protocol (EAP)** that defines triggers and actions based on climate forecasts specific to target zones (e.g., "When rainfall forecast exceeds X mm in Y timeframe, prepare and deploy mobile flood barriers in zone Z").

**1.2.3.** **Establish forecast-to-action coordination protocols** between IGEBU forecasters and emergency response actors (Civil Protection Service, Burundi Red Cross [CRB], local authorities, CCDRR), creating formal channels for translating climate forecasts into early action with clear institutional responsibilities at provincial and communal levels in target areas (Bujumbura province, Mpanda, Bubanza, Bukinanyana communes).

**1.2.4.** **Strengthen community-based early warning systems (CBEWS)** based on the Red Cross approach in select locations, expanding and integrating them with formal national mechanisms and **improve public channel dissemination by establishing community networks** as appropriate, which could include community radio broadcasts (coordinated with RTNB), SMS alert systems, WhatsApp groups and social media channels, community meetings through CCDRR and village leader networks, and traditional communication channels (drums, flags, town criers), including **the development of gender- and vulnerable groups-responsive communication approaches** ensuring alerts reach women, youth, elderly, persons with disabilities, and Batwa communities, including equipping female DRR committee members with phones and solar chargers. This will also include **conducting awareness campaigns in target communes** on flood and drought risks and appropriate preparedness and responses based on early warnings.

**Contribution to Climate Resilience**

By establishing CAP and EAP protocols, this output creates systematic mechanisms linking climate forecasts to anticipatory community actions. The forecast-to-action linkage transforms early warnings from information-only to actionable intelligence, directly addressing the "limited, slow and fragmented climate information and early warnings" identified as a root cause of vulnerability in the background (Part I).

21. **Outcome 2:** Strengthened institutional capacity covering the three target communes to reduce climate-induced flood and drought risks through expanded climate monitoring and improved forecasting.

    *Aligns with AF Outcome 2*

22. **Output 2.1: Climate monitoring network and forecasting capacity expanded** (to inform timely deployment of the dual-purpose mobile flood barriers).

    *Aligns with AF Output 2.1 (Strengthened capacity of institutions to understand and better address climate risks) and the Burundi Roadmap for Operationalizing a Multi-Hazard Early Warning System for All (2024–2027) Pillar 2: Detection, Monitoring, Analysis and Forecasting*.

    **Climate Change Adaptation Rationale**

    The background analysis (Part I) identifies critically sparse monitoring infrastructure as a key technical barrier. Only 10 hydrological stations and 3 meteorological stations cover Bujumbura province and its 358,116 direct project beneficiaries with total population of 874,786 across three target communes. No real-time monitoring exists in Mpanda, Bubanza, or Bukinanyana communes. Hydrological modeling relies on limited software platforms with severe capacity constraints. This deficit is particularly problematic as climate change intensifies precipitation extremes. Without expanded monitoring, forecasters cannot generate timely, accurate predictions of intensifying floods and droughts. This output establishes the technical infrastructure enabling all downstream adaptation activities.

    **Activities under Output 2.1:**

**2.1.1.** **Operationalize a dedicated monitoring room at IGEBU** with 24/7 capacity for data processing, analysis, and forecast generation, including equipment (computers, server services, specialized forecasting software) for data sharing and dissemination to relevant stakeholders such as Civil Protection, Red Cross, local authorities ensuring forecast information reaches response actors in real-time.

**2.1.2.** **Strengthen IGEBU and key actor capacities** through specialized training in advanced forecasting techniques, climate change scenario interpretation, and alert generation protocols and **document alert generation methods, thresholds, protocols**, and formats for flood and drought early warnings (and barrier deployment) and **designate and train provincial and communal focal points** for data analysis and alert interpretation, establishing clear

institutional responsibilities for climate information processing and response action at provincial and local levels.

**2.1.3.** **Expand the monitoring station network** to underserved target communes and zones: (a) rehabilitate 10 existing hydrological stations; (b) acquire and install 3 hydrological monitoring equipment/sensors at strategic river monitoring locations (public land only or with consent), particularly along the Rusizi River basin; (c) acquire and install 3 automatic meteorological stations in target communes (Mpanda, Bubanza, Bukinanyana) and priority zones (public land only or with consent). **A plan for waste management** (with end-of-life equipment retrieval/recycling clauses—solar power prioritized) and potential sediment/erosion control (e.g., silt fences) is required.

**Contribution to Climate Resilience**

This output addresses the "institutional fragmentation, governance and capacity gaps" identified as a root cause of vulnerability (Part I). Monitoring systems specifically capture high-intensity precipitation events and drought conditions projected under climate change scenarios. Trained focal points at provincial and communal levels bridge the critical gap between national forecasting and local community response, ensuring climate services responsibilities split across multiple institutions (IGEBU, Civil Protection, OBPE) are effectively coordinated.

23. **Outcome 3:** Strengthened awareness and ownership of adaptation and climate risk reduction processes, especially climate-informed preparedness and response processes at local level in three target communes, including indigenous peoples, to enable timely and inclusive deployment of the dual-purpose mobile flood barriers.

    *Aligns with AF Outcome 3*

24. **Output 3.1: Climate-informed preparedness/response plans** developed and operationalized for three (3) target communes (to prepare for the deployment of the dual-purpose mobile flood barriers).

    *Aligns with AF Output 3.2 (Strengthened capacity of national and subnational stakeholders and entities to capture and disseminate knowledge and learning) and the Burundi Roadmap for Operationalizing a Multi-Hazard Early Warning System for All (2024–2027) Pillar 4: Preparedness and Response Capacities*.

    **Climate Change Adaptation Rationale**

    Current disaster response in target communes is reactive and insufficient for escalating climate hazards. The background analysis identifies that CCDRR committees exist but lack climate-specific training and operational plans. Community consultations revealed that women provide most of the agricultural labor (especially in rice cultivation and vegetable farming) and bear primary responsibility for household food and water security yet face systematic exclusion from adaptation opportunities through limited land access, restricted credit, exclusion from decision-making, and limited access to technical training. The Batwa (1 percent of the target population) experience marginalization and cultural exclusion limiting their participation in adaptation planning. Youth (32 percent of the population) often lack leadership opportunities. Preparedness plans that do not account for climate change projections will be inadequate for future hazards.

25. **Activities under Output 3.1:**

    **3.1.1.** **Develop commune preparedness and response plans** (i.e., operational risk management plans or contingency plans) in target communes (Mpanda, Bubanza, Bukinanyana) that specifically address vulnerabilities to climate change-intensified floods and droughts, incorporating: climate change scenarios and projected hazard intensification; identification of priority vulnerable populations (women, youth, elderly, disabled, Batwa); linkage to climate forecasts from Output 2.1 (flood inundation triggers, drought thresholds); pre-agreed actions for different alert levels; evacuation routes, safe zones, and shelter locations; and coordination with mobile flood barrier deployment (Output 4.1) and irrigation activation.

    **3.1.2.** **Conduct community-level trainings on disaster risks, preparedness, and response in target communes**, reaching women's groups and associations; youth associations; farmer cooperatives; populations with limited formal education requiring simplified visual materials (fewer than half of children complete primary school in target zones); and vulnerable populations (elderly, disabled, Batwa indigenous minority). Also **develop gender- and vulnerable groups-sensitive communication materials** explaining climate risks and protective measures (flood reduction, not flood proofing), in local languages and suitable for

populations with limited formal literacy, including: visual aids and pictorial guides; color-coded wall murals at central locations (e.g., water points/health centers); female "Town Criers"; community radio programmes; community meetings and participatory trainings; and traditional communication networks. Also **conduct inclusive community simulation exercises** testing preparedness and response plans under projected climate change scenarios, ensuring communities—especially women, elderly/disabled, and Batwa—can respond effectively to intensifying hazards.

**Contribution to Climate Resilience**

Training on climate information interpretation and forecast-based action directly enhances adaptive capacity. By ensuring women, youth, and marginalized groups participate meaningfully, the output addresses the "gender inequality and social exclusion" identified as a root cause of vulnerability (Part I). Climate-informed preparedness plans provide clear protocols for responding to hazards that exceed historical norms.

26. **Output 3.2:** CCDRRs trained and supported in technical and management functions for climate-informed preparedness and response in the three target communes.

*Aligns with AF Output 3.3: Increased ownership of adaptation and climate risk reduction processes and the Burundi Roadmap for Operationalizing a Multi-Hazard Early Warning System for All (2024–2027), Pillar 4: Preparedness and Response Capacities.*

**Climate Change Adaptation Rationale**

Effective climate-informed preparedness and response requires capable local institutions that can translate climate information and early warnings into coordinated action. CCDRRs exist in the target communes but have limited climate-specific training, resources and decision-making capacity. Strengthening these committees will reinforce local ownership of climate risk reduction processes and improve coordination between communities, commune administrations, IGEBU, Civil Protection and the Burundi Red Cross.

**Activities under Output 3.2:**

**3.2.1.** Train and support CCDRRs and other emergency response actors (commune administrators, Red Cross volunteers and Civil Protection personnel) in technical and management functions for climate-informed preparedness and response, including climate change impacts and intensifying flood/drought risks; interpretation of climate forecasts and alert protocols; Early Action Protocols (EAP) and predetermined response actions; gender-sensitive emergency response; and coordination mechanisms linking forecast receipt to emergency actions. This will include strengthening coordination between IGEBU, Civil Protection, Red Cross, CCDRRs and local authorities and clarifying institutional roles and responsibilities for climate-informed preparedness and response at provincial and communal levels.

**Contribution to Climate Resilience**

Strengthened CCDRRs provide the local institutional mechanism needed to translate climate information, early warnings and preparedness plans into coordinated action. By strengthening local capacity and coordination arrangements, the output increases community ownership of adaptation and climate risk reduction processes and supports sustained climate-informed preparedness and response beyond the project period.

27. **COMPONENT 2: Innovative Flood and Drought Risk Reduction Practices and Technologies.**

This component deploys innovative adaptation technologies that address the dual climate stressors of floods and droughts, providing concrete physical measures that protect lives, livelihoods, and agricultural production from intensifying climate hazards. The innovations—water-filled mobile flood barriers and integrated water storage/irrigation systems—are specifically designed for climate change conditions: flexible, responsive to climate variability, deployable based on improved forecasts (from Component 1), and designed for intensifying hazards projected under climate scenarios.

The technology has been validated through the Adaptation Fund's Climate Investment Acceleration Programme (AFCIA) in Burundi during 2023–24. AFCIA testing at Gahwazi (within the project target area)

confirmed: barriers successfully contained floodwater with 2 hours deployment; the pilot protected approximately 250 hectares of farmland; high community acceptability; and successful dual-purpose functioning as water storage for irrigation.

28. **Outcome 4:** Innovation for effective, long-term adaptation to climate change accelerated, encouraged, and enabled to scale up through the dual-purpose mobile flood barrier technology and integrated water systems -enhancing ecosystem resilience and natural resource management, securing climate-resilient livelihoods for vulnerable communities.

    *Aligns with AF Outcome 8 and 6*

29. **Output 4.1. Mobile flood barrier technology and integrated water systems** deployed and operational and maintained in three (3) target communes to protect lives, assets, and agricultural land from intensified flooding and to irrigate agriculture.

    *Contributes to AF Outcome 8*

    **Consideration:** Use information from Component 1 for deployment details.

    *Figure 8 Mobile flood barrier deployed*



**Climate Change Adaptation Rationale (Flood Protection)**

The background analysis (Part I, Sections) establishes that flooding in the target communes is directly attributable to climate change-intensified precipitation events. Floods cause 20–30 percent crop losses and infrastructure damage affecting 70 percent or more of assets. Table 3 (Part I) profiles the specific vulnerabilities by zone: Mpanda (183,389 people) faces severe flooding from the Rusizi River with slopes barely reaching 2 degrees; Bubanza (49,945 people) faces urban flooding and waterlogging; Bukinanyana (124,782 people) faces flooding impacting infrastructure plus prolonged droughts.

Traditional structural measures (permanent levees, concrete flood walls) are expensive, inflexible, and can create maladaptation. Water-filled mobile flood barriers represent an innovative adaptation technology: modular design for rapid deployment within 2 hours of early warning; dual-purpose as both flood protection and water storage; designed for community-based operation; and able to withstand 1:20 to 1:50-year flood events. Table 7 (Part I) specifies 6.5 km of barriers required across five river locations to protect 598 hectares of agricultural land and 511 hectares affecting buildings and infrastructure.

**Climate Change Adaptation Rationale (Drought Irrigation)**

Droughts occur during extended dry seasons (historically June–August and January–February), potentially extending to six months. Agriculture employing 70–85 percent of the target population and predominantly rain-fed is extremely vulnerable. The flood barriers contain 1,700 liters per m², totaling 11,050 m³ for 6.5 km, capable of irrigating approximately 3.5 hectares during the full dry season. Key crops requiring protection and irrigation support include rice, corn, beans, soybeans, tomatoes, eggplant, onions, cabbage, watermelon, and amaranth.

**Activities under Output 4.1 — Flood Barrier Deployment:**

**4.1.1. Procure innovative water-filled mobile flood barriers** (6.5 km / approx. 1,300 units of 5 meters) designed to withstand flood conditions projected under climate change scenarios as shown in Table 7.

**4.1.2.** **Verify and finalize strategic deployment locations and teams in target communes** including a "poverty weighted blind scoring" of sites (elite capture mitigation), a Third-Party Monitor independently verifying barrier siting and beneficiary lists, including a resettlement screening with zero-displacement criteria and a "protection-by-design audit," signed off by CCDRR committees (including women and Batwa), before a Notice to Proceed is issued, all also based on outcomes Output 1.1 results. Establish no-go zones close to the river to protect habitats and biodiversity. Develop site-specific Occupational Health and Safety measures, waste management plans. And **establish barrier storage facilities** (using delivery containers where possible) in each target zone (safe from flooding) for rapid deployment when climate forecasts (from Output 2.1) indicate flood threats, including: equipment and tools for deployment; maintenance supplies and spare parts; mandatory safety checks for women; and silt fences.

**4.1.3.** **Develop operation and maintenance (O&M) protocols and plans** linking forecast-based triggers from Component 1 to deployment decisions, including: decision for barrier activation based on rainfall forecasts, river level predictions, and soil saturation levels; deployment procedures under time-constrained conditions (one part weighs 35 kg, carried by two people); safety, inspection, and maintenance protocols; deflation and storage procedures; rainwater capture and storage for irrigation; record-keeping systems; revegetation of disturbed soil areas post-installation; and an exit/sustainability strategy including concrete annual government budget lines and O&M indicators as disbursement-linked milestones for at least one tranche as a condition for approval of the O&M plans. This will also include **conducting participatory planning and training with communes** to establish maintenance responsibilities and ensure sustainability of adaptive infrastructure post-project.

**4.1.4.** **Train gender-balanced community-based deployment teams** in rapid barrier installation and operation, ensuring activation by early warnings from Component 1, with provisions for: gender-balanced team composition; youth inclusion and leadership development; clear role assignments and chain of command; and safety protocols. This will also include **conducting inclusive demonstration/simulation drill exercises** connecting early warning receipt to barrier deployment, testing the forecast-to-action chain under simulated high-intensity rainfall scenarios, including exercise evaluation reports.

**Operational cycle of the mobile flood barriers:** Barriers are deployed 1–3 times per flood season (October–April), triggered by IGEBU rainfall forecasts exceeding the 25 mm/24h alert threshold established under the Burundi Simplified Early Action Protocol (sEAP) for extreme floods. Each deployment lasts 3–14 days. At season end (~April), the CCDRR community team — guided by the sEAP — decides whether barriers remain inflated as irrigation reservoirs or are deflated and stored. Decision rule: barriers are retained as irrigation storage if (i) the flood-season hydrograph has receded below the 25 mm/24h alert threshold for more than 14 consecutive days, AND (ii) the CCDRR has agreed retention based on the dry-season cropping calendar; otherwise they are deflated and returned to the storage facility. The seasonal decision calendar (April assessment → irrigation/deflation decision → September readiness check) will be formalized in the O&M Protocol under Output 4.1 in Year 1.

**Puncture/failure record and mid-event contingency:** No structural failures or punctures occurred during the AFCIA pilot at Gahwazi/Mpanda (2023–24) across the two actual flood events recorded. The barriers are made of EPDM synthetic rubber rated for a 120–150-year flood event. Contingency protocol for a mid-event puncture: (1) the on-site commander activates the contingency response team; (2) the compromised 5-m segment is isolated using the inter-segment couplers; (3) a self-adhesive EPDM patch (held at the commune storage facility) is applied within 20 minutes by the deployment/technical team; (4) if the breach is not contained within 20 minutes, a pre-planned community evacuation is activated per the commune preparedness plan (Output 3.1); (5) the CCDRR notifies IGEBU and OBPE; (6) final puncture repair takes place after the event using the EPDM patch kit. This protocol will be documented in the O&M Manual, tested in the annual simulation drills, and added to the ESMP (Annex 4)

**Simulation-based validation of deployment and repair capacity:** The AFCIA pilot confirmed deployment of a 200-m section within 1.5–2 hours by a trained community team; however, breach-repair capability has not yet been simulated. The project introduces two annual simulated flood drills per commune (one dry-run and one staged with a controlled water release before the start of the flood season), with a <20-minute breach-repair benchmark required for community certification. A Year-1 baseline drill takes place before any barrier is procured; communities are not relied upon for live deployment until they have passed two consecutive certified drills. Deployment-time and breach-repair benchmarks will be captured as indicators in the M&E framework.

**Fuel management protocol:** The full fuel management protocol will be detailed in the O&M Protocol (Output 4.1, Year 1) and in the ESMP. Responsibility: the CCDRR Logistics Officer in each commune monitors fuel reserves monthly during the dry season and weekly during the flood season; replenishment is triggered when the stock falls below 120% of the volume required for one full 6.5 km deployment (≈457 L per commune based on the pump specifications. Fuel is procured through a pre-qualified national supplier under a standing call-off contract signed in Year 1 with OBPE as the contracting authority. AFCIA-pilot finding: fuel availability was not a binding constraint at the 200 m single-site scale, but at three-commune scale this risk increases materially, hence the call-off contract and pre-stocked reserves.

**Activities under Output 4.1 — Integrated Water Storage and Irrigation:**

**4.1.5** **Verify priority agricultural zones** based on Output 1.1 vulnerability assessments, climate change projections for drought severity, and participatory community consultations with poverty score targeting ensuring equitable access for women and poor farmers.

**4.1.6** **Procure mobile irrigation system equipment** (gravity-fed where topography permits; mobile solar-powered pumps where necessary; mobile hoses for operational flexibility) distributing stored water in the barriers to vulnerable agricultural areas during drought periods. Prioritize gravity-fed systems to reduce operational costs; use mobile solar photovoltaic pumps where gravity-fed irrigation is not feasible; design systems suitable for smallholder and women farmer O&M capacity. This requires consultation with women and persons with disabilities on physical design specifications of taps and pumps before procurement, with designs validated by a User Group Committee.

**4.1.7** **Operate the irrigation system efficiently with equal distribution.** This includes **developing water allocation protocols** ensuring fair distribution during droughts, with explicit provisions for: priority allocation for food security / nutrition crops, equitable access for vulnerable households (female-headed, elderly, disabled, marginalized, poor), transparent community decision-making processes; and gender-responsive access. This will also include **linking irrigation activation to drought early warnings from Component 1,** creating forecast-based irrigation for proactive agricultural adaptation: establish thresholds based on soil moisture forecasts and seasonal drought predictions; create decision protocols for water release timing; and integrate with EAP protocols from Output 1.2. This will also include **training farmer cooperatives and associations** (with targeted outreach to women, youth, and marginalized groups) in operating and maintaining irrigation systems, water management practices adapted to climate variability, and record-keeping for irrigation scheduling and water allocation.

**Contribution to Climate Resilience**

The mobile flood barriers provide direct adaptation to climate change-intensified flooding, protecting 358,116 vulnerable people directly and 598 hectares of agricultural land. The forecast-based deployment mechanism exemplifies anticipatory adaptation as described in the integrated adaptation mechanism (Part I, Table 5): rainfall forecasts exceeding 25 mm/24h trigger barrier deployment; drought soil moisture forecasts below 20 percent of benchmark activate irrigation. The integrated water capture and drought irrigation system converts a climate hazard into an adaptation resource, directly addressing the "absent innovative adaptation technologies and local capacity" identified as a root cause of vulnerability (Part I, Section 5). Gender-balanced training ensures women gain skills and employment while enhancing community adaptive capacity.

30. **COMPONENT 3: Results tracking and knowledge Management for Post-Project Sustainability and Innovation Diffusion.**

This component establishes systematic mechanisms for capturing, analyzing, sharing, and disseminating lessons learned and best practices to ensure sustained climate resilience beyond project completion. Components 2 and 3 share Outcome 4, with Component 3 delivering the evidence base and knowledge-sharing outputs. This directly addresses the "knowledge gaps" root cause identified in the background (Part I): limited evidence base on dual-purpose mobile flood barriers and no replication mechanism.

31. **Outcome 4 (continued):** Innovation for effective, long-term adaptation to climate change accelerated, encouraged, and enabled to scale up through the dual-purpose mobile flood barrier technology and integrated water systems -enhancing ecosystem resilience and natural resource management, securing climate-resilient livelihoods for vulnerable communities

*Aligns with AF Outcome 8*

**Climate Change Adaptation Rationale**

As climate change intensifies across Burundi and the broader region, the adaptation solutions demonstrated in this project have potential for widespread replication. Other communes and countries face similar dual climate hazards, and the integrated mobile barrier approach offers a cost-effective, flexible, and climate-responsive solution. As validated through AFCIA testing: lower capital cost than traditional dikes, feasible community operation, and a lifespan exceeding 20 years. Without systematic documentation, demonstration, and knowledge sharing, these innovations remain isolated interventions.

32. **Output 4.2. Strong evidence base** on the benefits of the innovative dual-purpose mobile flood barriers and integrated water systems **produced and disseminated**.

*Aligns with AF Output 8.2: Innovations identified and piloted which build the adaptation innovation evidence base and institutional capacity.*

**Activities under Output 4.2:**

**4.2.1. Deliver training, implement and monitor the Stakeholder Engagement Plan, Gender Action Plan and Environmental and Social Management Framework, and Indigenous Peoples Planning Framework/Indigenous Peoples Plan (IPPF/IPP).**

4.2.2. **Comprehensively document the project implementation processes, results and outcomes and lessons learned.** This would also include conducting a **detailed cost-benefit analysis** comparing the integrated mobile barrier approach to traditional flood protection and irrigation infrastructure, as well as developing technical manuals**, case studies, policy briefs and replication / scaling guidelines.** The replication / scaling guidelines should address lessons and pre-conditions for replication and viable financial and business models to support long-term use, dissemination, and scale-up beyond grant funding. Products relevant to communities should also be provided in Kirundi.

**Activity under Output 4.3:**

**4.3.1. Knowledge shared and disseminated at national, regional and international levels.**

**Contribution to Climate Resilience.**

Systematic documentation and dissemination amplify climate resilience impact beyond the target communes. Technical manuals and knowledge products reduce barriers to adoption in other contexts. Partnerships with regional platforms create sustained mechanisms for knowledge exchange, contributing to the AF Innovation Programme goal of scaling proven adaptation solutions.

33. **Cross-Cutting Note**

All activities under all outputs will be implemented in accordance with the Environmental and Social Management Plan (ESMP) detailed in ANNEX 4 — Environmental and Social Impact Assessment and Environmental and Social Management Plan (ESIA-ESMP) and the Gender Action Plan detailed in ANNEX 5 — Gender Action Plan (GAP), and the Indigenous Peoples Planning Framework and Indigenous Peoples Plan (IPPF/IPP) detailed in Annex 6. Gender equality and social inclusion will be ensured throughout project

design, implementation, and monitoring, with targeted actions to empower women, youth, ethnic minorities, and persons with disabilities.

## B. Project promotion of new and innovative solutions

The project promotes new and innovative climate change adaptation solutions across three interlinked dimensions — *technology*, *process*, and *knowledge* — each relevant to the Burundian context and addressing root causes of vulnerability identified in Part I.

34. **Innovative adaptation technology (Component 2 — Output 4.1).**

The core technological innovation is the deployment of 6.5 km of water-filled mobile flood barriers across river locations in three target communes (Mpanda, Bubanza, Bukinanyana), protecting 598 hectares of agricultural land and critical infrastructure (Output 4.1). These modular barriers — containing 1,700 liters per meter — can be installed by community teams within two hours of an early warning and withstand 1:20- to 1:50-year flood events. Unlike permanent levees or sandbags, they are re-usable, portable, and repositioned based on real-time forecasts, representing anticipatory rather than reactive flood protection.

The barriers serve a *dual-purpose* (Output 4.1): after floods recede, they are repurposed as water-reservoirs feeding gravity-fed, and if needed, mobile solar-powered, irrigation systems (3.5–24.5 ha depending on distribution approach) during yearly dry seasons lasting up to six months — turning a climate hazard into a productive resource and delivering 40–60 percent greater cost-effectiveness than separate flood and irrigation infrastructure. This approach was validated through the AFCIA pilot in Mpanda-Gahwazi in 2023–24, confirming the dual-purpose functioning.

35. **Innovative forecast-to-action process (Component 1 — Outputs 1.1, 1.2, 2.1, 3.1, 3.2).**

The project introduces a systematic *forecast-to-action* chain new to Burundi, where Part I identifies sparse monitoring infrastructure, no standardized alert protocols, and early warning coverage of only 20 percent. Component 1 addresses these gaps through: climate-scenario-based geospatial hazard maps using hydrodynamic modeling (Output 1.1); an expanded monitoring network with rehabilitated and new stations and a 24/7 IGEBU monitoring room and geoportal (Output 2.1); piloting the Common Alert Protocol (CAP) and Simplified Early Action Protocols (EAP) with forecast-based triggers directly linked to barrier deployment and irrigation activation through multi-channel dissemination (Output 1.2); and gender-responsive commune preparedness and response plans with community simulation exercises (Output 3.1); and strengthened CCDRRs that support local climate-informed preparedness, response and adaptation decision-making (Output 3.2). This integrated chain transforms early warnings from passive information into actionable intelligence coupled with anticipatory deployment of adaptation technologies.

36. **Innovative knowledge management for scaling (Component 3 — Outputs 4.2, 4.3)**

Component 3 institutionalizes innovation by generating the evidence base for replication, addressing the knowledge gaps identified in Part I. Output 4.2 produces technical manuals, gender-disaggregated cost–benefit analyses, O&M protocols, forecast-based activation decision protocols, and adaptation knowledge products (case studies, video documentaries in Kirundi, policy briefs, academic publications, SDG co-benefit tracking). Output 4.3 establishes demonstration sites and partnerships with regional platforms — NBI, IGAD, EAC, and African Union networks — for peer-learning exchanges and South–South knowledge transfer.

## C. Project roll out and scale up of innovative adaptation practices, tools, and technologies

37. The project builds directly on the proven AFCIA pilot in Mpanda-Gahwazi in 2023–24, where mobile water-filled barriers were successfully demonstrated and received high-level government endorsement when Burundi's President presented the technology at COP27, which tested the dual-purpose flood protection and water storage-irrigation functioning.

38. Component 2 represents the immediate scale-up of this pilot from one site to three target communes across 6.5 km of barrier length protecting 358,116 people, incorporating lessons learned regarding the dual-purpose and site selection on non-sandy and relatively flat terrain. The scale-up is underpinned by the forecast-to-action governance architecture (CAP/EAP protocols, expanded monitoring, commune

preparedness plans) from Component 1, which transforms the technology from a standalone intervention into an integrated, climate-responsive adaptation system.

39. Beyond direct scaling, Component 3 establishes systematic roll-out and replication pathways:

- **Evidence generation (Output 4.2): Technical manuals, cost–benefit analyses, and multi-format knowledge products tailored for government, communities, development partners, and regional practitioners.**
- **Demonstration and peer-learning** (Output 4.3): Demonstration events for officials and partners from non-target areas; partnerships with NBI, IGAD, EAC, and African Union platforms for South–South knowledge transfer.
- **National institutionalization**: Government budget commitments and exit strategies identifying budget lines and private-sector investment potential; training-of-trainers creating permanent in-country capacity at OBPE, IGEBU, and communal DRR committees; IGEBU/PFNPRGC coordination to identify priority replication sites.
- **Replication guidance**: Documentation covering site suitability assessment, adaptation to local conditions, governance arrangements, community mobilization, and viable financial models for scale-up beyond grant funding.

40. These mechanisms ensure innovations diffuse *locally* through trained communities maintaining systems post-project, *nationally* through government adoption and replication in other flood- and drought-prone communes, and *regionally* through sustained knowledge exchange platforms - directly contributing to AF Innovation Programme Expected Results.

## D. Economic, social and environmental benefits of the project

41. This project delivers climate adaptation benefits to 358,116 direct beneficiaries across 35 targeted Collines in three target communes (Mpanda, Bubanza and Bukinanyana). These 358,116 people are considered direct beneficiaries as they live in the 35 Collines specifically targeted by the project's higher-intensity, place-based adaptation interventions.The beneficiary profile comprises 51% women, 32% youth aged 15–34, 83% farmers, 5.6% elderly and persons with disabilities, and 1% ethnic minorities including Batwa. The total population of the three target communes is 874,786. The remaining 516,670 inhabitants are considered indirect beneficiaries as, while they are outside the 35 directly targeted Collines, they benefit from wider commune-level resilience improvements generated by the project, including strengthened preparedness and response arrangements, improved local disaster-risk management and institutional coordination, and associated benefits to shared infrastructure, services and economic activity. The indirect beneficiary figure is therefore calculated as 874,786 minus the 358,116 direct beneficiaries. Each person is counted only once according to the highest intensity of project support received. EWS coverage alone is not used as a basis for counting beneficiaries. The project prioritizes equitable benefit distribution through gender- and vulnerable-groups-sensitive vulnerability assessments, participatory stakeholder engagement, accessible communication strategies, targeted capacity building, and sex-, age-, and disability-disaggregated monitoring.

42. **Economic benefits**

Component 1 (Outputs 1.1, 1.2, 2.1, 3.1 and 3.2) generates economic benefits by enabling anticipatory, forecast-based action rather than costly post-disaster response. Geospatial hazard maps and risk profiles (Output 1.1) prevent malinvestment in high-risk zones and inform targeted protection of the most productive agricultural areas. Enhanced climate monitoring and forecasting capacity (Output 2.1) enables climate-informed agricultural planning — farmers can optimize planting dates, crop selection, and input timing, increasing productivity and income. The CAP/EAP early warning system (Output 1.2) and commune preparedness plans (Output 3.1) reduce economic losses by enabling anticipatory protective action before floods and droughts strike, protecting household incomes particularly for women-headed households and vulnerable families lacking financial reserves to recover from climate shocks.

Component 2/3 (Outputs 4.1, 4.2, 4.3) delivers the project's most substantial economic benefits. Mobile flood barriers (Output 4.1) protect 598 hectares of agricultural land and critical infrastructure (roads, markets, schools, health centers) from flood inundation, preventing the 20–30% crop losses that currently occur each flood season and maintaining economic connectivity. Dual-purpose water storage, and mobile irrigation systems (Output 4.1) enable year-round agricultural production for a limited number of target beneficiaries, increasing farm incomes through dry-season cropping and creating downstream economic opportunities in processing, marketing, and transport benefiting youth and vulnerable households.

Component 3 (Outputs 4.2, 4.3) multiplies economic benefits beyond target communes by enabling cost-effective replication through systematic cost–benefit documentation and demonstration events.

43. **Social benefits**

Flood protection (Output 4.1) saves lives — preventing drowning and flood-related injuries particularly among children, elderly, and persons with disabilities — and maintains access to schools, health centers, and water sources for vulnerable populations who depend heavily on public services. Community-operated barriers empower local populations with technical skills and ownership over protective infrastructure, reducing dependency. Assured irrigation access (Output 4.1) reduces distress migration, keeping families and communities intact, and provides water security during droughts, preventing food insecurity affecting malnourished children and vulnerable households.

Gender-responsive capacity building under Outputs 3.1 and 3.2 ensures women, youth, and marginalized groups — including indigenous Batwa communities through the IPP with FPIC processes — participate meaningfully in emergency response teams and decision-making structures. Multi-channel alert dissemination (Output 1.2) accommodates disabilities and literacy levels, ensuring inclusive early warning coverage. Demonstration events and knowledge products (Output 4.2, 4.3) showcase successful inclusion of women, youth, and marginalized groups in technical roles, challenging social norms and inspiring replication of inclusive approaches.

44. **Environmental benefits**

Flood barriers prevent flood-induced soil erosion and agricultural land degradation, protecting biodiversity and ecosystem services supporting vulnerable livelihoods. Efficient gravity-fed and solar-powered irrigation systems (Output 4.1) minimize water waste and eliminate fossil fuel dependency, while controlled irrigation during droughts reduces pressure on natural water sources, protecting ecosystems. Continuous environmental monitoring under Output 2.1 enables ecosystem-sensitive water management, balancing agricultural, human, and environmental water needs. Integrated hazard response plans (Output 3.1) incorporate environmental protection measures, preventing panic-driven environmental degradation during emergencies. Dissemination of integrated flood–drought adaptation approaches (Outputs 4.2, 4.3) influences regional environmental management practices across East Africa.

*Table 12 Benefits to vulnerable groups*

| Vulnerable Group | Economic Benefits | Social Benefits | Environmental Benefits |
|---|---|---|---|
| **Women** (181,421; 51%) | Equitable irrigation access increases income: technical training creates opportunities; protection of household assets | Gender-responsive capacity building ensures meaningful participation in decision-making; prevented displacement/violence | Women farmers adopt adaptation practices protecting soil and water resources |
| **Youth** (113,527; 32%) | Opportunities in deployment teams and cooperatives; increased productivity through climate-informed practices | Skills development and leadership in community disaster management; educational continuity through school protection | Youth engagement in environmental protection strengthens long-term sustainability |
| **Elderly & disabled** (20,052; 5.6%) | Protected livelihoods and assets; maintained economic connectivity through infrastructure protection | Reduced mortality/injury risk through accessible early warnings; maintained health/social service access | Reduced environmental stressors that disproportionately harm vulnerable populations |
| **Batwa & other minorities** (3,579; 1%) | Explicit inclusion in vulnerability assessments ensures targeted benefits reach marginalized populations | Participatory planning and the IPP strengthens voice and representation; capacity building creates pathways to leadership | Traditional ecological knowledge integrated into environmental management |

45. **Avoiding and mitigating negative impacts**

The project avoids or mitigates potential negative impacts in full compliance with the AF Environmental and Social Policy and Gender Policy. A comprehensive ESIA and Environmental and Social Management Plan (ESMP) have been prepared (see ANNEX 4 — Environmental and Social Impact Assessment and Environmental and Social Management Plan (ESIA-ESMP), addressing all 15 AF environmental and social principles. Key safeguards include hydrodynamic modeling to ensure barrier deployment does not cause downstream flooding; FPIC processes for all interventions affecting Batwa communities; a gender action plan (see ANNEX 5 — Gender Action Plan (GAP)) ensuring women's equitable participation and benefit-sharing; an accessible Grievance Redress Mechanism (GRM) for all stakeholders; and sex-, age-, and disability-disaggregated monitoring enabling adaptive management to address any emerging inequities.

## E. Cost-effectiveness of the project

46. The total project budget is US$ 5,000,000, allocated as follows:

**Component 1:** Climate information, warning systems and responses (Outputs 1.1, 1.2, 2.1, 3.1, 3.2): US$ 1,063,000 — hazard risk assessments, early warning dissemination, expanded monitoring network, commune preparedness plans, and CCDRR capacity strengthening. These interventions contribute to the broader project-wide benefits for both direct and indirect beneficiaries across the three target communes.

**Component 2:** Innovative flood and drought risk reduction technologies (Output 4.1): US$ 2,348,000 — mobile flood barriers (no water storage or man-made lakes) protecting 598 ha of agricultural land, plus integrated mobile irrigation systems for drought resilience.

**Component 3:** Knowledge management and innovation diffusion (Outputs 4.2, 4.3): US$ 890,600 — implementation and monitoring of the IPPF/IPP, evidence base, technical manuals, demonstration sites, and regional partnerships for replication.

**Project execution costs: US$ 306,700 ; IE management fee: US$ 391,700**

47. **Cost-effectiveness analysis per output**

The table below disaggregates cost-effectiveness by individual output, showing how each investment generates distinct adaptation value.

*Table 13 Overview of cost-effectiveness per output*

| Output (per ToC) | Budget (US$) | Key deliverables | Unit cost metric | Adaptation value / cost-effectiveness rationale |
|---|---|---|---|---|
| 1.1 — Geospatial hazard maps & risk profiles | 318 000 | Hazard maps and risk profiles for 3 communes; hydrodynamic flood models under current/future climate. | ~US$ 0.89 per beneficiary (US$ 318 000 ÷ 358,116) | Prevents malinvestment in high-risk zones; informs optimal barrier placement; one-time investment with 20+ year utility; far cheaper than post-disaster damage assessments |
| 1.2 — EWS dissemination & communication systems | 240 000 | CAP/EAP protocols; multi-channel alert dissemination (SMS, radio, community networks); awareness campaigns | ~US$ 0.67 per beneficiary | Increases EWS coverage from 20% to 50%+; low per-capita cost triggers high-value anticipatory action (barrier deployment, evacuation); gender-accessible multi-channel design maximizes reach |
| 2.1 — Climate monitoring network & forecasting capacity | 325 000 | Automatic meteorological and hydrological stations; IGEBU monitoring room; geoportal; staff training | ~US$ 0.91 per beneficiary | Permanent national infrastructure: data serves all sectors beyond project lifespan; enables forecast-based action chain; cost shared with national system — no duplication |
| 3.1 — Commune preparedness/response plans | 150 000 | 3 commune plans; training of deployment teams; simulation exercises; institutional coordination | ~US$ 50K per commune | Trained community teams eliminate costly external deployment; simulation exercises reduce response time; plans institutionalized in commune budgets post-project |
| 3.2 — CCDRRs trained and supported | 30 000 | CCDRR and emergency-response-actor technical/management training; forecast-to-action coordination; clarified institutional roles and responsibilities. | ~US$ 10K per CCDRR | Strengthens local ownership and capacity to translate climate information and preparedness plans into coordinated action. |
| 4.1 — Mobile flood barriers & integrated water systems | 2 348 000 | Mobile barriers; integrated mobile irrigation systems; O&M for 3 communes (no water storage or man-made lakes) | ~US$ 6.56 per beneficiary; ~US$ 3,926 per ha protected | Dual-purpose = 40–60% more cost-effective than separate flood + irrigation investments; 20+ year lifespan; reusable/repositionable; community-operated (low O&M); protects 358,116 people directly and 516,670 indirectly. |
| 4.2 — Evidence base produced & disseminated | 808 600 | Technical manuals; cost-benefit analyses; O&M protocols; knowledge products (video, policy briefs, publications), dedicated IPPF/IPP implementation and monitoring | | Enables replication without repeating R&D; each replication commune benefits at fraction of original cost; multiplier effect on AF investment |
| 4.3 — Demonstration | 82 000 | Demonstration events; NBI/IGAD/EAC/AU | ~US$ 27K per | Lowest-cost output with highest replication leverage; regional partnerships create sustained |

| | | | | |
|---|---|---|---|---|
| sites & knowledge-sharing platforms | | partnerships; regional dissemination | commune demonstration | diffusion pathways; directly serves AF Outcome 8 innovation scaling |

48. **Cost per beneficiary and comparison with alternatives**

Overall cost per beneficiary is approximately US$ 14.0 (total project amount US$ 5,000,000 ÷ 358,116 direct beneficiaries). Cost per hectare protected is approximately US$ 8 361 (total project amount US$ 5,000,000 ÷ 598 ha). These compare favorably with alternatives over a 20+ year lifespan, as shown in the table below:

*Table 14 Overview of cost alternatives*

| Approach | Cost per unit | Effectiveness / benefit |
|---|---|---|
| Mobile barriers + irrigation (project) | US$ 14.0 per beneficiary | 30–40% disaster loss averted; dual-purpose; low O&M; reusable |
| Smart irrigation / agriculture (project) | | 25–35% productivity increase[37]; income increase for women |
| Permanent levees (alternative) | US$ 28+ per beneficiary[38] | High maintenance; inflexible; land acquisition required; no drought function |
| Sandbags (alternative) | Recurring labor cost | Slow deployment (days vs. hours); single-use; ineffective for rapid-onset floods |

**Methodology for the USD 150/month farmer-revenue estimate:** A USD 150/month dry-season income estimate is drawn from AFCIA pilot monitoring at Mpanda commune (2023–24). It combines: (i) self-reported income surveys with participating farmer cooperatives before and during the dry season; (ii) crop-yield comparisons for rice and vegetables with and without irrigation; and (iii) local market-price data collected in Mpanda markets. Attribution to the barrier-irrigation function was established through the controlled pilot design in which the irrigated area at Gahwazi was directly served by barrier-stored water. The AFCIA methodology is referenced in Annex 2. Given that the figure originates from the AFCIA project rather than the full-proposal beneficiary population, the project proposal itself does not use USD 150/month as a target; instead, an income indicator is added under new AF Outcome 6 alignment for the sub-set of beneficiaries that will benefit from irrigation from stored water (approximately 3.5 ha of dry-season irrigation). The full-project Baseline Assessment (Month 1–3) will commission an independent income-survey panel, repeated at mid-term and terminal evaluation, providing a verifiable basis for Core Indicator 6.2.

49. **Dual-purpose design and systems integration**

The project's core cost-effectiveness advantage is the dual-purpose design of the mobile flood barriers (Output 4.1): the same investment provides flood protection during rainy seasons and supports mobile irrigation (although small-scale) during dry seasons, delivering 40–60% greater cost-effectiveness than permanent and separate flood and irrigation infrastructure. This eliminates the parallel investments that characterize conventional single-hazard adaptation programming.

Cost-effectiveness is further amplified through systems integration across components. Component 1's forecast-to-action chain enables optimal barrier deployment — early warnings trigger installation within two hours, maximizing protective value. Community deployment teams reduce reliance on external assistance. Component 3's evidence generation enables replication without repeating the full R&D cycle, multiplying the return on AF investment.

**Methodology for the 40–60% cost advantage over alternatives:** The 40–60% cost advantage is derived from Table 6 and Table 14 and compares the all-in capital + 20-year O&M lifecycle cost per hectare protected and per beneficiary of the dual-purpose mobile barrier against: (i) permanent earthen levees with separate irrigation infrastructure (baseline unit cost ≈ USD 350,000/km — World Bank Lake Tanganyika Integrated Regional Development Programme 2022 estimates); and (ii) separate sandbag flood defence combined with tank-based irrigation. Inputs: SLAMDAM unit cost (USD/m) per the WaveSave 2024 invoice schedule; pump capex and opex per the procurement plan; permanent-levee baseline from MININFRA / World Bank Burundi infrastructure unit costs (2020–2024). Lifecycle assumptions: discount rate 6% per AF guidance, 20-year horizon, ±25% sensitivity on capex and O&M.

50. **Alternatives considered**

[37] *Rosegrant, M.W., Ringler, C., & Zhu, T. (2009).* Water for Agriculture: Maintaining Food Security under Growing Scarcity. *Annual Review of Environment and Resources. Also: Malabo Montpellier Panel (2018),* Water Wise: Smart Irrigation Strategies for Africa.

[38] https://openknowledge.worldbank.org/server/api/core/bitstreams/0fe86369-94d4-5ce1-855c-14e62681dad6/content

The project was assessed against: (a) permanent levees — rejected as 2× more expensive (US$ 28+ per beneficiary vs. US$ 14.0), inflexible, and providing no drought function; (b) standalone climate information — rejected as insufficient without linked protective infrastructure; and (c) conventional irrigation — rejected as addressing drought only. The chosen integrated approach maximizes adaptation impact per dollar by addressing the full cost of adaptation to both flood and drought simultaneously, building on the validated AFCIA pilot (2023–24) to reduce implementation risk.

Without the project, communities would continue suffering 20–30% crop losses per flood and 25–40% yield reductions during droughts. The project averts these losses at US$ 14.0 per beneficiary while building long-term adaptive capacity and enabling national and regional scale-up aligned with AF Outcome 8 on innovation diffusion.

# F. Project consistency with national or sub-national sustainable development strategies

51. **National climate policy framework**

Burundi has ratified the UNFCCC, Kyoto Protocol, Paris Agreement (2018), Convention on Biological Diversity, and Convention to Combat Desertification. The country has progressively developed a climate adaptation policy framework - NAPA (2007), Vision Burundi 2025 (2011), Climate Change Strategy (2012), TNA/TAP (2018), updated NDC (2021), NAP (2023), and the EWS Roadmap (2024–2027). All strategies consistently identify agriculture and water resources as the two most climate-vulnerable sectors requiring urgent action — the same sectors this project directly addresses.

52. **Alignment with national strategies**

The table below demonstrates how each project component and output directly implements priorities across Burundi's key climate and development strategies.

*Table 15 Project Alignment with the main National climate Strategies*

| National Strategy | Priority addressed | Project Output(s) | How the project addresses the priority |
|---|---|---|---|
| NAPA (2007)[39] | Priority 1: Improvement of seasonal early warning forecasts | Outputs 1.1, 1.2, 2.1 | Geospatial hazard maps (1.1), strengthened EWS dissemination with CAP/EAP (1.2), expanded monitoring network and IGEBU forecasting capacity (2.1) |
| | Priority 4: Rainwater harvesting for agricultural/domestic use | Output 4.1 | Dual-purpose mobile barriers create water storage/gravity-fed and solar irrigation for 6-month dry season. |
| | Priority 10: Stabilization of river dynamics | Output 4.1 | Rapid-deployment water-filled mobile barriers at strategic river locations based on hydrodynamic modeling |
| | Priority 11: Education on climate adaptation | Outputs 3.1, 4.2, 4.3 | Gender-sensitive training; visual/oral materials for low-literacy populations; knowledge dissemination |
| Vision Burundi 2025[40] | Climate-resilient development; rational management of natural resources | All outputs | Integrated flood/drought management; water resource resilience; climate-resilient agricultural systems |
| Climate Change Strategy (2012) | Integrate DRR into development plans; strengthen resilience institutions; risk reduction in emergency preparedness | Outputs 1.1, 2.1, 3.1 | Climate-scenario risk assessments (1.1); institutional capacity building at IGEBU and commune level (2.1); preparedness plans with simulation exercises (3.1) |
| TNA/TAP (2018)[41] | Water monitoring (Tech 1); Harnessing rainwater (Tech 2); Control of rain dynamics (Tech 3); Community EWS (Tech 6) | Outputs 2.1, 4.1, 1.2 | Automatic monitoring stations (2.1); mobile flood barriers for rain dynamics control and water harvesting (4.1); community EWS with multi-channel dissemination (1.2) |
| NDC (2021)[42] | Integrated climate risk management; coaching population resilience; vulnerability research; water resources control | Outputs 1.1, 2.1, 3.1, 4.1 | Risk assessments with future climate scenarios (1.1); forecast-to-action linkages (2.1); gender-sensitive training (3.1); irrigation and water harvesting (4.1) |
| NAP (2023)[43] | Water Resources; Agriculture; Infrastructure; Health (indirect) | Outputs 4.1, 1.1, 4.2 | Water storage/irrigation (4.1); infrastructure protection via mobile barriers (4.1); evidence |

39 UNDP Adaptation (2009). Burundi National Adaptation Programme of Action (NAPA)
40 Republic of Burundi. (2011). Vision Burundi 2025. Presidency of Burundi.
41 UNFCCC Technology Mechanism. Burundi Technology Needs Assessment. UNFCCC Technology Mechanism. Burundi Technology Action Plan.
42 UNFCCC (2022). Burundi First NDC (Updated submission). Submitted October 2021.
43 UNFCCC (2023). National Adaptation Plan - Burundi. Submitted December 2023.

| | | | |
|---|---|---|---|
| | | | base for adaptation solutions (4.2) contributing to NAP Strategic Outcomes 1 (institutional coordination) and 2 (evidence generation) |
| EWS Roadmap (2024–2027)[44] | Pillar 1: Risk knowledge; Pillar 2: Detection/monitoring/forecasting; Pillar 3: Alert dissemination; Pillar 4: Preparedness/response | Outputs 1.1, 2.1, 1.2, 3.1 | Component 1 directly implements priority actions across all four EWS Roadmap pillars where the outputs (1.1; 1.2; 2.1; 3.1.) are directly linked to the pillars. |
| UNSDCF 2023–2027 | Strategic Result 5: Improved management of the environment and natural resources and strengthened systems for preparedness and response to natural and human-induced shock | Outputs 1.1, 1.2, 2.1, 3.1, 3.2, 4.1 | Climate-risk mapping and information (1.1); strengthened EWS and alert dissemination (1.2); improved monitoring and forecasting capacity (2.1); community preparedness and response capacity (3.1, 3.2); flood protection and water management (4.1). |
| | Strategic Result 1: Inclusive and sustainable food systems | Output 4.1 | Dual-purpose flood barriers, water storage and irrigation strengthen drought-season agricultural and livelihood resilience. |

53. **SDG contributions**

The project contributes to multiple Sustainable Development Goals: **SDG 2** (Zero Hunger) through irrigation enabling year-round agricultural production; **SDG 6** (Clean Water) through water storage infrastructure; **SDG 11** (Sustainable Cities and Communities) through flood protection of settlements and infrastructure; **SDG 13** (Climate Action) through climate information systems, early warnings, and adaptive capacity building - the project's primary SDG alignment; and **SDG 5** (Gender Equality) through gender-responsive design ensuring women's equitable participation and benefit-sharing across all outputs.

54. **Other supporting frameworks**

The project also aligns with: the National Development Plan (PND 2018–2027), which incorporates NDC priorities; the Third National Communication to UNFCCC (2019), whose climate vulnerability data informs the project's risk assessment approach; the Biodiversity National Strategy (CBD), as water harvesting during wet seasons reduces extraction pressure on natural water bodies during dry seasons; and the National Plan of Action to Combat Desertification (UNCCD), through climate-resilient agriculture in drought-prone areas.

## G. Project compliance with national technical standards

55. This project is designed to ensure full compliance with Burundi's legal and regulatory framework governing environmental protection, water resources management, land use, and climate change adaptation. Importantly, the project involves **no permanent infrastructure construction** except monitoring stations - all interventions utilize temporary, mobile, and deployable equipment and systems. This significantly reduces EIA and permitting requirements compared to traditional infrastructure projects. A comprehensive ESIA and ESMP have been prepared (ANNEX 4) in compliance with the Environment Code and Decree 100/22.

56. **Key national laws and regulations**

The following table summarizes the principal national laws applicable to the project and corresponding compliance measures.

*Table 16 Overview principal national laws applicable to the project and corresponding compliance measures.*

| Law / Regulation | Key requirements | Authorizing office | Project compliance |
|---|---|---|---|
| **Environment Code (2000) & Decree 100/22 (2010)** | EIA for installations affecting the environment (Arts. 21–27); screening, public consultation, EMP | MINEAGRIE / OBPE | Environmental screening conducted with OBPE; simplified assessments prepared for all temporary interventions; ESMP developed (ANNEX 2); public consultations held in all three target communes; environmental authorization certificates obtained |
| **Water Code (Law No. 1/02, 2012)** | Authorization for all hydraulic works; water quality standards; equitable distribution; | MINEAGRIE / Water Resources | Water resource authorizations obtained for temporary mobile barriers (Output 4.1) and water harvesting/storage/irrigation systems (Output 4.1); no permanent dams or canals — permitting focuses on |

[44] Roadmap for Operationalizing a Multi-Hazard Early Warning System for All (2024-2027). This roadmap contains four main pillars where action is needed

| | | | |
|---|---|---|---|
| | protection of water bodies | Directorate / IGEBU | operational authorization; no water quality requirement for irrigation in Burundi as confirmed by IFAD and FAO |
| **Land Code (Law of April 2011)** | Decentralized land administration; land certificates; procedures for allocation and disputes | Commune Land Offices | No displacement or resettlement; all sites on public land; coordination with commune land offices; FPIC processes documented; temporary land use agreements (not permanent acquisition) |
| **National meteorological standards (IGEBU/WMO)** | WMO standards for station siting, calibration, data quality, and reporting | IGEBU | All monitoring equipment under Output 2.1 complies with WMO standards; equipment registered with IGEBU; calibration certificates provided; data integrated into national systems |
| **Occupational health and safety regulations** | Worker safety equipment; safe operating procedures; emergency response; incident reporting | Ministry of Public Service, Labor and Employment | Safety training for all deployment teams; PPE provided; safe operating procedures for all equipment; emergency response plans; worker insurance arrangements |
| **Gender-Based Violence Law (No. 1/13, 2016)** | Equal participation of women; GBV prevention; accessibility for persons with disabilities; protection of vulnerable groups | Ministry of Justice, Human Rights and Gender | Gender-balanced participation in all activities; women's leadership in deployment teams; accessible materials for low-literacy populations; gender-responsive GRM; IPP for Batwa communities (Annex 6) |
| **National telecommunications regulations** | Compliance for SMS/radio alert dissemination | Regulatory authority / Civil Protection | CAP/EAP alert dissemination (Output 1.2) coordinated with IGEBU and Civil Protection; compliance with telecommunications regulations |

57. **Compliance matrix by project output**

The table below maps each project output to the applicable legal and technical standards.

| Output | **Applicable laws, regulations, and technical standards** | Key compliance requirements |
|---|---|---|
| **Output 1.1** — Geospatial hazard maps and risk profiles | Environment Code (screening); Water Code (water resource studies) | Environmental screening submitted to OBPE; stakeholder consultations conducted; water resource study authorization obtained |
| **Output 1.2** — Early warning dissemination and communication systems | Telecommunications regulations; CAP technical standards; data protection regulations | Alert protocols coordinated with IGEBU and Civil Protection; CAP/EAP standards applied; gender-responsive communication materials developed |
| **Output 2.1** — Climate monitoring network and forecasting capacity | WMO meteorological standards; Environment Code (equipment installation screening) | All stations comply with WMO siting/calibration standards; registered with IGEBU; environmental screening for installation sites; data sharing protocols established |
| **Output 3.1** — Commune preparedness/response plans | National DRM regulations; occupational safety; Law 1/13 (gender) | Plans aligned with national DRM framework; commune-level approval; gender-balanced participation; safety standards for simulation exercises; training certificates issued |
| **Output 3.2** — CCDRR strengthening | National DRM regulations; Law 1/13 (gender/vulnerable groups) | CCDRRs strengthened with inclusive participation and clear institutional roles; coordination arrangements established with commune administrations and relevant disaster-risk-management actors. |
| **Output 4.1** — Mobile flood barriers and integrated water systems | Environment Code; Water Code (hydraulic systems); Land Code (temporary use); occupational safety; **no building permits required** (temporary/mobile equipment) | Environmental screening with OBPE; temporary land use authorization; hydrodynamic modeling for deployment; deployment protocols and safety measures; ESMP implemented during all phases |
| **Output 4.2** — Evidence base produced and disseminated | Gender mainstreaming standards (Law 1/13); technical documentation standards | Gender-sensitive materials; accessible formats for persons with disabilities; documentation aligned with national knowledge management protocols |
| **Output 4.3** — Demonstration sites and knowledge-sharing platforms | Gender mainstreaming; occupational safety for demonstration events | Gender-balanced participation; safety protocols for demonstration events; coordination with MINEAGRIE Climate Change Directorate |

58. **Compliance process and timeline**

Compliance is ensured across four implementation phases:

- **Phase 1: Pre-implementation** (completed): Environmental screening with OBPE; ESIA conducted; ESMP developed (ANNEX 2); public consultations in all three communes; FPIC processes documented; environmental screening approvals obtained from OBPE.
- **Phase 2: Equipment deployment preparation** (Year 1): Technical specifications developed per applicable standards (WMO for monitoring stations, hydraulic design standards for barriers, irrigation standards for mobile systems); water resource intervention applications submitted to MINEAGRIE; land

tenure verified with commune offices; coordination mechanisms established with OBPE, IGEBU, Labor Inspectorate, and Ministry of Gender.

- **Phase 3: Implementation** (Years 2–3): ESMP mitigation measures implemented during all deployment; environmental and social monitoring per ESMP protocols; occupational safety compliance maintained; gender-responsive GRM operational; incident reporting to OBPE.
- **Phase 4: Post-implementation** (Year 4+): O&M plans implemented per technical standards; regular monitoring reports submitted; continued IGEBU coordination for meteorological data; equipment performance monitoring per WMO and manufacturer standards.

## H. Duplication of the project with other funding sources

59. **Overview**

A comprehensive landscape analysis has been conducted to ensure the proposed project fills critical gaps in Burundi's climate adaptation landscape rather than duplicating existing efforts. The project avoids duplication through three mechanisms: **geographic complementarity** (targeting 35 Collines in Mpanda, Bubanza, and Bukinanyana where interventions are absent or insufficient); **thematic differentiation** (uniquely addressing the forecast-to-action gap for flood/drought preparedness through innovative mobile barrier technology); and **building on completed pilots** (scaling the proven CTCN/AFCIA pilot from one site to three communes).

60. **Detailed analysis of relevant projects**

The table below maps each relevant project and how the proposed project avoids duplication and ensures complementarity, specifying the relationship to project outputs.

*Table 17 Overview of relevant projects and how the project avoids duplication and ensures complementarity*

| Project | Funder / Budget / Status | Geographic focus | Avoiding duplication & ensuring complementarity |
|---|---|---|---|
| **Completed projects** | | | |
| **CTCN/AFCIA pilot** — Mobile flood barrier deployment at Mpanda-Gahwazi | AFCIA; Completed 2022 | Mpanda (1 site) | **Completed - Foundation project** — the AF project scales this proven pilot from 1 site to 3 communes (Output 4.1); incorporates lessons on site selection (avoid sandy terrain) and dual-purpose functioning; no duplication — represents systematic scaling |
| **UNDP/GEF-LDCF** — Community Disaster Risk Management | GEF-LDCF US$ 9M; Completed Oct 2023 | Isare (national stations) | **Completed — AF project builds upon** 30 automatic stations installed nationally; AF project expands monitoring in underserved target communes (Output 2.1); data sharing protocols harmonized via IGEBU; proven coordination model between IGEBU, Civil Protection, and communities informs Output 3.1 |
| **IFAD PRODEFI II** — Value Chain Development Programme Phase II: climate-smart agriculture, food security, farmer organization, youth/women inclusion | IFAD US$ 41.57M + OPEC Fund US$ 6M + National Govt US$ 3.14M (Total US$ 50.71M); 2015–2022. Completed | Gihanga, Bubanza, Mpanda, Musigati, Ruganda, Rugombo | **Completed project** — UNEP/AF builds on strengthened cooperatives and organizations in target areas. PRODEFI II focused on rice and milk value chains, market linkages, cattle distribution, and marshland development. UNEP/AF focuses on flood/drought protection infrastructure and does not intervene in value chains, livestock, or marketing — complete thematic differentiation. Strengthened cooperatives from PRODEFI II provide ready-made institutional structures for community-based water management and flood protection (Output 4.1) |
| **Community Managed DRR in Rugombo** — Community risk assessment, resilience building against winds, erosion, floods, drought; Community Disaster Plans | Cordaid/Empowering Response Burundi (ERB); Completed 2020. | Rugombo town | **Completed project** — lessons learned inform the proposed intervention's community-based approaches. Community Managed DRR empowered communities to conduct their own risk assessments and develop locally owned disaster plans. This participatory methodology and focus on building local capacity provide a replicable model for community adaptation planning (Output 3.1) |
| **On-going projects** | | | |
| **IFAD/GCF** — Climate-proofing food production in Imbo and Moso | GCF; 2022–2027 | Gihanga-Kagwema | **Potential geographic overlap but thematically different.** FAD/GCF focuses on **reforestation, watershed civil works, and agricultural intensification**; UNEP/AF focuses on temporary mobile infrastructure and climate information systems; complementary — upstream watershed management enhances barrier effectiveness |

| | | | |
|---|---|---|---|
| **UNDP/GEF-LDCF** — Landscape restoration for urban/peri-urban Bujumbura | GEF-LDCF US$ 10M; 2024–2029 | Peri-urban Bujumbura (Kabezi, Kanyosha, etc.) | **Geographic separation** — UNDP targets peri-urban Bujumbura city surroundings; UNEP/AF targets rural communes; UNDP focuses on permanent infrastructure (anti-erosion ditches, terraces); flood mapping methodologies provide lessons for Output 1.1 |
| **World Bank** — Urban Resilience Emergency Project | IDA US$ 113M; 2024–2029 | Bujumbura city only | **Geographic exclusion** — Bujumbura city explicitly excluded from AF project target area; coordination at national level through IGEBU and DRM Platform to ensure consistent EWS approaches; both work with IGEBU — equipment and training investments will be complementary (Output 2.1) |
| **World Bank/GEF** — NAGURA (Colline Climate Resilience) | IDA US$ 70M + GEF US$ 18.3M; 2025–2031 | 80 Collines across sub-watersheds  | WB consultations completed — **zero overlap on target Collines confirmed**; WB emphasizes watershed restoration, land rehabilitation, and climate-smart agriculture; UNEP/AF emphasizes flood protection infrastructure (Output 4.1) and EWS (Outputs 1.1, 1.2, 2.1); complementary upstream watershed management |
| **WFP/Red Cross/IFRC** — Forecast-Based Financing & SEAP | WFP Anticipatory Action; 2023–ongoing | National; focus on Muhuta, Rumonge | **Different geographic focus**. WFP focusses on **humanitarian assistance** (cash, food); UNEP/AF focusses on **protective asset deployment** (Output 4.1) via same IGEBU forecasts; SEAP framework adopted and expanded in target communes (Output 1.2); both strengthen same national EWS but trigger different response types . |
| **FAO/GEF** — Resilient Food Systems | GEF US$ 7.8M; 2023–2026 | Nyabiraba, Kabezi, etc. (highlands) | FAO focuses on **hill irrigation on slopes**; UNEP/AF focuses on **lowland flood-prone areas** (Imbo Basin); **geographic and topographic separation confirmed through FAO consultations**; complementary highland/lowland water management |
| **OAP/Netherlands** — PADANE | Netherlands/SNV; 2023–2026 | Manga commune | **Different geographic focus.** PADANE focuses on nutrition, entrepreneurship, post-harvest storage; UNEP/AF focuses on flood/drought protection; OAP confirmed interest in mobile barrier innovation; community mobilization strategies will be harmonized |
| **Solar-Powered Community Water Systems Initiative** — Solar-powered pumps, tanks, taps, capacity building | Amazi Water; Private donors/partners; 2023–present | Multiple communes across four provinces | **Thematic differentiation**: Amazi Water focuses on clean water access through solar-powered water supply systems. UNEP/AF addresses agricultural water needs for irrigation during drought and flood protection. **Complementarity:** both use solar-powered solutions appropriate for Burundi's rural context. Lessons from Amazi's solar pump installations, community engagement approaches, and sustainable O&M models can inform UNEP/AF project irrigation system design (Output 4.1) |
| **Resilient Agri-Food Systems** — Agroforestry, Tree Planting, Farmer Field Schools (FFS), small-scale irrigation, water harvesting & storage | Cordaid International; Cordaid and international donors; Ongoing | Multiple sites | Cordaid focuses on integrated agri-food systems via agroforestry, FFS training, and small-scale irrigation. **Thematic complementarity**: Cordaid emphasizes agricultural practices (agroforestry, soil conservation, diversified cropping); UNEP/AF emphasizes protective infrastructure (flood barriers) and innovative water management (mobile barriers + EPDM storage/irrigation linked to early warnings). Lessons on community engagement and sustainable O&M can inform Output 4.1 design |
| **Concept note project** | | | |
| **OSS/AF** — Strengthening resilience to extreme weather for smallholder farmers | AF US$ 10M; Concept note 2025 | Bubanza, Gihanga communes | **Similar geographic focus so complementarity should be ensured.** OSS focuses on **agricultural advisory services**, warehouse receipt systems, and cold storage; UNEP/AF focuses on flood/drought early warnings linked to protective infrastructure (Outputs 1.1, 1.2, 4.1); UNEP/AF will avoid all value chain and cold storage interventions; coordination required on drought risk information sharing |

61. **Output-level non-duplication summary**

The table below confirms that each project output addresses a unique gap not covered by any existing initiative.

*Table 18 Overview of how the project addresses unique gaps*

| Output | Unique contribution — not duplicated |
|---|---|
| **1.1** — Geospatial hazard maps & risk profiles | No existing project produces climate-scenario-based geospatial flood/drought hazard maps with hydrodynamic modeling for the target communes; UNDP landscape restoration uses similar methods but in different geographic areas |
| **1.2** — EWS dissemination & communication | No project pilots CAP/EAP-linked alert dissemination triggering protective infrastructure deployment in target communes; Red Cross SEAP provides framework but triggers humanitarian — not infrastructure — response |
| **2.1** — Climate monitoring & forecasting capacity | Expands UNDP/GEF's 30-station network into underserved target province; no other project provides 24/7 IGEBU monitoring room and geoportal linked to barrier deployment |
| **3.1** — Commune preparedness/response plans | No existing project develops commune-level plans integrating forecast-to-barrier-deployment protocols; WB Urban Resilience develops EPR for Bujumbura city only |
| **3.2** — CCDRR strengthening | No existing project provides the proposed climate-specific capacity strengthening and forecast-to-action coordination for CCDRRs across all three target communes. |
| **4.1** — Mobile flood barriers & integrated water systems | **Unique** — no other project in Burundi or globally at this scale deploys dual-purpose mobile water-filled flood barriers with integrated water harvesting/storage/irrigation; builds on AFCIA pilot but represents systematic scale-up |
| **4.2** — Evidence base & dissemination | No existing project produces systematic evidence on dual-purpose mobile barrier technology for adaptation; fills critical knowledge gap for replication |
| **4.3** — Demonstration & knowledge-sharing platforms | No existing project establishes demonstration sites or regional partnerships (NBI, IGAD, EAC) specifically for mobile barrier technology diffusion |

62. **Coordination mechanisms**

To ensure ongoing complementarity during implementation, the project will maintain:

- **National coordination**: regular meetings with World Bank (NAGURA, Urban Resilience), UNDP, FAO, IFAD, and other implementing partners through MINEAGRIE and PFNPRGC (National DRM Platform).
- **IGEBU coordination**: harmonized data sharing protocols, equipment standards, and forecast dissemination with all projects strengthening the national EWS (Outputs 1.2, 2.1).
- **OSS/AF coordination**: explicit geographic and thematic delineation with the OSS project in Bubanza, with formal coordination protocol on drought risk information sharing.
- **Red Cross/WFP coordination**: shared forecast triggers and activation thresholds, with differentiated response protocols (humanitarian vs. infrastructure deployment).
- **Commune-level coordination**: joint planning with NAGURA and other projects at Colline level to prevent overlap in target communities.

63. **Incorporation of lessons learned from other projects**

The project design integrates key lessons from other projects as shown in the table below.

*Table 19 Overview of how the project design integrates lessons from other projects in the project design*

| Source project (status) | Lessons learned | Uptake in UNEP/AF project | Output(s) |
|---|---|---|---|
| CTCN/AFCIA Pilot, Mpanda (Completed 2024) | Dual-purpose mobile barriers work (2-hour deployment, successful flood defense and water storage/irrigation confirmed); sandy/hilly terrain reduces effectiveness — flat, non-sandy ground is optimal; EWS-to-deployment linkage is feasible; government endorsement confirmed at COP27 | Scales proven technology from 1 site to 3 communes (6.5 km, 598 ha); geotechnical ground-truthing and "protection-by-design audit" for site selection; full forecast-to-action chain (CAP/EAP) linking IGEBU forecasts to barrier deployment; post-project sustainability through government budget lines for O&M | 1.1, 1.2, 2.1, 3.1, 4.1 |
| UNDP/GEF-LDCF Community DRM (Completed 2023) | Community-based risk assessment methodology proven effective; IGEBU–Civil Protection–community coordination is feasible; 30 automatic stations installed nationally but gaps remain in target province | Participatory hazard mapping with community ground-truthing; proven coordination model replicated in commune preparedness plans; builds on existing 30-station network by rehabilitating 10 and installing 6 new stations in underserved communes | 1.1, 2.1, 3.1 |
| Cordaid/ERB Community DRR, Rugombo (Completed 2020) | Community-owned disaster planning produces stronger local ownership than top-down approaches; participatory methodology is replicable | Commune preparedness plans co-developed with communities; simulation exercises and local/indigenous knowledge integration embedded in planning process | 3.1 |
| IFAD PRODEFI II (Completed 2022) | Strengthened farmer cooperatives provide ready-made institutional structures; permanent irrigation infrastructure faces sustainability challenges in rural Burundi due to limited maintenance capacity | Existing cooperatives used as entry points for water management committees and deployment teams; mobile/temporary irrigation systems (solar-powered pumps, gravity-fed) chosen over permanent canals for cooperative-level O&M | 4.1 |
| Red Cross/WFP FbF/SEAP (Ongoing) | Forecast-based anticipatory action is feasible in Burundi (successful October 2023 activation); differentiated response protocols needed — same forecast can trigger different response types | SEAP framework adopted and expanded to trigger infrastructure deployment (not just humanitarian response); shared forecast triggers with Red Cross/WFP but differentiated action chains coordinated through IGEBU | 1.2 |

| | | | |
|---|---|---|---|
| UNDP Landscape Restoration, Bujumbura (Ongoing 2024–29) | Flood mapping methodologies (remote sensing, spatial analysis) are transferable across geographic areas | Methods inform geospatial hazard mapping, adapted with climate-scenario projections (future conditions, not just current) for rural target communes | 1.1 |
| World Bank Urban Resilience + NAGURA (Ongoing 2024–31) | IGEBU as central EWS coordination institution is effective; national-level investments create shared platforms; upstream watershed restoration enhances downstream flood protection | Harmonized equipment standards, data sharing, and forecast dissemination with WB through IGEBU; barriers positioned as complementary downstream protection to NAGURA's upstream watershed work; zero Colline overlap confirmed | 1.1, 1.2, 2.1, 4.1 |
| Amazi Water Solar Systems (Ongoing) | Solar-powered water pumps are viable in rural Burundi; community O&M models for solar systems tested and refined | Solar pump experience informs irrigation system design; solar power prioritized to reduce costs and eliminate fossil fuel dependency | 4.1 |
| Cordaid Resilient Agri-Food Systems (Ongoing) | Demonstration-based training (Farmer Field School approach) produces sustained behavior change | Participatory, demonstration-based training for deployment teams and farmer cooperatives; O&M sustainability models incorporated | 4.1 |

# I. Learning and knowledge management

64. **Learning strategy**

Learning and Knowledge Management (KM) is integral to this project, with a designated Component 3 (Outputs 4.2 and 4.3) and cross-cutting KM activities across all components. The project's KM objectives are to: (i) build capacity of target communities and national entities (OBPE and IGEBU); (ii) support adaptive management through evidence-based learning; (iii) facilitate stakeholder knowledge exchange; and (iv) contribute to national, regional, and global learning on diffusion, replication, and scale-up of adaptation innovations addressing multiple climate hazards — directly contributing to AF Outcome 8 on innovation diffusion.

65. **Learning themes**

Four cross-cutting learning themes guide knowledge capture throughout implementation:

- **Replicating and scaling innovative technologies**: technical, financial, and institutional factors for scaling mobile flood barriers from the CTCN/AFCIA pilot (2023–24) to broader deployment; optimization of dual-purpose technologies (flood protection and water storage/irrigation); cost-benefit analysis versus permanent infrastructure.
- **Early warning to action**: translation of IGEBU climate forecasts into timely community action; coordination mechanisms between IGEBU, OBPE, Civil Protection, and communities; effectiveness of CAP and EAP protocols.
- **Gender and social inclusion**: gender-differentiated vulnerabilities in adaptation design; women's participation in decision-making and technical training; accessibility for women, youth, Batwa minorities, and persons with disabilities.
- **Climate information**: impact of expanded monitoring infrastructure on forecast accuracy; optimal threshold levels for early warning triggers.

66. **Knowledge management approach**

The project implements a KM strategy organized around five stages, as shown in the table below:

*Table 20 Five stages of knowledge management*

| Stage | Activities |
|---|---|
| **Capture** | Systematic data collection: baseline assessments, monitoring data from expanded climate networks, sex-disaggregated beneficiary data, barrier deployment records, stakeholder feedback, technical studies (cost-benefit analyses, performance data), photo/video documentation |
| **Learn** | Technical performance reviews; reflection workshops with OBPE, IGEBU, commune staff, CCDRR members, and communities; communities of practice among CCDRR committees; OBPE-IGEBU coordination meetings for adaptive management |
| **Generate** | Knowledge products tailored to diverse audiences (see output-level table below) |
| **Share** | Multi-level dissemination — local (community demonstrations, radio in Kirundi, CCDRR networks), national (steering committee, RTNB media, dissemination workshop), regional (NBI, IGAD, EAC platforms, South-South exchanges), global (AF platforms, UNFCCC/CTCN, academic publications) |
| **Apply** | Real-time adaptive management using monitoring data; coordination with complementary initiatives (IFAD, World Bank, FAO); informing future programming and scaling |

67. **Output-level learning objectives and knowledge products**

The table below maps learning objectives and knowledge products to each output.

*Table 21 Overview of learning objectives and knowledge products to each output*

| Output | Learning objectives | Key knowledge products | Target audiences | Timeline |
|---|---|---|---|---|
| **1.1** — Geospatial hazard maps & risk profiles | Assess methodology for climate-scenario-based risk mapping; document data gaps and solutions; evaluate stakeholder validation process | Gender-sensitive vulnerability assessment toolkit; geospatial hazard mapping methodology guide; risk profile reports for 3 communes | Government ministries, IGEBU, commune planners, development partners | Year 1–2 |
| **1.2** — EWS dissemination & communication | Evaluate effectiveness of CAP/EAP protocols; assess multi-channel dissemination reach by gender; document community trust-building | EWS implementation guide; CAP/EAP activation protocol manual; community awareness campaign materials (Kirundi — visual/oral for low-literacy) | IGEBU, Civil Protection, CCDRR, Burundi Red Cross, communities | Year 1–3 |
| **2.1** — Climate monitoring network & forecasting capacity | Document impact of expanded monitoring on forecast accuracy; assess institutional capacity development at IGEBU; evaluate data integration | Climate monitoring expansion report; IGEBU capacity assessment; data sharing protocol documentation; station maintenance manual | IGEBU, WMO, government, national DRM platform | Year 1–3 |
| **3.1** — Commune preparedness/response plans | Evaluate forecast-to-barrier-deployment response times; assess gender-balanced participation; document simulation exercise outcomes | Commune preparedness plan templates; training curriculum for deployment teams; simulation exercise reports; gender-disaggregated participation analysis | Commune administrations, CCDRR, Civil Protection, communities | Year 1–3 |
| **3.2** — CCDRR strengthening | Assess the effectiveness of CCDRR capacity strengthening and local forecast-to-action coordination; document lessons on inclusive local adaptation decision-making and ownership. | CCDRR capacity-strengthening and coordination lessons; local adaptation governance case study. | CCDRRs, commune administrations, OBPE, Civil Protection/PFNPRGC, Burundi Red Cross | Year 1–3 |
| **4.1** — Mobile flood barriers & integrated water systems | Document technical performance of dual-purpose barriers; analyze agricultural productivity impacts; evaluate gender-equitable water allocation | Technical Design Catalogue (barrier designs, specifications, cost estimates); case study on dual-purpose functioning; video tutorial series (Kirundi) on barrier deployment, water harvesting, and irrigation | Government ministries, local governments, NGOs, farmer groups, development partners, global adaptation community | Year 2–4 |
| **4.2** — Evidence base produced & disseminated | Capture comprehensive implementation lessons for replication; document cost-effectiveness evidence; analyze sustainability factors | O&M Manual (French/Kirundi — gender-sensitive); cost-benefit analysis; lessons learned compendium; policy briefs; academic publications on innovation scaling | National DRM platform, regional/global practitioners, researchers, climate finance institutions | Year 2–4 |
| **4.3** — Demonstration sites & knowledge-sharing platforms | Assess replication potential in other contexts; document peer-learning outcomes; evaluate regional dissemination effectiveness | Training curriculum for institutional staff; demonstration event reports; replication guidance; South-South learning exchange reports; conference presentations | NBI, IGAD, EAC, AU networks, other communes, development partners, academic institutions | Year 3–4 |

**Cross-cutting dissemination products** (Years 1–4): National Dissemination Workshop (Year 4 closing event); social media content (Facebook, X); project fact sheets and brochures (French/Kirundi); media engagement (press releases, radio/TV features via RTNB); conference presentations at national, regional, and global events; regional knowledge exchange visits.

68. **Responsibilities**

**A Knowledge Management and Communications Officer** within the PMU (OBPE) leads KM strategy implementation. Roles are distributed as follows: Project Coordinator (overall KM oversight); KM Officer (day-to-day coordination, knowledge products, dissemination); Component leads (technical contributions); M&E Officer (data integration); all project staff (documentation responsibilities). Key partnerships include IGEBU (climate information), OBPE (community engagement), Civil Protection/PFNPRGC (DRM networks), Burundi Red Cross (community outreach), RTNB (media), academic institutions (research), and development partners (joint learning).



69. **Sustainability of knowledge assets**

Knowledge sustainability is ensured through:

- Archiving all knowledge products in accessible formats with formal handover to the Government of Burundi (OBPE and IGEBU).
- Integration of technical manuals and O&M protocols into IGEBU and OBPE institutional systems and at the community level.
- Community-level knowledge retention through trained CCDRR committees and farmer cooperatives maintaining visual/oral materials.
- Regional platforms (NBI, IGAD, EAC) providing sustained dissemination channels beyond project closure.
- Academic publications ensuring permanent availability of evidence and lessons learned in the global adaptation knowledge base.

70. **Contingency arrangements if Components 1–2 are delayed:** Three measures will be taken: (i) Decoupled early deliverables — the Output 4.2 baseline knowledge products (replicable EWS protocol, FPIC/IPP toolkit, GAP-mainstreaming playbook) can be produced from Year-1 inputs and the AFCIA pilot evidence base without depending on Component 2 barrier-deployment data, and these are now front-loaded to Year 1–2; (ii) Stage-gated South–South engagement with the Nile Basin Initiative and East African Community is staged in two tranches — a Year-2 Approach and Design Exchange (transferable even without operational data) and a Year 3–4 Performance and Lessons Exchange (requires barrier-deployment evidence); if implementation lags by more than 6 months at the Mid-Term Review, the second tranche slides into a no-cost extension of up to 12 months under the AF MIE flexibility provisions; (iii) Implementation-lag triggers — if Component 2 procurement is more than 6 months behind plan at Month 18, the Project Steering Committee re-baselines the Component 3 timeline and reallocates up to 15% of the Component 3 budget to acceleration measures (parallel procurement, additional TA).

## J. Project consultations conducted

71. **Overview**

A comprehensive, gender-responsive stakeholder consultation process was conducted during both the concept note phase and the full proposal development phase. Consultations involved direct and indirect stakeholders, including government institutions, UN and international organizations, NGOs, vulnerable and marginalized groups, and local communities across the target province of Bujumbura. The process ensured that the views, concerns, and priorities of all stakeholder groups — particularly women, indigenous peoples (Batwa), and vulnerable communities — were integrated into the project design.

72. **Consultation objectives**

The consultation process aimed to:

- Identify climate vulnerabilities, adaptation needs, and priority interventions in target communes (Mpanda, Bubanza, Bukinanyana).
- Ensure project alignment with national strategies and ongoing initiatives to avoid duplication and maximize complementarity.
- Validate institutional arrangements and clarify roles and responsibilities among executing entities (OBPE and sub-contracted entity IGEBU).
- Incorporate the perspectives of vulnerable groups, including women, youth, and indigenous Batwa communities.
- Identify potential environmental and social risks and mitigation measures.
- Establish mechanisms for continued stakeholder engagement during project implementation.

73. **Types of consultations conducted**

**Concept note phase**: Consultations involved over 20 stakeholders representing local and regional government, technical experts, parliament, indigenous peoples, environmental protection organizations, local communities, women's organizations, agricultural sector, media, and research institutions:

- Three online workshops with representatives from local government, community members, technical experts, and women's representatives, moderated by a local NGO.
- 15 key informant interviews with local leaders, government officials, indigenous people's representatives, researchers, and district administrators.
- Two focus group discussions with farmers and pastoralists in the programme area, moderated by trained local facilitators.

**Full proposal phase:** More extensive consultations with 30+ stakeholder entities through in-person meetings, field visits, online consultations, and community-level engagements, as shown in the table below:

*Table 22 Overview of consultations conducted for the full proposal*

| Stakeholder category | Entities consulted | Consultation method | Key contributions to project design |
|---|---|---|---|
| Government institutions | MINEAGRIE; OBPE; IGEBU; Bujumbura Province Governor's Office | In-person meetings | OBPE confirmed as Executing Entity; IGEBU confirmed as technical partner for Component 1 (Outputs 1.1, 1.2, 2.1, 3.1); provincial-level support validated; institutional mandate delineation between IGEBU (monitoring) and OBPE (environmental regulation) |
| UN and international organizations | FAO, IFAD, UNDP, WFP, World Bank | Online and in-person | Complementarity confirmed (no geographic overlap in target Collines); lessons learned integrated — IFAD sustainability concerns informed exclusion of permanent irrigation canals; WFP FbF informed CAP/EAP protocol design (Output 1.2); World Bank NAGURA Colline-level coordination agreed |
| NGOs and civil society | UNIPROBA; OAP; Burundi Red Cross; Cordaid International; Amazi Water | In-person | UNIPROBA: Batwa representation, FPIC processes informing the IPPF/IPP (Annex 6); OAP: traditional adaptation practices informing community engagement; Red Cross: SEAP coordination informing Output 1.2; Amazi Water: solar-powered water lessons informing Output 4.1 |
| Community-level | Farmers, women's groups, youth associations, Batwa communities in Mpanda, Bubanza/Gihanga and Bukinanyana/Buganda; additional stakeholders from Ntahangwa/Mutimbuzi. | Field visits, focus group discussions (separate sessions for vulnerable/marginalized groups) | Climate impact priorities identified (floods: 20–30% crop losses; droughts: 25–40% yield reduction); priority interventions validated (flood protection, EWS, water infrastructure, agricultural training); gender-specific needs captured |

The participation breakdown was as follows:

| Commune | Stakeholder / vulnerable group | Participants | Share of participants |
|---|---|---|---|
| **Ntahangwa (Mutimbuzi) - additional** | **All participants** | **49 (40 M; 9 F)** | **100%** |
| | Youth (17-35) | 37 | 76% |
| | Batwa | 2 | 4% |
| | Persons with disabilities | 2 | 4% |
| **Mpanda & Bubanza (Gihanga)** | **All participants** | **40 (29 M; 11 F)** | **100%** |
| | Youth (17-35) | 30 | 75% |
| | Batwa | 2 | 5% |
| | Persons with disabilities | 2 | 5% |
| **Bukinanyana (Buganda)** | **All participants** | **28 (23 M; 5 F)** | **100%** |
| | Youth (17-35) | 21 | 75% |
| | Batwa | 2 | 7% |
| | Persons with disabilities | 3 | 11% |
| **ALL CONSULTATIONS** | **All participants** | **117 (92 M; 25 F)** | **100%** |
| | **Youth (17-35)** | **88** | **75%** |
| | **Batwa** | **6** | **5%** |
| | **Persons with disabilities** | **7** | **6%** |

During the full-proposal phase, one community-level stakeholder consultation workshop was held in Mpanda with 117 participants, including 92 men and 25 women (21% women). The consultation included stakeholders from the three target communes and other relevant local stakeholders. Mpanda was directly represented; Bubanza was represented through participants from Bubanza/Gihanga; and Bukinanyana was represented

through participants from Buganda, Buganda is a zone within Bukinanyana commune, and the consultation for Bukinanyana commune was held in Buganda zone. The participation breakdown above and Annex 3/Table 48 now clearly present the target-commune consultation locations, with Ntahangwa/Mutimbuzi flagged as additional non-target-commune stakeholder participation rather than evidence of target-commune coverage. Attendance sheets with full group- and sex-disaggregation are attached to Annex 3.

74. **Key consultation outcomes and integration into project design**

The table below summarizes how consultation outcomes were directly incorporated into specific project outputs.

*Table 23 Summary of consultation outcomes and incorporation into the project*

| Consultation outcome | Stakeholder source | Integrated into output(s) |
|---|---|---|
| Flood protection identified as top community priority; mobile barriers validated through AFCIA pilot experience | Community consultations; CTCN/AFCIA pilot | Output 4.1 — Mobile flood barrier deployment scaled from 1 site to 3 communes |
| Need for multi-channel EWS using SMS, radio, sirens; low literacy requires visual/oral formats | Community groups; IGEBU; Red Cross | Output 1.2 — Multi-channel CAP/EAP alert dissemination with gender-responsive, accessible communication |
| IGEBU technical needs for monitoring infrastructure and forecasting capacity. | IGEBU consultations | Output 2.1 — Expanded monitoring network; 24/7 monitoring room; geoportal; staff training |
| Batwa systemic exclusion from land, water access, and social services; FPIC required | UNIPROBA | All outputs — IPP with FPIC processes; explicit Batwa inclusion in site selection, governance mechanisms, and benefit-sharing |
| Women as primary food producers but with limited resource access; gender-sensitive design needed | Women's focus groups; UNIPROBA | All outputs — Gender Action Plan; 30%+ women's participation quota in CCDRR; women's leadership in deployment teams |
| Avoidance of permanent irrigation infrastructure (sustainability concerns raised by IFAD) | IFAD consultations | Output 4.1 — Temporary/mobile water harvesting, storage, and irrigation systems (not permanent canals) |
| Commune-level preparedness plans needed with simulation exercises | Community groups; Civil Protection; PFNPRGC | Output 3.1 — Commune preparedness/response plans with community training and simulation exercises |
| Concerns regarding flood barrier downstream impacts | Community consultations | Output 1.1 — Hydrodynamic modeling to analyze flood impacts and ensure barriers do not negatively affect neighboring communities |
| Youth: limited employment options; need for livelihood diversification | Youth focus groups | Output 4.1 — Youth inclusion in deployment teams and water management cooperatives |
| Need for evidence base to enable replication and national adoption | Government; development partners | Outputs 4.2, 4.3 — Systematic evidence generation, demonstration sites, and regional knowledge-sharing platforms |
| Integration with WFP FbF forecast triggers and Red Cross SEAP protocols | WFP; Red Cross; IGEBU | Output 1.2 — SEAP framework adopted and expanded; differentiated response protocols (humanitarian vs. infrastructure deployment) |

75. **Environmental and social risk inputs**

Community consultations identified potential concerns that informed the ESIA-ESMP (see ANNEX 4 — Environmental and Social Impact Assessment and Environmental and Social Management Plan (ESIA-ESMP)).

- Flood barrier and water storage design may have downstream impacts — mitigation: hydrodynamic modeling under Output 1.1 to analyze impacts before deployment.
- Risk of vandalism of barriers and solar-powered infrastructure — mitigation: awareness campaigns, community ownership, and equipment protection (containers, fencing).
- Unclear roles, responsibilities, and ownership of technologies — mitigation: comprehensible roles/responsibility matrices with equitable benefit distribution developed under Outputs 3.1 and 4.1.
- 40% of population experiencing climate-related stress — mitigation: psychosocial support considerations integrated into community engagement.

76. **Ongoing stakeholder engagement during implementation**

The project will maintain continuous stakeholder engagement:

- **Project Steering Committee:** meetings with OBPE, IGEBU, Red Cross, key ministries, and community/vulnerable group representatives (including women, youth, Batwa).
- **Community-level consultations**: to verify site selection and co-design interventions for Outputs 4.1 (barrier placement), 3.1 (preparedness plans), and 1.1 (risk assessment validation).

- **Grievance Redress Mechanism**: gender-responsive, culturally appropriate, accessible to all stakeholders — multiple entry points (verbal, SMS, written) including for illiterate stakeholders.
- **Coordination with development partners**: regular meetings with World Bank (NAGURA, Urban Resilience), UNDP, FAO, IFAD, WFP to ensure continued project complementarity.
- **FPIC processes**: ongoing for all interventions affecting Batwa settlements.

77. **Evidence of consultation**

Detailed consultation records, including attendance sheets, photographs, and minutes, are maintained and available for review. Summary consultation tables with stakeholder names, positions, dates, objectives, outcomes, and conclusions are provided in ANNEX 3: Overview of project stakeholders and consultations conducted.

## K. How the project draws on multiple perspectives on innovation

78. The project integrates four complementary innovation perspectives — community-based, scientific-technical, development partner, and pilot-validated — ensuring the adaptation system responds to real vulnerabilities, capacities, and needs of Burundi's most climate-vulnerable populations.

79. **Community innovation perspective**

Separate consultations with smallholder farmers, women's groups, youth associations, and Batwa communities shaped the project around their lived experience of floods and droughts. Farmers identified dual-purpose barriers (flood protection + irrigation) as addressing both flood losses (20–30% crop destruction) and drought vulnerability (25–40% yield reductions) and provided local knowledge on flood patterns and seasonal water needs informing Outputs 1.1 and 4.1. Women highlighted exclusion from technical training despite providing most agricultural labor — informing the gender-responsive design of Outputs 1.2, 3.1, and 4.1 (50% women in deployment teams). UNIPROBA identified Batwa systemic exclusion, directly informing the Indigenous Peoples Plan. Participatory risk mapping integrating local knowledge will continue throughout implementation under Output 3.1.

80. **Scientific and technical innovation perspective**

IGEBU provided expertise identifying critical monitoring gaps — sparse station networks, limited forecasting tools, absence of standardized alert protocols — that shaped Component 1's innovation in climate information systems (Outputs 1.1, 1.2, 2.1). Hydrodynamic modeling expertise (CHIRPS/IMERG satellite data) enables climate-scenario-based flood simulations under Output 1.1, while WMO-aligned methodologies inform the monitoring expansion under Output 2.1.

81. **Development partner innovation perspective**

WFP/Red Cross provided the SEAP framework — the project innovates by extending forecast-based triggers from humanitarian response to infrastructure deployment (Output 1.2). IFAD's sustainability lessons on permanent irrigation failure directly informed the innovation decision to use temporary/mobile water systems under Output 4.1. UNDP's community DRM methodology and 30-station monitoring foundation inform Outputs 2.1 and 3.1, while World Bank coordination ensures complementary upstream-downstream integration.

82. **Pilot-validated technology innovation perspective**

The AFCIA pilot at Gahwazi/Mpanda (2023–24) validated the core technological innovation: barriers achieved 1.5–2-hour deployment, effective 50 cm flood defense, dual-purpose water storage/irrigation functionality, high community acceptance, and successful EWS-to-deployment linkage. This project moves from AF innovation Stage 2 (test/learn) to Stage 3 (scale/share) — scaling from 1 pilot site to 3 communes (6.5 km of barriers, 598 hectares (ha) protected), while systematically generating the evidence base (Output 4.2) and establishing demonstration and knowledge-sharing platforms for replication (Output 4.3).

83. **Integration across perspectives**

These perspectives combine into three innovation dimensions mapped to the ToC, as shown in the table below:

*Table 24 Overview innovation dimension*

| Innovation dimension | Key elements | Outputs | AF Outcome |
|---|---|---|---|
| Community innovation | Participatory risk mapping; community deployment teams; gender-responsive communication; Batwa FPIC | 1.1, 1.2, 3.1, 3.2, 4.1 | Outcomes 1, 3 |
| Technological innovation | Dual-purpose mobile barriers; hydrodynamic modeling; expanded monitoring; CAP/EAP protocols | 1.1, 1.2, 2.1, 4.1, 4.2 | Outcomes 1, 2, 8 |
| Institutional innovation | Forecast-to-action governance; IGEBU-community linkage; inclusive disaster committees; evidence-based replication | 1.2, 3.1, 3.2, 4.2, 4.3 | Outcomes 2, 3, 8 |

# L. Justification for funding requested

84. **Full cost of adaptation reasoning and self-sufficiency**

The project has been designed to deliver its outcomes and outputs with Adaptation Fund support alone, ensuring self-sufficiency. While the project operates in parallel with (coming) other adaptation initiatives in Burundi, it fills critical gaps that no other initiative addresses and achieves its objectives independently. The total funding requested (US$ 5,000,000) represents the full cost of adaptation — the incremental investment needed to shift from a baseline of reactive, fragmented, and inadequate climate response to an anticipatory, integrated, and technology-enabled adaptation system for 358,116 vulnerable people (direct beneficiaries).

85. **Baseline scenario vs. adaptation scenario**

The table below presents a systematic comparison of baseline conditions (without the AF project) and the enhanced adaptation scenario (with the AF project), organized by project outputs.

*Table 25 Overview of comparison of baseline conditions (without the AF project) and the enhanced adaptation scenario (with the AF project), organized by project outputs*

| Output (per ToC) | WITHOUT project — baseline scenario | WITH AF project — adaptation scenario | Adaptation additionality |
|---|---|---|---|
| **1.1** — Geospatial hazard maps & risk profiles | Limited understanding of how climate change affects target communities; no gender-disaggregated climate vulnerability analysis; planning based on historical patterns rather than projected scenarios | Comprehensive climate change vulnerability assessments for 1 province and 3 communes covering flood/drought risks under multiple climate scenarios (RCP 4.5/8.5); gender-sensitive vulnerability analysis; geospatial mapping of high-risk areas guiding targeted investments | Enables climate change-specific vulnerability analysis as basis for designing EWS, preparedness planning, and risk reduction measures. |
| **1.2** — EWS dissemination & communication | Inadequate alert dissemination (only ~20% population coverage); no Common Alert Protocol; no institutional responsibilities at provincial/communal levels; 5-minute delays inadequate for flash floods | CAP piloted for standardized alerts; Simplified EAP implemented defining forecast-based triggers including for barrier deployment; designated responsibilities at provincial/communal levels; multi-channel dissemination | Fills critical gaps in dissemination, enabling communities to anticipate and prepare rather than merely react; forecast-to-action linkage transforms warnings into anticipatory adaptation |
| **2.1** — Climate monitoring network & forecasting capacity | Sparse monitoring network (10 hydrological, 3 meteorological stations for entire province); limited real-time flood/drought forecasting; insufficient modeling tools; no designated personnel at provincial/communal levels | Expanded monitoring network with additional automatic stations in underserved communes; operationalized IGEBU monitoring room with 24/7 capacity; specialized forecasting software; trained provincial/communal focal points | Establishes technical infrastructure and trained personnel for detecting intensifying climate hazards; monitoring designed to capture conditions projected under climate change scenarios |
| **3.1** — Commune preparedness/response plans | Disaster response reactive and insufficient for escalating climate hazards; communal DRR committees lack climate-specific training; women excluded from emergency planning | Climate-informed preparedness plans in 3 communes accounting for intensified floods/droughts; designated personnel for alert interpretation and emergency coordination; gender-responsive community training; simulation exercises under future climate scenarios | Training on climate information interpretation and forecast-based action directly enhances adaptive capacity; gender-responsive approach ensures women participate in preparedness |
| **3.2** — CCDRR strengthening | CCDRRs exist in the target communes but have limited climate-specific training, resources and decision-making capacity, with weak coordination between local actors and national forecasting and response institutions. | CCDRRs in all three target communes strengthened through climate-risk and forecast interpretation training and improved coordination with commune administrations, IGEBU, Civil Protection and the Burundi Red Cross. | Strengthens local institutional ownership and capacity to translate climate information and preparedness plans into coordinated adaptation action. |

| | | | |
|---|---|---|---|
| **4.1** — Mobile flood barriers & integrated water systems | Communities rely on inadequate conventional response (sandbags, evacuations); no flood protection infrastructure; no water storage; no irrigation capacity; separate investments required for flood and drought | Mobile water-filled flood barriers deployed across 3 communes (6.5 km); rapid deployment within hours of forecast; dual-purpose: flood protection during rainy season + water harvesting/storage/irrigation during droughts; proven technology scaled from AFCIA pilot | Mobile barriers are adaptation-specific technology for climate change-induced flood risk; dual flood-drought function delivers two sets of adaptation benefits for one infrastructure investment; innovation turns climate hazard (excess water) into adaptation resource (stored water) |
| **4.2** — Evidence base produced & disseminated | Adaptation solutions remain isolated without systematic documentation; limited pathways for scaling as climate change intensifies across region | Comprehensive implementation documentation: technical manuals, cost-benefit analysis, community engagement strategies; adaptation knowledge products; policy briefs; academic publications | Systematic documentation amplifies climate resilience impact beyond target communes; reduces barriers to adoption regionally |
| **4.3** — Demonstration sites & knowledge-sharing platforms | No resources exist for rigorous documentation or knowledge dissemination; countries independently struggle with similar challenges without access to proven solutions | Demonstration events for government and development partners; partnerships with NBI, IGAD, EAC; replication guidance; South-South learning exchange | Partnerships create sustained mechanisms for knowledge exchange as climate change progresses; accelerates adaptation action regionally |

86. **Adaptation additionality**

The project demonstrates climate change additionality — activities and investments that would not occur under baseline development scenarios because they specifically address climate change impacts:

- **Climate-specific vulnerability and risk assessment**: Vulnerability assessments incorporate climate change scenarios (RCP 4.5 and RCP 8.5) to project future flood and drought patterns rather than relying solely on historical data, enabling anticipatory adaptation (Output 1.1).
- **Addressing intensifying climate extremes**: The project responds to documented trends of increasing frequency and intensity of floods and droughts. Burundi is experiencing shifts in rainfall seasonality (wet season now starts later in October and ends sooner in April), creating a dual hazard of more severe droughts and more destructive flooding. Mobile barriers and integrated water management specifically address this climate-driven variability (Output 4.1).
- **Innovative adaptation technologies**: Mobile flood barriers represent adaptation-specific technology — rapidly deployable when forecasts indicate imminent high-intensity rainfall, repositionable as risks evolve, and repurposable for water storage during droughts. Traditional permanent infrastructure cannot provide this dual flood-drought function or adapt to changing rainfall patterns (Output 4.1).
- **Forecast-based early action**: The project establishes systematic forecast-to-action linkages where climate information triggers anticipatory protective measures. Component 1 (climate monitoring and forecasting) enables Component 2 (barrier deployment based on early warnings) — an anticipatory approach that does not exist in the baseline scenario (Outputs 1.2, 2.1, 3.1, 4.1).
- **Gender-responsive climate adaptation**: Climate change intensifies vulnerabilities for women who provide most agricultural labor yet face systematic exclusion from adaptation opportunities. The gender-responsive approach ensures adaptation benefits reach those most vulnerable (all outputs).

87. **Why AF funding is essential**

Without AF support, Burundi lacks both financial resources and technical capacity to address these adaptation gaps:

- Government budgets prioritize immediate service delivery over anticipatory climate analysis; national institutions lack specialized climate modeling expertise (Outputs 1.1, 2.1).
- Early warning coverage would remain limited to major urban centers, leaving rural communes vulnerable to intensifying flash floods (Output 1.2).
- Communities would continue responding to disasters reactively rather than anticipatorily, and vulnerable populations — especially women — would remain excluded from adaptation decision-making (Outputs 3.1, 3.2).
- Neither government nor farmer resources are sufficient to invest in flood protection or water storage infrastructure; traditional donor-funded irrigation does not address flood protection simultaneously (Output 4.1).
- Successful adaptation innovations would remain undocumented and confined to implementation sites with no replication pathways (Outputs 4.2, 4.3).

88. **Integration and cost-effectiveness**

The project delivers superior cost-effectiveness through:

- **Dual-purpose technology**: The same mobile barriers provide both flood protection and drought adaptation — 40–60% more cost-effective than separate flood and irrigation infrastructure.
- **Flexible, scalable innovation**: Mobile barriers cost ~30% less than permanent infrastructure while offering greater flexibility for changing climate conditions; barriers can be repositioned as risks evolve.
- **Proven technology reduces risk**: Scaling the validated AFCIA pilot (2023–24) minimizes technology risk; community operation reduces long-term costs versus engineer-dependent permanent infrastructure.
- **Systems approach creates synergies**: Integration of climate information (Component 1), infrastructure (Component 2), and knowledge management (Component 3) creates synergies exceeding standalone component impacts — early warnings enable optimal deployment; trained communities maximize effectiveness; documented lessons accelerate replication.

# M. Project sustainability

89. **Overview.**

The project has been designed with sustainability as a core principle, ensuring that adaptation benefits continue beyond the implementation period and create pathways for replication and scaling. Sustainability is addressed across all five dimensions required by the Adaptation Fund — institutional, financial, technical, social, and environmental — and embedded in each output through institutional ownership, capacity building, local maintenance systems, policy integration, and knowledge dissemination. Given the innovative nature of the mobile flood barrier technology, the sustainability design pays particular attention to the physical lifecycle of the barriers themselves, including ownership, storage, transport, filling, and long-term maintenance.

90. **Output-Specific Sustainability**

The table below provides an overview of sustainability needs, measures, and institutional responsibilities per output.

*Table 26 Overview of sustainability needs, measures, and institutional responsibilities per output.*

| Output | Sustainability needs | Sustainability measures | Responsible institutions |
|---|---|---|---|
| 1.1 — Geospatial hazard maps & risk profiles | Update vulnerability and risk assessments every five years to reflect evolving climate scenarios; maintenance of GIS databases and hydrodynamic models | Technical capacity built among IGEBU and provincial/communal staff to update assessments; documented methodologies and technical manuals create permanent knowledge resources; risk maps integrated into existing institutional databases and communal development planning cycles | IGEBU (technical updates, modeling); Provincial and communal authorities (integration into planning cycles) |
| 1.2 — EWS dissemination & communication | Continued operation of CAP and multi-channel alert networks; updating of Early Action Protocols; training refreshers for focal points; continued operation of CBEWS | Clear institutional responsibilities designated at provincial/communal levels for alert generation, interpretation, dissemination, and coordination; forecast-to-action coordination protocols formalized between IGEBU and emergency response actors; gender- and vulnerable groups-responsive communication approaches established; multiple communication channels reduce dependency on single technology | IGEBU (alert generation and forecasting); Provincial/communal focal points (local dissemination); Civil Protection and Red Cross (emergency response coordination); CCDRR committees (community-level dissemination) |
| 2.1 — Climate monitoring network & forecasting capacity | Equipment maintenance, calibration, and repair; data processing and server services; geoportal hosting and maintenance; spare parts procurement; regular training updates for technical staff | IGEBU assumes ownership of climate monitoring and forecasting infrastructure as core institutional function; operationalized monitoring room with 24/7 capacity integrated into IGEBU's core functions; multi-year budget commitments (2028–2032) to be formalized during implementation; trained IGEBU personnel with specialized forecasting capacity; provincial/communal focal points designated and trained | IGEBU (equipment operation, maintenance, forecasting, data management); MINEAGRIE (annual budget allocation); Provincial/communal focal points (local data analysis and interpretation) |
| 3.1 — Commune preparedness/response plans | Regular updating of commune preparedness and response plans; continued training and capacity refreshers; | Target communes integrate DRR responsibilities into strengthened CCDRR committees with formalized roles in communal plans; trained emergency response actors form permanent technical resource base; clear institutional positions | Communal DRR committees/CCDRR (plan implementation, community coordination); Commune administrators (official |

| | | | |
|---|---|---|---|
| | annual simulation exercises and drills; maintenance of coordination mechanisms and gender/vulnerable groups outreach | and responsibilities designated; coordination protocols established; gender-sensitive communication materials developed in local languages | oversight, local development plan integration); Provincial coordination units; Civil Protection and Red Cross (emergency response) |
| 3.2 — CCDRR strengthening | Continued functioning of strengthened CCDRRs; refresher capacity building; maintenance of local coordination arrangements. | CCDRR roles embedded in communal preparedness and development planning; coordination arrangements documented; trained members provide a continuing local resource for climate-informed preparedness and response. | CCDRRs; commune administrations; OBPE; Civil Protection/PFNPRGC |
| 4.1 — Mobile flood barriers & integrated water systems | Regular maintenance of barriers (puncture repair, valve/fitting replacement); maintenance of storage facilities; spare parts procurement; refresher training for deployment teams; transport and filling logistics; maintenance of water storage integrity; maintenance of irrigation systems (hoses, pumps, filters) | O&M protocols linking forecast-based triggers to deployment decisions with decision trees; gender-balanced community-based deployment teams trained; storage facilities established in each target zone using delivery containers; barriers deflatable and storable; farmer cooperatives trained in irrigation operation; water allocation protocols for equitable drought distribution; formal asset ownership transferred to Government of Burundi (OBPE) | OBPE (overall Component 2 coordination, maintenance oversight, exit strategy); Communal DRR committees and deployment teams (barrier operation, deployment, routine maintenance); Commune administrators (local budget allocation); Farmer cooperatives (day-to-day irrigation operation, water allocation) |
| 4.2 — Evidence base produced & disseminated | Continued knowledge dissemination and learning exchange; updating technical manuals based on lessons learned | Comprehensive implementation documentation (technical manuals, cost-benefit analysis, community engagement strategies, O&M protocols); knowledge products archived in accessible formats with formal handover to Government | OBPE (documentation coordination, national dissemination); IGEBU (technical documentation, climate service knowledge) |
| 4.3 — Demonstration sites & knowledge-sharing platforms | Regional knowledge-sharing platform participation; updating of replication guidance based on emerging lessons | Technical manuals provide step-by-step guidance, technical specifications, and proven implementation models; project knowledge products enable regional replication; partnerships with NBI, IGAD, EAC create sustained knowledge exchange mechanisms beyond project funding | OBPE and PFNPRGC (national DRM coordination and scaling); IGEBU and PFNPRGC (coordinate identification of priority replication sites); Civil society and development partners (replication in other contexts) |

91. **Institutional Sustainability**

Institutional sustainability is ensured through anchoring project assets and functions within existing national, provincial, and community-level structures.

At the national level, IGEBU assumes ownership of all Component 1 climate monitoring and forecasting infrastructure as a core institutional function, with a commitment to maintain operational budgets through annual Ministry allocation. OBPE retains oversight of all Component 2 physical assets — mobile barriers and irrigation systems — with responsibility for exit strategy implementation.

At the provincial and communal level, target communes integrate DRR responsibilities into strengthened CCDRR committees with formalized roles in communal plans. Clear institutional positions and responsibilities are designated at provincial and communal levels for alert generation, interpretation, dissemination, and emergency coordination.

At the community level, gender-balanced deployment teams and farmer cooperatives create permanent local technical capacity for barrier operation and irrigation management. Training-of-trainers approaches ensure knowledge transfer continues beyond the project. To mitigate personnel turnover risks, multiple staff members are trained per institution, and all procedures are documented in technical manuals.

**OBPE capacity in the three target communes:** OBPE currently has dedicated staff in place in each of the three target communes. Specifically, each commune has:

- A full-time Communal Officer responsible for coordinating all project activities at the commune level;
- A local technical team of 2–3 staff per commune, covering environmental monitoring, community mobilization, and data collection;
- Regular support from the provincial OBPE team, providing technical supervision, monitoring and evaluation, and administrative assistance; and
- Back-up support from central-level OBPE technical teams when and where needed.
- This structure ensures that implementation capacity is embedded at the local level, with technical and administrative support from higher levels.

**Comparison with the AFCIA Pilot Phase**

The current capacity represents an improvement over the pilot phase. During the AFCIA pilot, OBPE had only one focal point based at the central level, as implementation was led by a different organization. Key functions, including monitoring and evaluation, financial management, and social safeguards, were centralized at the national level, with very limited presence or capacity at the communal level.

In contrast, the current project has a decentralized operational structure, with staff directly within the target communes. This shift reduces coordination bottlenecks and enables more responsive implementation on the ground.

**Capacity-Strengthening Measures Built Into the Project**

The proposal contains capacity-strengthening measures for OBPE spread across Component 1 (Output 2.1, 3.1 and 3.2), Component 2 (4.1), and Component 3 (Outputs 4.2, 4.3), as well as cross cutting project management arrangements. Below is a complete synthesis, organized by theme.

1. Institutional and Coordination Capacity (Output 2.1 — Component 1)

Although Output 2.1 primarily targets IGEBU, it directly builds OBPE's capacity to coordinate at the communal level:

- Designation and training of provincial and communal focal points for data analysis, alert interpretation, and institutional responsibility for climate information response, bridging the gap between national forecasting and local OBPE coordination;
- Establishment of forecast-to-action coordination protocols between IGEBU and emergency response actors (including OBPE), with clear institutional responsibilities formalized at provincial and communal levels;
- OBPE's role in receiving and acting on IGEBU's real-time forecasts is embedded in these protocols, equipping OBPE staff to trigger barrier deployment decisions based on climate data.

2. Community Mobilization and Preparedness Planning Capacity (Output 3.1 and 3.2 — Component 1)

This is the most direct OBPE capacity-strengthening output in the proposal:

- Training of emergency response actors, including CCDRR members, commune administrators, and Civil Protection personnel led by OBPE Communal Officers, covering:
    - Climate change impacts and intensifying flood/drought risks;
    - Interpretation of climate forecasts and Early Action Protocol (EAP) activation;
    - Gender-sensitive emergency response;
    - Coordination mechanisms linking forecast receipt to emergency action;
- Development of commune preparedness and response plans in Mpanda, Bubanza, and Bukinanyana — OBPE Communal Officers co-lead this process with commune administrations, directly building their planning and facilitation skills;
- Community-level training delivery — OBPE local teams are expected to participate in trainings on disaster risk, preparedness, and response, including for women's groups, farmer cooperatives, youth, elderly, disabled, and Batwa communities, using simplified visual and oral materials developed in local languages (Kirundi);
- Inclusive simulation exercises — OBPE coordinates annual simulation drills testing preparedness and response plans under projected climate change scenarios, building practical operational capacity and generating exercise evaluation reports.

3. Technical Barrier Operation and Maintenance Capacity (Output 4.1 — Component 2)

This is the core operational capacity needed for OBPE to execute Component 2 on the ground:

- Development of Operation and Maintenance (OM) protocols and plans, with OBPE as the responsible institutional owner linking forecast-based triggers to deployment decisions, safety protocols, deflation and storage procedures, and record-keeping systems;
- Training of gender-balanced community-based deployment teams — OBPE oversees and supports training in rapid barrier installation and operation, team composition, role assignments, chain of command, and safety protocols;

- Annual certified simulation drills (two per commune: one dry-run, one with controlled water release), with a 20-minute breach-repair benchmark required for community certification — OBPE coordinates this certification process;
- Irrigation system training — OBPE-supported training for farmer cooperatives and associations in operating and maintaining mobile irrigation systems, water management practices, and record-keeping for irrigation scheduling and equitable water allocation;
- OBPE as contracting authority — OBPE signs the standing fuel call-off contract for pump fuel for all three communes, requiring OBPE central/provincial staff to manage procurement and supply chain oversight;
- Formal asset ownership transfer — all Component 2 physical assets (barriers, irrigation systems, storage facilities) are formally transferred to the Government of Burundi through OBPE at project closure, with OBPE assuming maintenance oversight and exit strategy implementation.

4. Knowledge Management and Documentation Capacity (Outputs 4.2 and 4.3 — Component 3)

These outputs build OBPE's institutional knowledge capacity:

- OBPE leads documentation and dissemination of the OM Manual (in French and Kirundi), the lessons learned compendium, and cost-benefit analysis — directly building OBPE's ability to capture and communicate implementation evidence;
- A Knowledge Management and Communications Officer embedded in the PMU (OBPE) leads KM strategy implementation across all components, supported by the Project Coordinator and M&E Officer;
- Formal knowledge archiving and handover — all technical manuals, OM protocols, and knowledge products are archived in accessible formats and handed over to OBPE at project closure, creating a permanent institutional resource base;
- Training curriculum for institutional staff and participation in regional South-South learning exchanges (Nile Basin Initiative, IGAD, EAC) build OBPE's capacity for replication and scaling of the technology beyond the project.

5. Cross-Cutting Institutional Capacity (PMU and Project Management)

The project provides dedicated consultancy services for capacity development and support to the M&E, ESMP, Gender, and Finance Officers of the OBPE-hosted PMU. These services support the development and implementation of data gathering and monitoring plans, environmental and social management monitoring, gender mainstreaming, and financial management and procurement — all in line with UNEP and Adaptation Fund requirements. Full documentation of procedures in technical manuals ensure that capacity is institutionalized and resilient to staff turnover.

92. **Financial Sustainability**

Financial sustainability represents the most critical risk area, as identified during the technical review. The project addresses this challenge through several reinforcing mechanisms.

Government and community-endorsed Operation & Maintenance (O&M) Plans will include concrete annual budget lines and responsibilities for asset maintenance, barrier and irrigation O&M. Multi-year budget commitments will be formalized during project implementation for continuity of climate services post-project, including identifying private-sector investment potential for replication and scale-up.

The dual-purpose technology itself significantly reduces the financial burden of sustained operation. By combining flood protection and irrigation in a single system, the barriers deliver an estimated 40–60% cost savings compared to investing in separate infrastructure for each function. Mobile barriers cost approximately 30% less than permanent infrastructure, and community-based operation eliminates dependency on expensive external engineering services. The deflatable, storable design further reduces long-term maintenance costs compared to permanent structures that require continuous upkeep.

Critically, the irrigated agriculture enabled by the barriers generates household income that can contribute to sustained O&M financing. Targetted farmer cooperatives are expected to have increased yield improvements through dry-season irrigation, potentially partly self-financing ongoing maintenance costs through increased agricultural productivity.



93. **Technical Sustainability**

Technical sustainability depends on selecting technologies that communities can realistically operate and maintain over the long term, and on ensuring that the practical requirements of barrier ownership, storage, transport, and filling are addressed from the outset.

**Technology Design for Local Capacity:** The project prioritizes simple, locally maintainable technologies. The mobile flood barriers are composed of EPDM synthetic rubber — a durable, UV-resistant, and water-resistant material with an expected lifespan exceeding 20 years. Each 5-metre barrier unit weighs approximately 55 kg when empty, allowing two people to carry and position it without heavy machinery. Gravity-fed irrigation systems are used where topography permits, reducing dependency on pumps and moving parts. Where pumping is necessary, mobile solar-powered systems are deployed.

**Quantified annual O&M cost and financing plan:** A lifecycle O&M cost analysis has been prepared and will be added as Annex 9 — O&M Cost Model. Provisional estimates for the full 6.5 km system across the three communes: spare parts and EPDM patch kits USD 8,500/yr (2–3% membrane replacement/yr based on SLAMDAM manufacturer-recommended replacement cycle and Kenya/Pakistan deployment data); pump fuel and maintenance USD 14,200/yr (6–10 deployments/yr × 457 L/event × USD 1.45/L + 10% pump servicing); transport and storage-facility upkeep USD 6,800/yr; refresher training and drills (2/yr per commune) USD 11,500/yr; CCDRR/deployment-team stipends USD 28,800/yr (see CR8). Total annual O&M ≈ USD 69,800/yr across the three communes (≈ USD 23,300 per commune). Financing plan: (i) Year 4 (project closure) — project covers the first 12 months of O&M; (ii) Years 5–7 — Government of Burundi commitment to integrate an annual line item of FBu 200 million (≈ USD 67,000) into the OBPE / MINEAGRIE recurrent budget, pre-negotiated and reflected in a Memorandum of Understanding to be signed before Year-1 close as a disbursement-linked condition; (iii) Years 5+ — a cooperative-level Water-Use Fee may be tested with irrigation beneficiaries to fund commune-level routine maintenance; contribution expected to be limited given the small irrigated area (≈3.5 ha).

**Composition of community-based deployment teams:** Each commune fields three Deployment Teams (one per 2 km of barrier), each composed of 12 members (minimum 4 women, including 1 Site Commander), drawn from the CCDRR community-volunteer roster, plus 2 paid Logistics Officers per commune (CCDRR staff). Total per commune: 36 community volunteers + 2 paid staff. Institutional status: CCDRR-affiliated volunteers under a formal Volunteer Agreement with per-diem and burden-mitigation compensation (see CR8). Minimum personnel required to deploy 2 km within the 1.5–2 h window: 24 members (4 m/min/person assembly rate per the AFCIA pilot benchmark, plus 30 pump operators); the 36-member roster provides 50% redundancy for absences and illness. Roles, training requirements, and call-out protocol are detailed in the O&M Plan template.

**Barrier lifespan — 20+ vs 40+ years:** The manufacturer (SLAMDAM B.V. / WaveSave) cites a 40-year membrane lifespan under controlled storage and proper handling, supported by independent confirmation from field deployments (e.g. SNV Kenya/Laikipia 2024; Reuters 2021; Africanews 2024). The proposal deliberately uses 20+ years as a conservative planning assumption reflecting (i) UV and thermal stress in tropical conditions exceeding the Dutch test environment, (ii) additional puncture risk from agricultural debris in the Imbo basin, and (iii) the fact that no SLAMDAM deployment globally has yet reached the 20-year in-service mark. The 20-year horizon is used for the lifecycle cost analysis and for the cost-effectiveness comparison; the conservative assumption protects the cost-benefit case under adverse conditions.

**Evidence of sustained community O&M discipline and pre-negotiated O&M cost-sharing:** Pilot evidence (2022–2024): the APRN-BEPB monitoring reports document that after CTCN/AFCIA support closed in May 2022, the Gahwazi/Mpanda community continued routine inspection (monthly), dry-season storage and minor repairs through the local cooperative without external support — verified during the FDP scoping mission (April 2026). Pre-negotiated O&M cost-sharing: a confirmed agreement between UNEP, OBPE, MINEAGRIE and the three communal administrations will be drafted in Q1 Year 1, signed before the end of Year 1, and treated as a disbursement-linked condition for Year 2 funds, covering the FBu 200 million/yr recurrent-budget commitment.

**OBPE capacity in the three target communes:** OBPE currently maintains Provincial Environmental Offices in Bubanza and Cibitoke (covering the three target communes), with 14 technical staff across the two provincial offices (10 environmental officers, 2 GIS/M&E, 2 administrative). During the AFCIA pilot only 2 OBPE staff were operationally engaged at the single Mpanda site. To bridge the capacity gap at three-commune scale, the project will: (i) use the currently existing OBPE Communal Officers; (ii) deliver a structured capacity-strengthening programme for OBPE provincial staff (≥5 days/yr per officer on barrier O&M, FPIC, GAP/ESMP and EWS protocols); and (iii) co-locate a secondment from IGEBU for the climate-information/EWS functions. A detailed staffing plan is added to Section III.A.

Trained technical capacity spans three levels: IGEBU personnel receive specialized forecasting training; provincial and communal focal points are trained in data analysis and alert interpretation; and community deployment teams are trained in barrier installation, maintenance, and repair. Documented O&M protocols include decision trees for activation, installation procedures, inspection and maintenance checklists, deflation and storage procedures, and record-keeping systems.

**Barrier Ownership and Legal Transfer:** Formal ownership of the mobile flood barriers and irrigation equipment transfers to the Government of Burundi through OBPE upon project completion. During Years 2–3, operational responsibility is progressively transferred to communal DRR committees and deployment teams, establishing clear chains of custody between the national owner (OBPE), the communal custodian (commune administrators), and the day-to-day operators (CCDRR deployment teams and farmer cooperatives). This layered ownership model ensures both legal accountability at the government level and practical operability at the community level. The AFCIA pilot demonstrated that this arrangement is feasible — the pilot barriers are currently operated independently by the Mpanda community with government oversight.

**Storage and Inventory Management:** When not deployed, each barrier unit is deflated, folded, and rolled into its compact transport box for storage. The project establishes dedicated storage facilities in each of the three target communes, repurposing the shipping containers used for barrier delivery as permanent, weather-protected storage buildings. This approach eliminates the need for constructing separate storage infrastructure. Storage facilities must be sited on higher ground safe from flooding and accessible to road transport, while avoiding direct and prolonged exposure to sunlight despite the barriers' UV resistance. A spare parts inventory — including replacement sealing plugs (required every 10 years), valve fittings, repair kits with EPDM primer, and Vaseline for rubber plug maintenance — will be maintained at each storage location. OBPE assumes oversight of inventory management, while communal deployment teams conduct quarterly inspections and report on barrier condition and spare parts stock levels.

**Transport and Rapid Deployment Logistics:** Timely deployment depends on the ability to transport barriers from storage facilities to deployment sites within the 2 hours window between early warning receipt and anticipated flood onset. The project addresses this by positioning storage containers at strategic locations within each commune, minimizing transport distances to the five identified river deployment sites. Each barrier unit's compact transport box is designed for loading onto standard vehicles or available in the communes. The O&M plan specifies transport arrangements — including vehicle availability agreements with commune administrations — that are formalized during Year 1 and tested through annual simulation exercises. The AFCIA pilot confirmed that community teams can deploy barriers within approximately two hours of receiving a warning.

**Filling and Water Source Management:** Deploying the barriers requires filling each unit with water using a pump and connected hoses — both compartments of each unit must be filled simultaneously to a height of approximately 67 cm. Each meter of barrier holds approximately 1,700 liters, meaning the full 6.5 km deployment requires access to substantial water volumes at or near the deployment sites. The project addresses this by siting barriers along the Rusizi River and its tributaries, where water sources for filling are immediately adjacent to deployment locations. Motorized pumps, hoses, and fittings are included in the project procurement (Output 4.1) and stored alongside the barriers. The O&M plan includes protocols for pump maintenance, hose inspection, and ensuring fuel or power availability for pumping equipment during the flood season. Filling and sealing procedures — including the critical step of allowing air to escape before sealing plugs — are covered in hands-on deployment training and documented in locally adapted user manuals based on the manufacturer's protocols.

**Fuel management protocol:** The full fuel management protocol will be detailed in the O&M Protocol (Output 4.1, Year 1) and in the ESMP. Responsibility: the CCDRR Logistics Officer in each commune monitors fuel reserves monthly during the dry season and weekly during the flood season; replenishment is triggered when the stock falls below 120% of the volume required for one full 6.5 km deployment (≈457 L based on the pump specifications (see annex 2). Fuel is procured through a pre-qualified national supplier under a standing call-off contract signed in Year 1 with OBPE as the contracting authority. AFCIA-pilot finding: fuel availability was not a binding constraint at the 200 m single-site scale, but at three-commune scale this risk increases materially, hence the call-off contract and pre-stocked reserves.

**Solar-pump alternative — technical feasibility:** A high-flow solar-pump feasibility check was performed during proposal design. Filling 11,050 m³ within the 1.5–2-hour emergency window requires a sustained pumping rate of ~5,525–7,367 m³/h across the system. The largest commercially available solar surface pumps deliver ~9 m³/h per unit (e.g. ennos 1.5 HP Sunlight pump at 147 L/min; LARENS 600 W at 90

L/min), implying more than 600 solar pumps would be required versus a fleet of ~60 petrol pumps (each ~98 m³/h). Solar filling is further constrained by the fact that flood events typically occur under low-irradiance storm conditions. Petrol pumps are therefore the only technically viable option for the emergency-fill window. Solar-powered pumps will be used for dry-season irrigation, where flow requirements are far lower, and the petrol fleet is dedicated exclusively to the 1.5–2-hour deployment window. Lifecycle GHG emissions of the petrol fleet are negligible against the adaptation benefit.

**Maintenance and Repair:** Post-deployment maintenance involves draining, cleaning (using household detergent), inspecting for damage, drying, and re-storing the barriers. Rubber sealing plugs require greasing with Vaseline after each use to prevent desiccation. Small punctures can be repaired immediately using the emergency repair kits provided, followed by treatment with EPDM primer after use. The quarterly inspection protocol covers barrier membrane integrity, valve and fitting condition, transport box condition, pump and hose functionality, and spare parts stock. Repair beyond the community team's capacity triggers escalation to OBPE, which maintains a relationship with the technology supplier for technical support and specialized component procurement.

The AFCIA pilot in Mpanda-Gahwazi (2023–24) validated that community-based operation and maintenance is feasible in the Burundian context — the local community now operates the pilot barriers independently. With the EPDM material's 40+ year lifespan compared to 3–5 years for sand barriers or 1–5 years for sandbags, the long-term maintenance burden is substantially lower than alternatives.

94. **Social Sustainability**

Social sustainability is embedded through inclusive governance and broad-based community ownership of project assets and processes.

Gender-responsive design ensures that women constitute at least 50% of CCDRR committee members and barrier deployment teams, with at least 40% of project benefits accruing to women. Gender-sensitive communication materials in Kirundi with visual and oral formats accommodate populations with limited formal literacy. Youth are included in deployment teams and water management cooperatives, providing employment opportunities and technical skills that strengthen community adaptive capacity.

The Indigenous Peoples Plan (IPP) with Free, Prior, and Informed Consent (FPIC) processes ensures meaningful Batwa participation in governance structures, with representation formalized in CCDRR committees and culturally appropriate engagement protocols institutionalized beyond the project. Participatory design throughout implementation builds genuine community ownership — deployment teams and farmer cooperatives manage assets directly, and transparent decision-making processes govern water allocation during drought. Equitable access is ensured through blind vulnerability-based scoring for site selection, poverty-sensitive targeting with independent NGO validation, and priority allocation for food security crops and vulnerable households.

95. **Environmental Sustainability**

Environmental sustainability measures protect the ecosystems on which long-term adaptation depends.

No-go zones are established close to rivers to protect riparian habitats and biodiversity, following a wetland wise-use approach that maintains protected corridors. The dual-purpose barrier design reduces environmental pressure by capturing and storing floodwater for irrigation, reducing the need for groundwater extraction and relieving pressure on fragile upland water sources during droughts.

A waste management plan includes end-of-life equipment retrieval and recycling clauses — the EPDM material is 100% recyclable at end of life. Solar power is prioritized for monitoring stations and irrigation pumps, eliminating fossil fuel dependency. Silt fences provide sediment and erosion control during deployment, and revegetation of any disturbed soil areas is conducted post-installation. All infrastructure is sized for future climate scenarios (RCP 4.5/8.5) rather than historical records, with design standards for 1-in-50 to 1-in-100-year flood events ensuring that investments remain effective as climate conditions intensify.

96. **Policy and Governance Sustainability**

The project is designed to embed adaptation outcomes into national and sub-national policy frameworks, creating institutional pathways for sustained impact.

Mobile flood barriers and integrated water management are positioned as proven adaptation technologies for Burundi's National Adaptation Plan (NAP) revision scheduled for 2027. At the communal level, climate vulnerability assessments and preparedness plans inform communal development planning cycles, ensuring climate considerations are mainstreamed into local governance. Early Action Protocols and forecast-based action mechanisms are integrated into national DRR policy through PFNPRGC coordination, creating a permanent framework for anticipatory climate response.

97. **Risk Mitigation**

The project proactively addresses identified sustainability risks through targeted mitigation measures.

*Table 27 Overview of sustainability risk mitigation measures.*

| Sustainability risk | Mitigation measures |
|---|---|
| Government budget constraints | Multi-year budget commitments formalized; O&M Plans developed with communities; demonstration events showcase innovation to create demand for government scaling |
| Personnel turnover | Multiple staff trained per institution; procedures documented in technical manuals; training-of-trainers approaches create cascading knowledge transfer |
| Technology complexity | Priority on robust, simple technologies; spare parts locally available where possible; village technicians trained; gravity-fed systems used where topography permits |
| Barrier damage, theft, or deterioration | Formal government ownership through OBPE; secure storage in dedicated facilities; quarterly inspections with documented reporting; community identity-building around "their" flood protection system, drawing on the Kenyan lesson that shared identity transforms stakeholder perception from "their project" to "our solution" |
| Transport and filling failures during emergencies | Storage containers pre-positioned at strategic locations near deployment sites; transport arrangements formalized with commune administrations; filling pumps and fuel reserves maintained alongside barriers; annual simulation drills test the full logistic chain from warning to deployment |
| Elite capture of high-value assets | Blind vulnerability-based scoring; poverty-sensitive targeting with independent NGO validation; Third-Party Monitor (TPM) for site selection and beneficiary verification; annual elite capture audit in APPR |
| Maladaptation / false sense of security | "Flood reduction, not flood proofing" framing in all communication; mandatory failure simulation drills with overtopping scenarios; barrier deployment conditioned on evidence of local drainage maintenance |
| Loss of traditional knowledge | Traditional and indigenous water management strategies documented alongside technological innovations; community-owned knowledge preserved in local-language materials |

98. **Exit Strategy**

The exit strategy ensures systematic handover of all project assets, capacities, and knowledge through a phased approach.

During Year 1-3, O&M Plans are developed. These would include concrete annual government budget lines and O&M indicators as disbursement-linked milestones for at least one project budget tranche as a condition for approval of the O&M plans. This includes formalizing the asset ownership framework, securing storage facility locations, and establishing spare parts supply chains.

During Years 2–3, operational responsibilities are progressively transferred to designated institutions. Community-based maintenance systems become fully operational, and O&M fund health is monitored through M&E indicators. Deployment teams conduct independent exercises without project staff supervision, and farmer cooperatives assume day-to-day irrigation management. The transport and filling logistics chain is tested through at least two annual simulation exercises per commune.

In Year 4, formal handover of all assets takes place to the Government of Burundi — OBPE for physical infrastructure (barriers, irrigation systems, storage facilities, pumps, and spare parts) and IGEBU for monitoring equipment. All knowledge products are archived in accessible formats and formally transferred. Demonstration events and replication guidance are completed, and verification confirms that dedicated annual budget allocations are in place for ongoing O&M. A post-closing surveillance will be conducted beyond project closure, which will be part of the O&M plan / government commitment.

Post-project, IGEBU operates monitoring and forecasting as a core institutional function. CCDRR committees maintain preparedness plans and coordinate barrier deployment, storage, transport, and filling using established protocols. Project beneficiaries / farmer cooperatives self-manage irrigation. NBI/IGAD/EAC platforms sustain regional knowledge exchange. Technical manuals and academic publications ensure the permanent availability of the evidence base for replication elsewhere.

## N. Overview of environmental and social impacts and risk identified

99. The project has been screened against all 15 principles of the Adaptation Fund Environmental and Social Policy (ESP) and the Adaptation Fund Gender Policy. An Environmental and Social Impact Assessment

and Environmental and Social Management Plan (ESIA-ESMP), a standalone Gender Action Plan (GAP), and an Indigenous Peoples Planning Framework and Plan (IPPF/IPP) were prepared to identify potential risks, assess risk significance, and define concrete mitigation and monitoring measures. Based on this analysis, Components 1 and 2 are classified as Category B (medium risk), and Component 3 (Knowledge Management) as Category C (low risk), with impacts expected to be site-specific, moderate in scale, reversible, and manageable through the ESMP and associated action plans.

100. The main environmental footprint arises from the mobile flood barriers and associated small-scale works under Component 2, while Component 1 consists primarily of "soft" activities related to climate information services, early warning, capacity building and planning. Social risks are more prominent than biophysical impacts, and relate mainly to access and equity, gender equality and women's empowerment, inclusion of Batwa and other marginalized groups, information asymmetries, elite capture of high-value assets, labor and occupational health and safety, and potential economic displacement.

101. **Positive environmental and social impacts**

The ESIA-ESMP and GAP identify strong positive environmental, social and gender outcomes, which are central to the project rationale.

- The project will reduce climate-induced flood and drought risks for approximately 358,116 people (direct beneficiaries) in 35 Collines in Mpanda, Bubanza and Bukinanyana, including an estimated 51 percent women, 32 percent youth and around 1 percent Batwa.

- Component 1 will strengthen climate information, multi-hazard risk mapping, and people-centered early warning systems, increase anticipatory action capacity and reduce loss of life, assets and livelihoods.

- Component 2 will provide innovative mobile flood barriers to protect productive land and critical community infrastructure, thereby reducing erosion, sediment loss and damage to agricultural plots and social services in the Imbo plains.

- Vegetation restoration, basic soil conservation and revegetation along barrier alignments will contribute to reduced sediment loads and better management of fragile valley-bottom ecosystems.
- The GAP will support a gender-transformative approach by addressing structural barriers to women's access to climate information, participation in disaster risk governance, control over adaptation assets and protection from gender-based violence and sexual exploitation and abuse/sexual harassment (GBV/SEAH).

- The IPPF/IPP will promote the effective participation and benefit-sharing of Batwa communities and other marginalized groups, safeguard their rights and livelihoods, and ensure culturally appropriate Free, Prior and Informed Consent (FPIC) for any activities affecting them.

- The project's Grievance Redress Mechanism (GRM), combining Colline-level committees, communal technical committees and a national steering level, will improve accountability, conflict resolution and protection of vulnerable groups, including women and Batwa, in line with AF ESP requirements.

102. **Overview of key potential environmental and social risks**

Screening against the 15 ESP principles shows that the project does not trigger high-risk (Category A) impacts, does not support activities inconsistent with national law, and does not involve any resettlement, conversion of critical habitats, or high-risk infrastructure. However, several moderate risks require active management / mitigation measures as proposed in the ESMP, GAP and IPPF/IPP:

- **Access and equity; elite capture of benefits (Principle 2):**
  Because mobile barriers and associated services are high-value adaptation assets, there is a risk that local elites, better-connected farmers or powerful communal actors could influence barrier siting and operational decisions in their favor, to the detriment of poorer and more marginalized households. Similar risks exist for preferential access to early warning information, training opportunities and decision-making spaces in disaster risk governance structures.

- **Marginalized and vulnerable groups, including Batwa (Principles 3 and 7):**

Batwa communities and other structurally marginalized groups (e.g. persons with disabilities, elderly, female-headed households) may be inadvertently excluded from consultations, early warning coverage, training and benefit-sharing, or bear a disproportionate share of any temporary disturbance related to barrier deployment or construction logistics. Illiteracy, language barriers and discrimination increase the risk of information exclusion, reduced access to the GRM, and inequitable treatment in any compensation or support processes.

- **Human rights, gender equality and GBV/SEAH (Principles 4 and 5):**
  The project operates in a context of high gender inequality, limited formal land rights for women, and documented risks of GBV and SEAH in disaster settings. Without specific safeguards, there is a risk that women have less access to early warnings, decision-making roles in DRR committees, paid employment in project activities, and control over adaptation assets, and that power imbalances could increase exposure to GBV/SEAH linked to project workers or community dynamics. Specifically, a 34% digital gender gap in rural Burundi means women routinely receive flood alerts 2–4 hours later than men — a life-safety gap in flash flood scenarios. Historical infrastructure bias prioritizes commercial zones over social reproductive infrastructure (water points, health post access routes), compounding women's time poverty post-disaster. The GAP addresses these structural mechanisms across four pillars

- **Economic displacement and land-use impacts (Principle 8):**
  While no physical resettlement or land acquisition to trigger resettlement is anticipated, localized installation works, temporary storage of barriers, or designation of protection corridors may generate minor, site-specific restrictions on land use or informal activities within narrow footprints. This may result in temporary economic displacement, especially for smallholders, women farmers or Batwa using marginal land informally. A further risk — identified as a Red Flag in the ESIA-ESMP — is green gentrification: flood protection generates immediate land value appreciation, creating economic incentives for landlords to evict Batwa squatters from newly protected zones, converting the project's principal benefit into a driver of dispossession. This risk is pre-emptively addressed through legally binding Non-Eviction Agreements with communal administrations and a no-displacement covenant embedded in all project implementation agreements prior to commencement of works.

- **Natural habitats and biodiversity (Principles 9 and 10):**
  Environmental risks relate primarily to small-scale disturbance of riparian vegetation, temporary soil compaction, increased erosion during installation, and potential interference with natural drainage if barriers or ancillary works are poorly sited. No critical habitats or protected areas will be converted or degraded, but there is a risk of localized habitat disturbance in valley-bottom ecosystems and wetland margins if good practice is not followed.

- **Climate change and maladaptation (Principle 11):**
  The ESMP identifies a risk of "false sense of security" or maladaptation if barrier design, flood modeling or operational protocols fail to account for climate change, or if barriers encourage settlement and investment in areas that remain at residual risk under future climate conditions. There is also a risk that poorly coordinated deployment could deflect floodwaters towards unprotected communities downstream.

- **Core labor rights and occupational health and safety (Principle 6):**
  Risks relate to unsafe installation practices, manual handling of heavy barrier segments, work near flowing water, and possible use of informal or underage labor if contractors are not adequately supervised. Women workers may face risks of discrimination or harassment in male-dominated work sites.

- **Public health, water and sanitation (Principles 3, 4 and 5):**
  Construction and barrier deployment may generate temporary nuisances such as dust, noise, waste generation and localized traffic risks. In flood-affected zones there is also an indirect risk of increased vector- and water-borne disease (e.g. malaria, diarrheal disease) if drainage is not well managed and if vulnerable households face reduced access to safe water or sanitation during emergencies.

  **Vector-borne disease (malaria) risk clarification:** Water is stored entirely inside the sealed EPDM barrier envelope during both the flood-response and dry-season irrigation phases; the enclosed water surface is not exposed to the atmosphere. Mosquito oviposition therefore cannot take place inside the barriers, and no incremental malaria vector risk is introduced by the

intervention. The ESP screening (Principle 13, Public Health) and Annex 4 (ESIA-ESMP) confirm this design characteristic; irrigation off-take points feed distribution hoses/taps directly, without intermediate open storage. Community awareness and site inspection continue to monitor for standing water around installation sites (e.g., temporary puddles at valve fittings), addressed under the routine O&M inspection cycle.

- **Knowledge governance, epistemic appropriation and platform sustainability (Component 3 — Principles 2, 7, 14 and 15):**
  Component 3 (Knowledge Management) introduces a distinct risk of epistemic appropriation: documentation and dissemination of Batwa Traditional Ecological Knowledge (TEK) and women's adaptive practices through institutional channels without FPIC-governed community ownership constitutes extraction of indigenous intellectual property under UNDRIP Article 31. Output 4.2 knowledge products risk defaulting to technical French-language formats inaccessible to non-literate beneficiaries, women, youth, and Batwa — replicating structural exclusion at sub-regional scale. Output 4.3 exchange platforms risk post-project discontinuity without defined hosting and governance transition arrangements. Rated High significance for Principles 2, 7, 14, and 15 in the ESIA-ESMP.

103. **Summary of mitigation and management measures**

To manage the above potential risks, the ESIA-ESMP, GAP and IPPF/IPP define a comprehensive set of mitigation, monitoring and institutional measures that fully reflect the mitigation hierarchy (avoid, minimize, restore, offset) and are integrated into project design, budgeting and implementation arrangements. Key measures include:

- **Governance, access and equity:**
  - Use of transparent, vulnerability-based criteria and participatory, publicly documented processes for selecting barrier sites and beneficiary Collines, with particular attention to the poorest households, women, Batwa and persons with disabilities.
  - Inclusion of civil society and independent observers in site selection and monitoring, and publication of decisions and criteria at Colline and commune level to discourage elite capture.

- **Gender-responsive and inclusive design:**
  - Implementation of the GAP to ensure women's meaningful participation and leadership in DRR committees, early warning governance and barrier deployment teams. The 50/30 Governance Standard applies as a binding conditionality: all CCDRRs must achieve minimum 50% female membership and minimum 30% female occupancy of executive roles (Chair, Treasurer, Secretary) before receiving physical assets under Output 4.1. Women are certified as Site Commanders for barrier deployment logistics and as Treasurers of community irrigation cooperatives, ensuring authority over adaptation assets extends beyond attendance.
  - Tailored communication channels (e.g. market-based messaging, women's groups, radio, visual tools) to close the gender gap in access to climate information and early warnings, and to reach illiterate and rural women.
  - Integration of GBV/SEAH risk mitigation in all community engagement and GRM processes, including confidential reporting pathways, survivor-centered referral protocols, codes of conduct for all project workers, and mandatory training on GBV/SEAH for implementing partners.

- **Batwa and marginalized groups:**
  - Application of the IPPF/IPP to ensure culturally appropriate engagement, FPIC for any activities that may affect Batwa communities, and targeted measures to prevent their exclusion from project benefits. Civil works contracts specify a mandatory minimum of 15% of unskilled labor positions sourced from Batwa community members, including a dedicated sub-quota for Batwa women, monitored by paid Batwa community monitors at each active construction site. Environmental management plans explicitly map and protect traditional clay corridors as a usufruct right; any restriction on Batwa access to clay deposits is classified as economic displacement requiring full FPIC and agreed livelihood alternatives. UNIPROBA serves as the mandatory third-party facilitator for all Batwa consultations throughout the full project lifecycle.

- Use of dedicated facilitators adapted communication tools and participatory mapping to safeguard Batwa access to essential livelihood resources and ensure they are represented in local committees and GRM bodies.

- **Land use and economic displacement:**
  - Careful micro-siting of any fixed structures and temporary installations to avoid or minimize interference with existing land uses and to prevent physical resettlement.
  - Where minor, temporary economic impacts are unavoidable (e.g. short-term crop loss within small footprints), livelihood support will follow ESMP and IPP principles, based on actual occupancy and use and not only on formal land titles, in line with AF ESP and international good practice.

- **Natural habitats, biodiversity and pollution control:**
  - Application of good construction practices, including erosion and sediment control, waste management, avoidance of unnecessary clearance of vegetation, and restoration/revegetation of disturbed areas after works.
  - Design and siting of barriers, and small works based on hydrodynamic modeling to maintain natural drainage where possible and avoid deflecting flows into sensitive habitats or unprotected settlements.

- **Climate-robust design and maladaptation risk management:**
  - Use of up-to-date climate scenarios and hydrological modeling to size barrier systems and identify safe deployment configurations under current and future climate conditions.
  - Regular simulations and drills integrating the early warning system and barrier deployment teams to test and refine standard operating procedures and reduce the risk of “false security”.

- **Labor and occupational health and safety:**
  - Inclusion of labor and OHS clauses in all contracts, prohibiting child and forced labor, ensuring fair working conditions, and requiring provision and use of appropriate personal protective equipment.
  - Training of workers and supervisors on safe work procedures, emergency response, gender equality and GBV/SEAH, and unannounced site inspections by the project team and relevant authorities.

- **Knowledge governance and epistemic equity (Component 3):**
  - A three-stage FPIC Attribution Protocol governs all Output 4.2 knowledge products involving Batwa TEK: (1) pre-documentation consent specifying scope and authorized contributors; (2) pre-publication consent specifying attribution language, distribution channels, and restrictions; and (3) post-publication review confirming compliance and providing a community correction right. A Co-Design Committee — comprising at minimum two Batwa women and two women farmers per intervention zone — governs all Output 4.2 products from scoping through approval. All knowledge products are released simultaneously in a full Kirundi version and a visual low-literacy format validated by non-literate community members.
  - A Platform Transition Plan, defining hosting institutions, governance transfer arrangements, and funding continuity mechanisms for Output 4.3 exchange platforms, is finalized no later than the midterm review (Month 30) as a binding project requirement. The MEL framework tracks sub-regional replication of documented adaptive practices as a project closing milestone.

- **Grievance Redress Mechanism and monitoring:**
  - Operationalization of the three-tier GRM: Tier 1 (Customary/Bashingantahe level, 48-hour resolution); Tier 2 (UNIPROBA Project level — oral WhatsApp voice-note hotline and physical Grievance Logbook, 7 working days); Tier 3 (PMU/Steering Committee level for serious violations, displacement, and FPIC non-compliance, 14 days). The mechanism is oral-first, zero-cost, and zero-intimidation by design. GBV/SEAH and displacement cases are immediately triaged as Red Category and escalated directly to Tier 3, bypassing mediation. The Financial Gateway Mechanism links safeguards compliance — including Batwa quota compliance, signed Non-Eviction Agreements, and completed FPIC Audit Trails — to disbursement tranches. Multiple accessible entry points are available with clear

time-bound procedures; the dedicated GBV/SEAH pathway follows “do no harm” and confidentiality principles throughout.

- Integration of ESMP, GAP and IPP indicators into the project’s Monitoring, Evaluation and Learning (MEL) system, including sex-, age- and disability-disaggregated data and specific “red flag” triggers (e.g. zero complaints in active worksites, disproportionate benefit capture by certain groups).

Through this package of measures, and with the ESMP, GAP and IPPF/IPP treated as binding instruments for implementation, the project is expected to remain compliant with all 15 ESP principles and the AF Gender Policy, while maximizing positive environmental and social outcomes for vulnerable groups in the target area.

As shown in the table below, 10 principles have been triggered during the risk screening and require specific management measures/instruments; 5 require no additional plan/measure. All triggered potential risks are mitigated through instruments in the ESMP, GAP and IPPF/IPP. No principle triggers a Category A response.

*Table 28 Checklist of environmental and social principles & Mitigation Strategy*

| AF ESP Principle | No further Plan Required | Potential Impacts and Risks –Plans Required for Mitigation | Technical Justification for Screening Classification | Justification & Operational Instrument |
|---|---|---|---|---|
| 1. Compliance with the Law | ✓ | | Compliance Demonstrated.<br>The ESMP includes a detailed legal review confirming the project's compliance with Burundi's Code de l’Environnement, Code Foncier, and Code de l’Eau.<br><br>Justification: The potential gap regarding Batwa customary land rights vs. Statutory Law has already been assessed. The project ESMP explicitly mandates the use of AF safeguards (international standards) to bridge this gap. No further legal assessment is needed to proceed. | Integrated into ESMP. Compliance is not a standalone "plan" but a mandatory condition. It is managed via the Regulatory Monitoring Register within the general ESMP to track permits (water extraction, construction). |
| 2. Access and Equity | | ✓ | Compliance Demonstrated.<br>The project sites and beneficiary selection criteria are fully defined.<br><br>Justification: The risk of elite capture has been assessed and neutralized through the Vulnerability Targeting Strategy detailed in the proposal. Quotas for landless households and Batwa (5-10%) are already built into the project design. Implementation simply requires monitoring, not new assessment.<br>Additional note — Component 3: Output 4.2 knowledge products risk defaulting to technical French-language formats inaccessible to non-literate beneficiaries, women, youth, and Batwa. Output 4.3 platforms risk excluding community-level actors. Mitigated through mandatory parallel community-level formats (oral, visual, Kirundi) and inclusive platform design governance. | Instrument: Stakeholder Engagement Plan (SEP).<br>To curb elite capture, the SEP must institutionalize existing community groups into legally recognized community committee (community committees) with binding statutes. Operational governance must enforce volumetric equity via strict rotational rationing schedules and multi-stakeholder oversight, ensuring reliable hydraulic pressure and access across both upstream offtakes and downstream tailenders. |
| 3. Marginalized and Vulnerable Groups | | ✓ | Compliance Demonstrated.<br>The presence of Batwa communities has been confirmed and mapped during the consultation phase.<br><br>Justification: A comprehensive Indigenous Peoples Plan (IPP) has been prepared and is annexed to the proposal. This Plan already identifies the specific risks (exclusion and potential economic displacement) and dictates the required mitigation measures. The assessment of these groups is therefore complete. | Instrument: Inclusive Emergency Response Plan.<br>Standard plans often fail the disabled or elderly during disasters. This specific protocol ensures early warning systems reach these groups and that evacuation routes are accessible. |
| 4. Human Rights | ✓ | | Compliance Demonstrated.<br>The project design has been screened against the UN Human Rights Due Diligence framework.<br><br>Justification: No activities with high human rights risks (e.g., armed security personnel, forced labor) | Integrated into ESMP. No specific "Human Rights Plan" is standard for this risk level. Grievance Redress Mechanisms (GRM) included in the SEP are sufficient to handle potential complaints. |

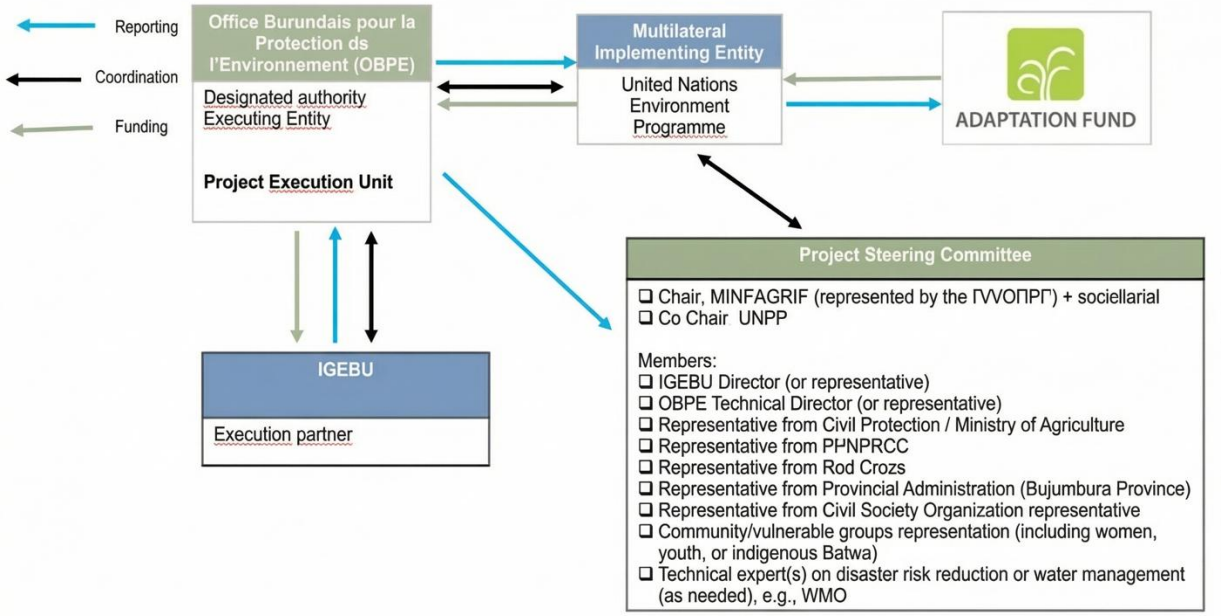
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| | | | are included. The project's Grievance Redress Mechanism (GRM) is already designed to handle any localized rights disputes. No further specialized human rights impact assessment is required. | |
| 5. Gender Equality and Women's Empowerment | | ✓ | Compliance Demonstrated.<br>A full Gender Assessment was conducted during the proposal phase.<br><br>Justification: The project has already integrated the findings into a Gender Action Plan (GAP) with specific indicators (e.g., equal pay, women's leadership quotas in community committees). The risks are known and the management plan is ready. | Instrument: Gender Action Plan (GAP).<br>Mandatory. This goes beyond "protection." The GAP applies the 50/30 Governance Standard: minimum 50% female membership and minimum 30% female occupancy of executive roles (Chair, Treasurer, Secretary) in all CCDRRs as a binding conditionality for receipt of physical assets. Women are certified as Site Commanders for barrier deployment logistics and as Treasurers of irrigation cooperatives, ensuring control over adaptation assets beyond attendance. The Nutrition-First Zoning standard mandates that over 50% of irrigated land supports subsistence crops controlled by women. Independent access to drought-resilient inputs is ensured. |
| 6. Core Labor Rights | | ✓ | Compliance Demonstrated.<br>The project activities (civil works) are standard, and the labor risks are well-understood.<br><br>Justification: The ESMP includes a comprehensive Health, Safety, and Labor Management Plan that aligns with ILO conventions and national law (including PPE provision and child labor prohibition). No further labor audit is needed for approval. | Instrument: Labor Management Procedures (LMP).<br>Crucial for the construction phase. This plan dictates the OHS (Occupational Health & Safety) standards for workers and strictly prohibits child labor, which is a high risk in rural agriculture. |
| 7. Indigenous Peoples | | ✓ | Compliance Demonstrated.<br>(See Principle 3).<br><br>Justification: The Indigenous Peoples Plan (IPP) serves as the definitive assessment and management instrument. Free, Prior, and Informed Consent (FPIC) consultations have been initiated and documented. The impacts on traditional clay resources are identified, and the "Clay Corridor" access protocols are already defined in the ESMP.<br>Additional note — Component 3: Documentation of Batwa TEK (wetland management, clay harvesting, seasonal indicators) without FPIC-governed community ownership constitutes epistemic appropriation under UNDRIP Article 31. Rated High significance in ESIA-ESMP Table 60 (A4.3.3.7). Mitigated through three-stage FPIC Attribution Protocol, Co-Design Committee, and community veto right. | Instrument: Indigenous Peoples Plan (IPP).<br>CRITICAL. Given the Batwa population (3,579), a standalone IPP is non-negotiable. It ensures FPIC compliance and details specific benefit-sharing mechanisms tailored to Batwa cultural practices. |
| 8. Involuntary Resettlement | ✓ | | Compliance Demonstrated.<br>The project footprint is defined.<br><br>Justification: The project always avoids resettlement due to project interventions.<br>The Resettlement Policy Framework (RPF) or specific Resettlement Action Plan (RAP) has identified the compensation modality ("Asset-First" and "Land-for-Land"). The scope of impact is known and manageable under the existing instruments. | Integrated into ESMP. Physical displacement is avoided. However, A Livelihood Restoration Protocol is incorporated to mitigate economic displacement risks triggered by new land-use restrictions (e.g., enforcement of riparian buffer zones) and temporary service interruptions during facility rehabilitation."). |
| 9. Protection of Natural Habitats | | ✓ | Compliance Demonstrated.<br>Project sites have been screened against Key Biodiversity Areas (KBAs).<br><br>Justification: The ESMP already delineates "No-Go" buffer zones for wetlands and specifies bio-engineering techniques to prevent damage. The environmental risks are standard for construction | Instrument: Biodiversity Management Plan (BMP).<br>Since works occur near riverbanks (Rusizi, Nyamagana), this plan defines "No-Go Zones" for machinery and spoil disposal to prevent siltation of riparian habitats. |

| | | | | |
|---|---|---|---|---|
| | | | and are fully covered by the existing mitigation plan. | |
| 10. Conservation of Biological Diversity | ✓ | | Compliance Demonstrated.<br>The project is restorative in nature.<br><br>Justification: The screening confirms the project will not use invasive species. The protocol for using native species for slope stabilization is already written into the technical specifications. | Integrated into ESMP. Interventions are in modified landscapes. Standard "Good Agricultural Practices" (GAP) guidelines prevent the introduction of invasive species. |
| 11. Climate Change | ✓ | | Compliance Demonstrated.<br>The project is an adaptation intervention.<br><br>Justification: Screening confirms negligible emissions. The infrastructure designs incorporate climate-resilient standards (RCP 4.5/8.5) as detailed in the Feasibility Study. | Integrated into ESMP. The project is the mitigation/adaptation plan. No separate emissions plan is needed as construction carbon footprint is negligible. |
| 12. Pollution Prevention and Resource Efficiency | | ✓ | Compliance Demonstrated.<br>Construction risks are generic and low impact.<br><br>Justification: A Waste Management and Erosion Control Plan is already embedded in the ESMP. Standard Operating Procedures (SOPs) for machinery maintenance are sufficient to manage pollution risks. | Instrument: Waste Management Plan (WMP).<br>Part of the Contractor's obligations. Manages construction debris, plastic liners, and prevents fuel spills from machinery into soil/water sources. |
| 13. Public Health | | ✓ | Compliance Demonstrated.<br>The link between water infrastructure and disease vectors is established.<br><br>Justification: water stored in the barriers is closed off to mosquitos (malaria control). The Community Health and Safety Plan is part of the ESMP. No new epidemiological study is required. | Instrument: Community Health & Safety Plan.<br>Specifically addresses the "Water-Disease Nexus." The barrier units comprise of sealed EPDM compartments enclosing stored water in both the flood-response and dry-season irrigation phases; no retention basins or open storage structures exist in the project design. The Community Health and Safety Plan requires weekly visual inspection of valve/off-take fittings for residual standing water, with larviciding applied as needed, and manages dust/noise during works. |
| 14. Physical and Cultural Heritage | ✓ | | Compliance Demonstrated.<br>The site survey identified no physical cultural resources in the direct path of works.<br><br>Justification: The "Chance Find Procedure" included in the ESMP is the standard and sufficient mitigation measure for potential unknown discoveries.<br>Additional note — Component 3 (Priority): Documentation and dissemination of traditional water management practices, clay harvesting calendars, and indigenous seasonal knowledge without community ownership protocols constitutes intangible cultural heritage appropriation (ESIA-ESMP A4.2.2.14, rated High). Mitigated through FPIC Attribution Protocol, Batwa veto right at pre-publication stage, and conditional distribution restriction. | Integrated into ESMP. A standard Chance Find Procedure clause is inserted into all construction contracts. No standalone plan required.<br>Additional note — Component 3: Beyond physical chance finds, documentation and sub-regional dissemination of traditional practices without community ownership protocols constitutes intangible cultural heritage appropriation. Mitigated through the FPIC Attribution Protocol and Co-Design Committee governance for all Output 4.2 knowledge products (Annex 6, Section 8). |
| 15. Lands and Soil Conservation | | ✓ | Compliance Demonstrated.<br>The project is designed to enhance soil conservation.<br><br>Justification: Technical designs for terracing and anti-erosion ditches follow international best practices. The environmental benefit is clear and requires no further risk assessment.<br>Additional note — Component 3 (Priority): Output 4.3 exchange platforms and demonstration sites without post-project transition arrangements will collapse upon project closure, eliminating sub-regional replication pathways (ESIA-ESMP A4.3.3.15, rated High). A Platform Transition Plan defining hosting institutions, governance transfer, and funding continuity is required no later than midterm review (Month 30). | Instrument: Erosion and Sediment Control Plan (ESCP).<br>Mandatory during the "Earthworks Phase." It specifies technical barriers (silt fences, gabions) to prevent the digging of canals from causing river sedimentation during rains. |

# PART III: IMPLEMENTATION ARRANGEMENTS

## A. Project management arrangements

Figure 9 Project organigram




104. **Institutional arrangements**

**Implementing Entity.** The United Nations Environment Programme (UNEP) will serve as the Multilateral Implementing Entity (MIE) for this project. UNEP will be responsible for overseeing project execution, ensuring compliance with both Adaptation Fund and UNEP policies, reporting to the AF Board, and contracting and providing guidance to the Executing Entities. UNEP will coordinate with the Designated Authority (DA) and the Project Steering Committee (PSC).

**National Executing Entities.** *Office Burundais pour la Protection de l'Environnement (OBPE)*, housed within the Ministry of Environment, Agriculture and Livestock (MINEAGRIE), serves as both the Designated Authority (DA) for the AF and as the lead Executing Entity responsible for the project. OBPE will host the Project Management Unit (PMU) and will report to UNEP and the PSC on progress, implementation challenges, and compliance with environmental and social safeguards.

*Institut Géographique du Burundi (IGEBU)*, also under MINEAGRIE, will be responsible for the delivery of Component 1 (Climate information and warning systems) under a sub-agreement with OBPE. IGEBU's mandate covers collection and monitoring of climate data, seasonal weather forecasts and meteorological monitoring, cartography/topography/hydrological activities, and disseminating forecasts through the National Platform for Risk Prevention and Disaster Management (PFNPRGC). A specialized NGO may be sub-contracted under Activity 4.2.1 to implement and monitor the IPPF/IPP, including FPIC processes.

105. **Component-output execution responsibility mapping**

The table below clarifies which Entity leads each component and output.

*Table 29 Overview of responsible entities per output*

| Component | Output | Lead Entity | Rationale |
|---|---|---|---|
| **Component 1**: Climate information, warning systems and responses to flood and drought risks/threats | **1.1** — Geospatial flood and drought hazard maps and risk profiles for 3 target communes | **IGEBU** | Matches IGEBU mandate on climate data, cartography, and hydrological activities |
| | **1.2** — Early warning dissemination and communication systems strengthened | | Matches IGEBU mandate on disseminating forecasts through PFNPRGC |
| | **2.1** — Climate monitoring network and forecasting capacity expanded | | Matches IGEBU mandate on meteorological monitoring and seasonal forecasts |

| | | | |
|---|---|---|---|
| | **3.1** — Climate-informed preparedness/response plans developed and operationalized for 3 target communes | | IGEBU provides climate information inputs; OBPE coordinates community engagement and institutional linkages |
| | **3.2** — CCDRRs trained and supported in technical and management functions for climate-informed preparedness and response | **OBPE** | OBPE coordinates commune-level preparedness and institutional strengthening; IGEBU, Civil Protection, PFNPRGC and the Burundi Red Cross provide technical support. |
| **Component 2**: Innovative flood and drought risk reduction practices and technologies | **4.1** — Mobile flood barrier technology and integrated water systems deployed and operational in 3 target communes | **OBPE** | OBPE manages physical infrastructure deployment, procurement of barriers, community deployment teams, and irrigation systems |
| **Component 3**: Results tracking and knowledge management for post-project sustainability and innovation diffusion | **4.2** — Strong evidence base on the benefits of the innovations produced and disseminated | | OBPE coordinates documentation, technical manuals, and dissemination in partnership with IGEBU for climate data. A specialized NGO implements and monitors the IPPF/IPP under Activity 4.2.1. |
| | **4.3** — Demonstration sites, peer-learning exchanges, and knowledge-sharing platforms established | | OBPE leads national and regional knowledge-sharing through PFNPRGC, NBI, IGAD, EAC partnerships |

106. **Fund flow structure**

UNEP → OBPE (via Project Cooperation Agreement/PCA) → IGEBU (via sub-agreement for Component 1 outputs 1.1, 1.2, 2.1 and 3.1). OBPE maintains segregated project bank accounts and prepares financial reports; IGEBU reports to OBPE on Component 1 expenditure.

107. **Project Steering Committee**

**Composition:**

- **Chair**: MINEAGRIE (represented by the DA/OBPE secretariat)
- **Co-Chair**: UNEP.
- **Members**: IGEBU Director or representative; OBPE Technical Director or representative; Representative from Civil Protection (Ministry of Interior); Representative from PFNPRGC; Representative from Red Cross; Representative from Provincial Administration (Bujumbura Province); Representative from Ministry of Agriculture; Civil Society Organization (CSO) representative; Community/vulnerable groups representative (including women, youth, or indigenous Batwa); Technical experts as needed (e.g., WMO)

**Gender representation:** The PSC will aim for at least 30% female representation.

**Meeting frequency:** At least annually, with additional extraordinary meetings for urgent matters.

**PSC responsibilities:**

- Provide strategic oversight and guidance from project start to completion, including supervision of progress, review of annual work plans, budgets, and progress reports.
- Review deviations from agreed plans and consider amendments to work plans, timelines, or budgets.
- Ensure alignment with national laws, policies, and AF requirements.
- Review work progress across all three Components and eight outputs (1.1, 1.2, 2.1, 3.1, 3.2, 4.1, 4.2, 4.3)
- Facilitate coordination among project stakeholders including provincial and commune-level actors.
- Monitor compliance with the ESIA-ESMP and Gender Action Plan.
- Support knowledge management and dissemination of project results (Outputs 4.2, 4.3)

108. **Output-specific responsibilities and coordination**

The table below details lead, supporting, and sub-national coordination responsibilities for each output:

*Table 30 Overview of responsibilities per output*

| Output (per ToC) | Lead entity | Supporting entities (for specific expertise) | Sub-national coordination |
|---|---|---|---|
| **1.1** — Geospatial hazard maps and risk profiles | IGEBU | OBPE, PFNPRGC | Provincial focal points, CCDRR |

| | | | |
|---|---|---|---|
| **1.2** — EWS dissemination and communication | | Civil Protection, PFNPRGC, Burundi Red Cross (CRB), RTNB | Provincial disaster management, commune leaders |
| **2.1** — Climate monitoring network and forecasting capacity | | WMO (international) | Provincial focal points, communal focal points |
| **3.1** — Commune preparedness/response plans | | Burundi Red Cross, Civil Protection, PFNPRGC | Provincial Civil Protection coordinators, CCDRR |
| **3.2** — CCDRR strengthening | OBPE | Civil Protection, PFNPRGC, Burundi Red Cross, IGEBU | Commune administrators, CCDRRs |
| **4.1** — Mobile flood barriers and integrated water systems | OBPE | Civil Protection, IGEBU (forecasts), Burundi Red Cross | Provincial DRR coordinators, community deployment teams, farmer cooperatives, women's associations |
| **4.2** — Evidence base produced and disseminated | | IGEBU, universities, regional platforms (NBI, IGAD, EAC, AU) | Provincial administration, local demonstrations |
| **4.3** — Demonstration sites and knowledge-sharing platforms | | IGEBU, PFNPRGC, NBI, IGAD, EAC | Provincial administration, commune administrations |

109. **Roles and responsibilities of key stakeholders**

**UNEP (Multilateral Implementing Entity)**:

- Ensure overall project compliance with AF policies (ESP, GP) and all reporting, monitoring, evaluation, and safeguarding requirements.
- Contract and provide guidance to the Executing Entity (OBPE)
- Provide technical backstopping and capacity building support to the PMU on adaptation, climate services, DRR, gender, and environmental/social safeguards.
- Monitor project performance and conduct regular supervision missions (at least annually)
- Review and approve annual work plans, budgets, progress reports, and fund disbursement requests.
- Report to the AF Board including annual Project Performance Reports (PPRs) aligned with the AF Results Framework (Outcomes 1, 2, 3, 6, 8)
- Commission independent final evaluation (within 9 months of operational closure)
- Oversee independent annual financial audits.

**OBPE (Designated Authority and Executing Entity)**:

*As DA*: Provide strategic coordination with UNEP on national policy; serve as PSC secretariat; facilitate national stakeholder engagement; support dissemination of results.

*As Executing Entity (Components 2 and 3; overall coordination and funding of IGEBU for Component 1)*:

- Recruit, supervise, and host the PMU.
- Lead Output 3.2 under Component 1 and implement all project activities under Component 2 (Output 4.1) and Component 3 (Outputs 4.2, 4.3)
- Contract IGEBU for Component 1 delivery (Outputs 1.1, 1.2, 2.1, 3.1) with IGEBU reporting to OBPE.
- Contract NGO for implementation and monitoring of IPPF/IPP measures.
- Recruit and manage consultants, contractors, and service providers per ministerial and UNEP procurement procedures.
- Provide periodic progress reports, monitoring reports, financial reports, and detailed work plans to UNEP and PSC.
- Implement the ESIA-ESMP and Gender Action Plan for Components 2 and 3; ensure IGEBU does so for Component 1 and the NGO implements applicable IPPF/IPP safeguards.
- Maintain proper financial records and comply with audit requirements.
- Facilitate stakeholder consultations, grievance mechanisms, and community engagement.

**IGEBU (Sub-contracted for Component 1 for the output below)**:

- Deliver all activities under Outputs 1.1, 1.2, 2.1, and 3.1.
- Report to OBPE on Component 1 progress, expenditure, and compliance.
- Implement ESIA-ESMP and Gender Action Plan provisions for Component 1 activities.

**NGO (Subcontracted for IPPF/IPP implementation and monitoring):**

- Implement and monitor the IPPF/IPP measures
- Report to OBPE on IPPF/IPP implementation, expenditure, and compliance.
- Support compliance with applicable ESIA-ESMP and Gender Action Plan provisions in activities involving Batwa communities.

**PSC members and responsibilities**:

*Table 31 Overview of PSC member responsibilities*

| Stakeholder | Key responsibilities |
|---|---|
| PFNPRGC | Coordinate national/sub-national DRM response; contribute to Output 3.1 and 3.2 preparedness planning; facilitate coordination between EWS (Component 1) and response mechanisms; support scaling via Output 4.3 |
| Ministry of Interior (Civil Protection) | Facilitate provincial/commune-level coordination; ensure integration with national security and civil protection policies; support Outputs 1.2 and 3.1 |
| Ministry of Agriculture | Support implementation of irrigation/water management (Output 4.1); provide agricultural extension services; ensure integration with national agricultural adaptation policies |
| Provincial Administration (Bujumbura) | Provide provincial oversight for all outputs; facilitate dialogue between national EEs and commune administrations; support Output 4.3 demonstrations |
| CSO representative | Ensure community participation and accountability; support awareness campaigns (Outputs 1.2, 3.1 and 3.2) |
| Community/vulnerable groups representative | Represent beneficiary interests (women, youth, Batwa); ensure inclusive engagement; support gender-responsive implementation monitoring across all outputs |

110. **Legal and financial arrangements**

**Project Cooperation Agreement (PCA):** UNEP will contract OBPE through a PCA specifying scope of work, outputs, and deliverables aligned with the 8 project outputs (1.1, 1.2, 2.1, 3.1, 3.2, 4.1, 4.2, 4.3); budget allocations and disbursement schedules (typically quarterly); reporting requirements; compliance obligations (UNEP procurement, AF ESP/GP); performance indicators aligned with the AF Results Framework (Outcomes 1, 2, 3, 6, 8); grievance and dispute resolution mechanisms; and provisions for adaptive management.

**Procurement framework:** All procurement must follow competitive, open, fair, and transparent processes in compliance with UNEP procedures; apply international standards for quality, cost-effectiveness, and integrity; and prioritize local procurement where feasible.

**Financial management and audit:** OBPE will maintain segregated project bank accounts and proper financial records; prepare annual financial reports; conduct financial reconciliations and internal controls; submit to independent external financial audits at least annually; and support final independent evaluation. UNEP will review financial reports, commission independent audits, and address findings.

111. **Environmental and social safeguards management**

The PMU is responsible for implementing all ESMP, Gender Action Plan and and IPPF/IPP measures. measures. UNEP provides implementation guidelines, technical backstopping from ESP/gender experts, and regular supervision and compliance monitoring.

OBPE must include competitive procurement clauses in all sub-contracts ensuring compliance with AF ESP (particularly Principles 1, 4, 5, 6, 8, 12, 13), AF Gender Policy, and national laws.

Government environmental/social and gender focal points serve on the PSC for safeguard oversight. A project-level Grievance Mechanism will be established — gender-responsive, culturally appropriate, accessible to vulnerable groups, with multiple channels, documented response procedures, and escalation to UNEP or independent review.

112. **Monitoring, evaluation, and reporting**

**PMU responsibilities.** Day-to-day monitoring of all activities and outputs; collection of monitoring data disaggregated by sex, age, disability status, and other relevant categories; quarterly progress reports to UNEP and PSC covering physical progress on all 8 outputs, indicator data (baseline and progress toward targets per AF Results Framework), financial progress, implementation challenges, safeguard compliance, and gender mainstreaming progress.

**UNEP monitoring.** Regular in-country supervision missions (at least annually); annual PPRs consolidated from both EEs and submitted to AF Board against project objectives, outcomes, outputs, and AF Results Framework indicators (Outcomes 1, 2, 3, 6, 8); and final evaluation within 9 months of operational closure covering achievement of objectives, sustainability, lessons learned, innovation outcomes, and recommendations for scale-up.

113. **Adaptive management**

The project adopts a flexible adaptive management approach:

- **Minor changes** (activities/timelines): PMU proposes; PSC reviews and approves if AF and UNEP requirements are met.
- **Moderate changes** (output-level modifications): New ESP screening and impact assessment required per AF ESP and UNEP policies.
- **Major changes** (project objectives or AF Results Framework alignment): Prior approval from AF Board through UNEP required.

114. **Project launch and inception workshop**

An Inception Workshop will be organized within three months of signing the project agreement, bringing together PSC members, UNEP, OBPE, IGEBU, provincial/commune administrators, community representatives (including traditional authorities, women's organizations, youth leaders, and Batwa), Red Cross, CSOs, and technical experts.

**Workshop objectives**:

- Confirm the organizational structure, roles, responsibilities, and reporting lines.
- Confirm the Results Framework, monitoring indicators, baselines, targets aligned with AF Outcomes 1, 2, 3, 6, 8.
- Confirm implementation of ESIA-ESMP and Gender Action Plan.
- Review and agree on Year 1 annual work plan and budget for all 8 outputs.
- Introduce the Grievance Mechanism and community engagement channels.
- Discuss the knowledge management framework (Outputs 4.2, 4.3)

Workshop outputs will include the Inception Workshop Report submitted to the AF, the finalized Year 1 work plan and budget, and confirmed implementation arrangements.

## B. Measures for financial and project risk management

115. Throughout the project period, potential financial and project management risks will be monitored, managed, and escalated if needed by the Project Management Unit (PMU) and UNEP. Risks will be reassessed regularly in line with annual monitoring and reporting requirements. This section outlines key potential risks, their risk level, mitigation measures, indicators for verification, and monitoring responsibilities (also discussed under section III.D).

116. **Risk Management Framework**

The project applies a risk management approach covering institutional / social, financial, and operational / environmental risks. All risks are assessed using a standard risk matrix (likelihood × impact) and classified as low, medium, or high. Risk mitigation measures are embedded in project design and implementation arrangements, with clear escalation procedures when risk thresholds are exceeded.

The risks were identified based on lessons from previous UNEP projects in Burundi, outcomes of stakeholder consultations, and the findings of a UNDP-commissioned HACT micro-evaluation of OBPE (BDO LLP, July 2023), which rated OBPE's overall risk as **moderate** with elevated concern in asset management, accounting systems, and procurement. The most project-relevant findings have been integrated into the below tables.

*Table 32 Overview of Institutional / social Risks and mitigation measures*

| Ref. | Risk Description | Risk Level | Mitigation Measures | Indicators / Means of Verification | Frequency | Responsibility |
|---|---|---|---|---|---|---|

| | | | | | | |
|---|---|---|---|---|---|---|
| R001 | Delays in project start-up due to lengthy contracting or critical staff not in place | Medium | Pre-agreed activities/budgets with OBPE and IGEBU during formulation; inception workshop within 3 months; EEs contracted within 6 months. **Escalation:** Delays >1 month reported to UNEP AF Coordinator. | Inception workshop held within 3 months; EE agreements signed within 6 months | Monthly (first 6 months) | UNEP Task Manager |
| R002 | Loss of government support due to political transitions or lack of prioritization | Medium | Project Steering Committee (PSC) with clear ToR established within 3 months; strong NDA/OBPE coordination; extra PSC meetings as needed. **Escalation:** Declining engagement reported to NDA and UNEP. | PSC ToR finalized and PSC operational within 3 months | Monthly (first 6 months), then semi-annually | UNEP / PMU |
| R003 | Non-adoption of interventions due to lack of community ownership or capacity | Medium | Participatory planning; capacity development on O&M with community structures; FPIC for activities affecting indigenous peoples. **Escalation:** Capacity gaps reported to PSC. | Training reports with sex-disaggregated participant lists; O&M plans operational; capacity assessments showing improvement | Annually | PMU / UNEP M&E Officer |

*Table 33 Financial Management and Procurement Risks and mitigation measures*

| Ref. | Risk Description | Risk Level | Mitigation Measures | Indicators / Means of Verification | Frequency | Responsibility |
|---|---|---|---|---|---|---|
| R004 | EE/sub-contractor capacity constraints leading to ineffective execution, financial mismanagement, or procurement delays | Medium | UNEP non-objection for key staff recruitment; consultancy firm to build the capacity of the project finance officers on financial management and procurement; audit firm assesses procurement capacity; UNEP supervision (missions). **Escalation:** Non-compliance reported to UNEP Task Manager and PSC. | Procurement capacity audit; training records; supervision mission reports | Monthly (Year 1), then semi-annually | UNEP M&E Officer |
| R005 | Complex financial management/procurement leading to delays or integrity issues | Medium | UNEP control framework under UN Financial Regulations; EE procurement subject to recognized procedures and audit firm review; independent external audits; clear audit trails. **Escalation:** Late audits or non-compliance reported to PSC and UNEP Senior Management. | External audit reports with management letters; procurement compliance evidence; audit findings addressed within 3 months | Annually | PMU / UNEP Fund Management Officer |
| R006 | Inadequate accounting system; bank reconciliations only annual | High | PCA requires dedicated and recognized financial management system in place at OBPE; UNEP retains no-objection on disbursements until system operational; monthly bank reconciliations required. **Escalation:** Module not operational within 6 months → second tranche withheld. | Recognized module auditor-verified; monthly reconciliation statements signed; staff training certificates | Monthly (Year 1), then quarterly | PMU Finance Officer / UNEP Fund Management Officer |
| R007 | Inflation, currency instability, or market price fluctuations causing budget shortfalls | Medium | Budgets in USD; EE holds USD bank account; short disbursement-to-spending cycle; contingency line in budget; local sourcing where cost-effective. **Escalation:** Shortfalls >10% reported to PSC. | USD accounts confirmed; expenditure vs. plan reports; procurement cost comparisons | Annually | PMU / UNEP |
| R008 | High import taxes on project equipment resulting in insufficient funds | High | Apply for tax exemptions early (precedent from pilot); coordinate with Ministry of Finance/NDA; prioritize local sourcing. **Escalation:** Non-granting or delays >3 months reported to PSC and NDA. | Tax exemption applications and responses | Semi-annually | PMU / UNEP |
| R009 | Incomplete asset register, no insurance on non-vehicle assets, risk of duplicate payments | High | Dedicated AF asset register from day one with unique ID tags; comprehensive insurance for all major assets (barriers, pumps, hydro-met stations); annual physical inventory; invoices stamped "PAID" with project code upon payment. **Escalation:** Register-to-count discrepancy >5% triggers investigation; | Asset register updated quarterly; all assets tagged within 3 months of procurement; insurance policies in force; annual inventory reconciliation; | Quarterly (register); annually (inventory) | PMU / UNEP Task Manager |

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| | | | uninsured assets trigger immediate action. | invoices stamped and coded | | |
| R010 | No conflict-of-interest declarations in procurement processes | Medium-High | Mandatory signed conflict-of-interest declarations; PCA specifies the more restrictive of Burundi or UNEP procurement rules prevails. **Escalation:** Undeclared conflict of interest triggers process annulment. | Conflict-of-interest declarations on file; auditor procurement compliance assessment | Semi-annually | PMU / UNEP Fund Management Officer |

*Table 34 Operational / environmental Risks and mitigation measures*

| Ref. | Risk Description | Risk Level | Mitigation Measures | Indicators / Means of Verification | Frequency | Responsibility |
|---|---|---|---|---|---|---|
| R011 | Extreme weather events disrupting project activities | Medium-Low | Flexible scheduling; technical studies based on climate projections; coordination with IGEBU for flood/drought monitoring. **Escalation:** Weather delays >3 months reported to PSC. | Activity completion rates despite disruptions | Semi-annually | PMU / UNEP |
| R012 | Limited data availability/quality affecting M&E and adaptive management | Medium | Baseline verified at inception; consultancy firm to build the capacity of the M & E, ESMP and Gender officers on M & E and data collection; IGEBU collaboration for hydro-met data; participatory GIS mapping; regular data quality checks. **Escalation:** Persistent gaps reported to PSC. | Baseline survey reports; M&E database populated; data validation reports | Quarterly | PMU / UNEP M&E Officer |
| R013 | Limited availability of gas/petrol and internet | Medium | Advance procurement of fuel; import if needed; internet established at IGEBU. **Escalation:** Procurement plans not covering fuel needs. | Fuel needs identified in advance; internet operational | Semi-annually | PMU / UNEP |
| R014 | The full scale mobile flood barrier is not filled within 2 hours | High | Use of high capacity petrol pumps, adequate deployment teams and two full-system simulated drills per year per commune before each flood season (see details below) | Procurement plan with pump speciifications and actuals; deployment team and drill reports | Before flood season | PMU / UNEP M&E Officer |

***Details R014: System-level pump specifications and 2-hour deployment feasibility:** System design parameters: 11,050 m³ ÷ 2-4 h = required system flow 5,525 m³/h. The procurement plan provides 60 high-capacity petrol pumps (20 per commune; e.g. Honda WT40) each delivering ~98 m³/h — total system capacity ~5,775 m³/h.. Personnel: 15 pump operators each operating 2 pumps = 30 trained operators (10 per commune). Scaling from the AFCIA 200-m pilot: the pilot validated the technique (single pump, single site); the full project validates the system (parallel multi-pump, multi-section). Risk mitigation: (i) two full-system simulated drills per year per commune before each flood season; (ii) +spare pump capacity (1 reserve pump per commune); (iii) phased deployment is operationally permissible — the highest-risk 2–3 km sections can be prioritized and filled in 45–60 min, with downstream sections filled within an extended 3–4 h window if needed.

117. **Risk Management Procedures**

**Monitoring and Reporting.** The PMU will maintain a risk register updated quarterly. Annual Project Performance Reports (PPRs) will include updated risk assessments. UNEP supervision missions will review risk management effectiveness.

**Escalation.** When risk indicators exceed thresholds, the responsible party escalates: PMU → UNEP Task Manager → PSC → UNEP Senior Management. High risks require immediate escalation and corrective action plans.

**Adaptive Management.** Work plan adjustments, budget reallocations within AF guidelines, additional mitigation measures, or formal project amendments subject to AF Board approval.

**Audit and Compliance.** Independent financial audits annually. The first-year audit will specifically verify implementation of R006, R008 and R009, mitigation measures, with follow-up tracked in subsequent audits.

**Lessons Learning.** Risk management experiences documented and shared through project reports and PSC meetings.

## C. Measures for Environmental and Social Risk Management

118. **Compliance Framework and Project Categorization**

The project demonstrates full compliance with the Adaptation Fund's Environmental and Social Policy (ESP) and Gender Policy (GP), as well as UNEP's Environmental, Social and Economic Sustainability (ESES) Framework. Following rigorous screening against all 15 AF ESP principles, the project has been categorized as **Category B (medium risk)** with localized, site-specific environmental and social risks that are moderate in scale, reversible, and manageable through standard mitigation measures.

**Risk Profile:** The Category B classification is driven by: (a) social equity risks - potential elite capture and exclusion of 3,579 Indigenous Batwa and marginalized groups (Principles 2, 3, 5, 7); (b) installation-phase risks - occupational health and safety, soil erosion, and public health vectors (Principles 6, 13, 15); and (c) ecological risks - potential impacts on riparian habitats from water management interventions (Principle 9). All other principles were cleared.

**Institutional Responsibilities:** UNEP provides oversight and quality assurance through annual supervision missions and technical backstopping. OBPE (Executing Entity) hosts the Project Management Unit with dedicated Social Safeguards Expert and Gender Focal Point responsible for day-to-day ESMP implementation. IGEBU implements Component 1 safeguards. An NGO partner implements the Indigenous Peoples Plan. The Project Steering Committee reviews safeguards compliance at all meetings with authority to approve adaptive management measures.

119. **Environmental and Social Assessment**

A comprehensive ESIA-ESMP (ANNEX 4 — Environmental and Social Impact Assessment and Environmental and Social Management Plan (ESIA-ESMP)) was prepared through consultations involving women (51% of target population), youth (32%), Indigenous Batwa communities (3,579 people), persons with disabilities, local authorities, and traditional leaders. The assessment identifies strong positive outcomes - 358,116 people will benefit directly from reduced climate risks, enhanced early warning systems, protected productive land, ecosystem restoration, and improved accountability through the Grievance Redress Mechanism. Key risks requiring mitigation include elite capture of high-value assets; exclusion of Batwa and vulnerable groups; gender inequality and GBV/SEAH; temporary economic displacement; localized habitat disturbance; maladaptation risks; unsafe labor practices; and construction-related public health impacts.

120. **Comprehensive Mitigation Measures (ESMP)**

The project applies the mitigation hierarchy (Avoid → Minimize → Restore → Offset) with detailed measures integrated into design, budgeting, and contracts:

- **Access and Equity (Principle 2):** Vulnerability-based site selection with transparent public processes; Third-Party Monitor independently verifies barrier siting and beneficiary lists; minimum 5-10% quotas for landless households and Batwa; legally recognized Community Committees for Disaster Risk Reduction (CCDRR) enforce equitable water allocation; annual elite capture audits.

- **Gender Equality (Principle 5) –** See ANNEX 5 — Gender Action Plan (GAP)**:** Minimum 50% women in CCDRRs and deployment teams with 30% in leadership roles; gender-responsive communication channels reaching illiterate rural women; equal pay enforcement; targeted support for women farmers (seeds, training, irrigation access); comprehensive GBV/SEAH prevention through mandatory training, Code of Conduct with zero-tolerance policy, confidential reporting pathways, survivor-centered referrals, and unannounced site inspections.

- **Indigenous Peoples (Principles 3 & 7) –** See ANNEX 6 — Indigenous Peoples Planning Framework (IPPF) and Indigenous Peoples Plan (IPP)**:** Culturally appropriate Free, Prior, and Informed Consent (FPIC) process facilitated by UNIPROBA; double quota ensuring at least two Batwa representatives (one male, one female) in every CCDRR; two paid Batwa community monitors per site; no-displacement covenant with Asset-First compensation decoupled from formal land titles; Clay Corridor access protocols with Traditional Use Passes and hydraulic shunts maintaining moisture in clay beds; Hybrid Early Warning Systems integrating Traditional Ecological

Knowledge with analog channels (town criers, visual signals, sirens); 15% minimum local Batwa labor with sub-quota for women; participatory mapping of sacred sites as No-Go Zones.

- **Economic Displacement (Principle 8):** Avoidance strategy prioritizing state-owned land; careful micro siting; Temporary Land Use Agreements with community consent; Livelihood Restoration Protocol providing livelihood support based on actual occupancy (not only formal titles) at full replacement cost; voluntary donation protocols with documented FPIC.

- **Natural Habitats & Biodiversity (Principles 9, 10, 12):** No-Go buffer zones (minimum 10m) near wetlands/rivers; Erosion and Sediment Control Plan with silt fences and immediate revegetation; hydrodynamic modeling to maintain natural drainage; native species protocol with invasive species prohibition; Waste Management Plan for construction debris and fuel storage; annual biodiversity monitoring with adaptive management triggers.

- **Climate-Robust Design (Principle 11):** Infrastructure sized for RCP 4.5-8.5 scenarios and 1-in-50 to 1-in-100-year events; barriers framed as "flood reduction" not "flood proofing"; mandatory annual failure simulation drills; conditional deployment linked to local drainage maintenance; integrated evacuation protocols.

- **Labor Rights & OHS (Principle 6):** Mandatory contract clauses: zero-tolerance for child/forced labor, ILO compliance, equal pay, PPE provision, safe work procedures, workers' right to refuse unsafe work; pre-work OHS and GBV/SEAH training; unannounced site inspections; worker grievance channels; supplier certification with spot checks.

- **Public Health (Principle 13):** Water is enclosed within sealed EPDM barrier compartments in both the flood-response and dry-season irrigation phases (no retention basins or storage structures in the design); weekly visual inspection of valve/off-take fittings for residual standing water, with larviciding as needed; construction management (dust suppression, noise restrictions, waste disposal, traffic plans); health awareness campaigns; emergency water/sanitation contingency plans.

- **Cultural Heritage (Principle 14):** Cultural heritage screening and participatory mapping with Batwa elders; No-Go Zones for sacred sites; Chance Finds Procedure in all contracts mandating immediate work stoppage, notification within 24 hours, and protection until clearance.

121. **Grievance Redress Mechanism (GRM)**

A robust three-tier GRM integrates traditional mechanisms (Bashingantahe) with modern approaches, ensuring accessibility (multiple entry points: written, verbal, SMS, phone, suggestion boxes, in-person), confidentiality, and responsiveness should be in place before concrete project interventions start.

- **Level 1 - Colline Grievance Committee:** Traditional Bashingantahe leaders, Colline chief, women's representatives, Batwa representatives; handles local disputes; 7-day acknowledgment, 14-day resolution target.

- **Level 2 - Communal Technical Committee:** Commune administrator, OBPE representative, civil society, gender focal point; handles appeals and technical issues; 14-day acknowledgment, 30-day resolution.

- **Level 3 - National Steering Committee:** OBPE Director-General, UNEP representative, Ministry of Justice, human rights expert, gender specialist; handles corruption, systemic violations, high-risk GBV/SEAH; 7-day acknowledgment, 60-day resolution (expedited for GBV/SEAH).

**Special GBV/SEAH Pathway:** Confidential toll-free "Green Line," anonymous "Black Box" suggestion boxes, women's "Maman Lumière" pathway with female focal points; no mediation - survivor-centered approach with direct referral to specialized services; strict confidentiality and no-retaliation policies.

**Accessibility for Vulnerable Groups:** Kirundi language with visual tools for low-literacy; accessible locations; female focal points; UNIPROBA facilitators for Batwa; no-cost principle with travel reimbursement; "Cahier de doléances" protocol for illiterate complainants with fingerprint authentication.

**GRM Monitoring:** Monthly reports to PMU; quarterly reports to PSC; annual GRM report in APPR; anonymized statistics publicly posted; complainant satisfaction surveys; independent audits.

122. **Monitoring, Evaluation, and Adaptive Management**

**Multi-Layered Monitoring System:**

- **Tier 1 - Participatory:** Trained Batwa community monitors (two per site) track daily compliance using pictorial tools; report directly to UNIPROBA and PMU; quarterly community monitoring meetings.
- **Tier 2 - Internal:** PMU Social Safeguards Expert conducts monthly site visits; quarterly safeguards dashboard to PSC; Stop-Work Authority for critical non-compliance; 48-hour rapid response for violations.
- **Tier 3 - Independent:** UNEP annual supervision missions; Third-Party Monitor verifies site selection; mid-term and terminal evaluations; annual external social audits.

**Key ESMP Performance Indicators:** % beneficiaries from poorest quintile (≥40%); % Batwa representation in CCDRRs (≥5%); % women in CCDRR leadership (≥30%); % women in deployment teams (≥50%); gender pay gap (0%); GBV/SEAH incidents (100% resolved, zero tolerance); % workers with OHS training (100%); lost-time injury rate (<5 per million hours); child/forced labor (zero); area habitat restored (100%); water quality (meet standards); malaria incidence (no increase); unresolved land disputes (zero).

123. **Compliance Summary**

The project demonstrates **full compliance with all 15 AF ESP principles and Gender Policy** through comprehensive risk identification, impact assessment, and management planning detailed in ESMP (ANNEX 4 — Environmental and Social Impact Assessment and Environmental and Social Management Plan (ESIA-ESMP), GAP (ANNEX 5 — Gender Action Plan (GAP), and IPP (ANNEX 6 — Indigenous Peoples Planning Framework (IPPF) and Indigenous Peoples Plan (IPP). Key compliance elements: legal compliance verified; vulnerability-based site selection with TPM verification; Indigenous Peoples Plan with FPIC; Gender Action Plan with quotas and GBV/SEAH prevention; no physical displacement with livelihood restoration protocols; biodiversity management with No-Go Zones; climate-resilient design; labor rights and OHS protocols; accessible grievance mechanism; multi-layered monitoring; adequate budget; and UNEP quality assurance.

The gender-transformative approach exceeds GP minimum requirements through women's meaningful participation (50% CCDRR membership, 30% leadership), control over adaptation assets, economic empowerment, and GBV/SEAH mitigation. All safeguards' commitments are binding conditions of AF financing, integrated into project legal agreements, and subject to ongoing monitoring throughout implementation.

# D. Monitoring and Evaluation Arrangements and Budgeted M&E Plan

124. The project's Monitoring and Evaluation (M&E) system will comply with the Adaptation Fund's M&E requirements, Environmental and Social Policy (ESP), Gender Policy (GP), Evaluation Framework, and UNEP's M&E policies and guidelines. The M&E framework employs a results-based approach that tracks progress toward outputs, outcomes, and the project objective through indicators, baselines, targets, and means of verification. The M&E system will ensure accountability, facilitate adaptive management, capture lessons learned, and promote knowledge sharing to enhance project effectiveness and sustainability.

125. **M&E Framework and Approach**

The M&E framework is grounded in the following key principles:

- **Results-Based approach**: The M&E system focuses on measuring project results against the targets and indicators established in the Results Framework (see Part III.E), ensuring that all activities contribute to achieving intended outcomes and the project objective.

- **Participatory and Inclusive M&E**: Stakeholders at national and local levels will be actively engaged in M&E activities. Participatory approaches ensure that monitoring captures diverse perspectives and values community knowledge and experience.

- **Gender-Responsive M&E**: All M&E activities will integrate gender considerations through sex-disaggregated data collection, gender-sensitive indicators, and monitoring of Gender Action Plan implementation. The M&E system will track women's participation, access to benefits, etc.

- **Adaptive Management:** M&E findings will inform adaptive management decisions, allowing the project to adjust activities, strategies, or targets based on evidence and lessons learned while maintaining compliance with AF and UNEP policies.

- **Learning and Knowledge Management**: M&E will capture lessons learned, best practices, and innovation throughout project implementation, contributing to the knowledge base on climate change adaptation in Burundi.

126. **M&E Responsibilities**

Clear roles and responsibilities ensure effective M&E implementation:

- **UNEP**: Responsible for the Evaluation process, M&E guidance to Executing Entities (OBPE and sub-contracted IGEBU), reviews report from the PMU, conducts supervision missions, ensures compliance with AF and UNEP M&E requirements, submits annual PPRs to the AF Board and in charge of commissioning independent terminal evaluation.

- **Project Management Unit (PMU) - OBPE and IGEBU:** Responsible for day-to-day Monitoring activities, employs dedicated Monitoring staff (under Component 3), collects monitoring data on indicators (including sex-disaggregated data), maintains Monitoring database, conducts field visits and stakeholder consultations, prepares progress reports, monitors ESMP and Gender Action Plan implementation, and manages the grievance redress mechanism.

- **Project Steering Committee (PSC):** Reviews M&E reports and progress against indicators, provides guidance on addressing implementation challenges, reviews work plan adjustments based on M&E findings, and ensures alignment with national priorities.

- **Community Stakeholders:** Participate in baseline surveys, data collection, participatory monitoring exercises, and feedback sessions; provide information on project impacts and sustainability.

- **Independent Evaluators**: Conduct mid-term review and final evaluation with impartial assessment of project performance, results, and sustainability.

127. **Main M&E Activities and Timeline**

The M&E plan includes the following key activities aligned with AF requirements and UNEP standards:

*Table 35 M&E Activities, Responsibilities, Timeline, and Budget*

| M&E Activity | Responsible Parties | Timeline | **Reporting format** | Budget (USD) |
|---|---|---|---|---|
| Inception workshop | PMU (Project Coordinator) | Within 3 months of project agreement signing | Workshop report | Under execution fee (USD 5 000) |
| Baseline Data Report (BDR) | Independent Consultancy contracted by UNEP | Within the first 6 months of project implementation | Baseline report | 20 000 Under MIE fee (part of the USD 95 000) |
| M&E Plan Development | PMU (M&E Officer) | During inception phase (Month 1-3) | M&E Plan | Included in M&E Officer salary (USD 105 600) |
| Field Monitoring / Missions | PMU and UNEP Task Manager | Minimum yearly | Mission reports | Under comp 3 (USD 40 000)<br>Under MIE fee (USD 15 668) |
| Annual Project Performance Reports (PPRs) | PMU drafts, UNEP revised, PSC informed | Annually, no later than 2 months after end of reporting year (starting 1 year after inception workshop) | PPRs | Included in Project Coordinator and M&E Officer salary + MIE fee |
| Progress Reports | PMU (M&E Officers) | Half yearly throughout project | Progress reports | Included in M&E Officer salary (see above) |
| Project Performance Workshops | PMU, PSC | Half yearly throughout project | PSC meeting reports | Under execution fee (USD 12 000) |
| Gender Action Plan Monitoring | PMU (Project ESMP and gender plan implementation officer | Half yearly throughout project with annual synthesis | Monitoring reports | Included in Gender Officer salary under Component 3 (USD 105 600) |

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| ESMP Compliance and GRM cases Monitoring and recording | PMU (Project ESMP and gender plan implementation officer (PMU) | Half yearly throughout project with annual synthesis | Monitoring reports | Included in ESMP implementation officer salary under Component 3 (USD 105 600) |
| Consultancy services for capacity development and support of the M&E officer to develop and implement data gathering and monitoring plans | PMU | Within year 1 | Capacity strengthening report | Under execution fee (USD 40.700) |
| Mid-term review | Independent Evaluators contracted by UNEP | Mid-term | Review report | 35 000 Under MIE fee (part of the USD 117 510) |
| Completion workshop | PMU (Project Coordinator) | At the end of the project | Workshop report | Under execution fee (USD 5 000) |
| Project Completion Report and Summary | PMU drafts, UNEP revised | Within 6 months after project completion | Completion report | Included in Project Coordinator and M&E Officer salary + MIE fee |
| **Evaluation** | | | | |
| Terminal Evaluation | Independent Evaluators contracted by UNEP | Within 9 months of operational closure | Evaluation report | 60 000 Under MIE fee (part of the USD 117 510) |

128. **Contingency arrangements if Components 1–2 are delayed:** Three measures will be taken and should be tracked): (i) Decoupled early deliverables — the Output 4.2 baseline knowledge products (replicable EWS protocol, FPIC/IPP toolkit, GAP-mainstreaming playbook) can be produced from Year-1 inputs and the AFCIA pilot evidence base without depending on Component 2 barrier-deployment data, and these are now front-loaded to Year 1–2; (ii) Stage-gated South–South engagement with the Nile Basin Initiative and East African Community is staged in two tranches — a Year-2 Approach and Design Exchange (transferable even without operational data) and a Year 3–4 Performance and Lessons Exchange (requires barrier-deployment evidence); if implementation lags by more than 6 months at the Mid-Term Review, the second tranche slides into a no-cost extension of up to 12 months under the AF MIE flexibility provisions; (iii) Implementation-lag triggers — if Component 2 procurement is more than 6 months behind plan at Month 18, the Project Steering Committee re-baselines the Component 3 timeline and reallocates up to 15% of the Component 3 budget to acceleration measures (parallel procurement, additional TA).

*Table 36 Overview M & E budget*

| Type of M & E Activity | Activity | Total | Yea 1 | Year 2 | Year 3 | Year 4 |
|---|---|---|---|---|---|---|
| Measurements of means of verification (baseline assessment and M & E plans) | Inception and completion workshops and reports (under project execution cost) | **$ 10.000,00** | $ 5.000,00 | $ - | $ - | $ 5.000,00 |
| | Consultancy services for capacity development and support of the M&E officer to develop and implement data gathering and monitoring plans (under project execution cost) | **$ 40.700,00** | $ 40.700,00 | $ - | $ - | $ - |
| Direct Project Monitoring | M & E officer (under comp 3) | **$105.600,00** | $ 26.400,00 | $26.400,00 | $26.400,00 | $26.400,00 |
| | Field Monitoring / Supervision Missions (under comp 3) | **$ 40.000,00** | $ 10.000,00 | $10.000,00 | $10.000,00 | $10.000,00 |
| Total | | **$196.300,00** | **$ 82.100,00** | **$36.400,00** | **$36.400,00** | **$41.400,00** |
| Total from MIE fee | 1.Mid-term and final evaluation<br>2.Baseline report | **$110,368,00** | | | | |

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| | 3. UNEP monitoring missions | | | | | |
| Total | | **$306,968,00** | | | | |

129. **M&E Reporting Requirements**

The project will produce the following M&E reports in compliance with AF and UNEP requirements:

- **Inception Report:** Prepared within 3 months of project start, documenting inception workshop outcomes, finalized M&E Plan with confirmed indicators, baselines and targets, detailed Year 1 work plan and budget, updated risk assessment, and stakeholder engagement plan.

- **Baseline Data Report (BDR):** Prepared by UNEP, with support from an independent consultancy/team, and completed within the first six months of implementation. The BDR will validate project baseline values, confirm indicator methodologies, disaggregation and data sources, and flag any evidence-based adjustments required to baselines or targets. It will guide subsequent monitoring and be submitted to the AF in line with its requirements.

- **Half yearly Progress Reports**: Prepared by PMU and submitted to UNEP and PSC, covering progress on outputs and activities, expenditure against budget, risks and issues, ESMP and Gender Action Plan implementation status, Grievance Mechanism performance, and adaptive management actions.

- **Annual Project Performance Reports (PPRs):** Prepared by UNEP and submitted to AF Board no later than 2 months after end of reporting year, including:
    - Project milestones.
    - Financial data.
    - Procurement data.
    - Risks assessments.
    - ESP compliance.
    - GP compliance.
    - Project indicators.
    - Lessons learned.
    - Project results.

- **Final Evaluation Report:** Conducted by independent evaluators within 9 months of operational closure, assessing project performance against objectives, outcomes, and outputs using AF evaluation criteria (relevance, effectiveness, efficiency, impact, sustainability, coherence, gender equality and social inclusion, innovation, and replicability), ESP and GP compliance, and sustainability of results, with recommendations for future programming.

- **Project Completion Report (Final PPR):** Submitted 6 months after project completion, synthesizing cumulative results, lessons learned, sustainability assessment, and final financial statement.

- **Technical Reports:** As needed for specific studies, assessments, or knowledge products (e.g., ESIA-ESMP monitoring reports, Gender Action Plan assessment, climate risk assessments, infrastructure functionality reports).

# E. Project Results Framework

*Table 37: Project results framework*

| Project Results | Indicator | Baseline | Target | | Means of Verification | | | Risks, Assumptions, Notes |
|---|---|---|---|---|---|---|---|---|
| | | | Mid-term | Final | Methods and Sources | Responsible Party | Frequency | |
| Objective: To enhance the resilience of vulnerable communities and institutions in Burundi to climate change-induced flood and drought events by deploying innovative adaptation technologies, strengthening climate information systems and early warning capacities, and promoting gender- and vulnerable groups-responsive community empowerment and institutional capacity building. | Core Indicator : Number of beneficiaries with strengthened resilience to climate change-induced flood and drought events. | 0 (no comprehensive integrated climate adaptation solution exists for flood/drought risk mitigation in target communes: Mpanda, Bubanza, Bukinanyana). Baseline year: 2026. | Direct: 179,058 (≥50% Women 89,529; Youth 56,764;<br><br>Indirect = 437,393 − 179,058): 258,335 (51% Women 131,751. Youth 82,667; | Direct: 358,116 (≥50% Women 179,058; Youth 113,527;<br><br>Indirect = 874,786 total commune population − 358,116 direct beneficiaries): 516,670 (51% Women 263,502; Youth 165,334; | Beneficiary registry disaggregated by direct/indirect status, sex, age, vulnerability; household and community surveys; commune population census data. | PMU M&E Officer (OBPE), with IGEBU | Annually (PPR); baseline at inception; mid-term and terminal evaluation. | Direct beneficiaries are the 358,116 inhabitants of the 35 targeted Collines receiving higher-intensity project support. Indirect beneficiaries are the remaining 516,670 inhabitants of the three target communes who benefit from wider commune-level resilience effects. The indirect figure is calculated from the total population of 874,786 after deducting direct beneficiaries. Each person is counted once, and EWS coverage alone is not used to determine beneficiaries under Core Indicator 1. |
| **Outcome 1:** Reduced impacts of flood and drought hazards through the generation and dissemination use of climate risk information for preparedness and the | Outcome Indicator 1: Number of people using climate-related flood and drought threat and hazard information to inform preparedness and the deployment of the dual-purpose mobile flood barriers. | 71,623 (~20% of target population currently receives basic climate information and early warnings). Baseline year: 2026. | 89,529 people (25% of total direct beneficiaries) using improved climate/hazard information, of which: Women 44,765; Youth 26,859; | 179,058 people (50% of total direct beneficiaries) using improved climate/hazard information, of which: Women 89,529. Youth 53,717; | Household and institutional surveys on information receipt and use; communication system logs; IGEBU early warning reports; community feedback sessions. | IGEBU (Component 1 lead), reporting to OBPE PMU. | Awarenes s/use surveys: mid-term and terminal; logs collected | Communities trust and act on information received. Multi-channel dissemination overcomes connectivity limitations. |

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| deployment of the dual-purpose mobile flood barriers.<br><br>**Aligns with AF Outcome 1.** | | | | | | | continuously. | |
| **Output 1.1:** Geospatial flood and drought hazard maps and risk profiles for three (3) target communes developed (to verify the most suitable locations for the dual-purpose mobile flood barriers) | Output Indicator 1.1: Number of geospatial flood/drought hazard maps and risk profiles produced and validated in a gender-inclusive manner.<br><br>Input: GAP activity 1.1.1.a, 1.1.2.a, 1.1.3.a and 1.1.4.a | 0 (no comprehensive flood/drought hazard mapping exists for the 3 target communes). Baseline year: 2026. | 3 maps/profiles completed (1 per commune, covering flood or drought hazard). | 9 maps/profiles completed: 3 flood hazard maps, 3 drought hazard maps, 3 integrated risk profiles (1 set per commune). | Published maps and risk profiles; technical validation reports; stakeholder review records. | IGEBU (Component 1 lead), with OBPE and PFNPRGC support. | Once, upon completion of assessments (Year 2), validated through stakeholder review. | Deployment sites identified through Component 1 are suitable. Stakeholders engage in review and validation. |
| **Output 1.2:** Early warning dissemination and communication systems strengthened (to inform the deployment of the dual-purpose mobile flood barriers) | Output Indicator 1.2.1: Number of early warning systems established or improved<br><br>Input: GAP activity 1.1.5.b | 1 (basic national-level system; no communal-level systems for flood/drought). Baseline year: 2026. | 2 early warning systems improved (1 national, 1 of 3 communal). | 4 early warning systems established or improved (1 national, 3 communal — Mpanda, Bubanza, Bukinanyana). | System design and upgrade records; technical commissioning reports. | IGEBU (Component 1 lead), reporting to OBPE. | Once per system, upon commissioning. | Improved communication channels remain accessible. Technical upgrades are completed on schedule. |
| | Output Indicator 1.2.2: Number of people covered by new or improved early warning systems | 71,623 (~20% of target population currently covered). Baseline year: 2026. | 89,529 people (25% of total direct beneficiaries) covered, of which: Women 44,765;.. | 179,058 people (50% of total direct beneficiaries) covered, of which: Women 89,529;. | Verified list of covered population disaggregated by sex, age, vulnerability; communication system coverage logs. | IGEBU (Component 1 lead), reporting to OBPE. | Coverage logs: continuous; verification surveys: mid-term and terminal. | Communities trust and act on climate information received. Multi-channel dissemination overcomes connectivity limitations. |
| **Outcome 2:** Strengthened institutional capacity to monitor and forecast flood and drought risk. | Outcome Indicator 2: Number of IGEBU staff and designated provincial and communal focal points demonstrating strengthened capacity in climate monitoring, forecasting and alert interpretation. | 0 (no staff trained on integrated monitoring, EWS dissemination or barrier deployment protocols). Baseline year: 2026. | 65 IGEBU staff trained, of which: Women 33; Youth 20. | 130 IGEBU staff trained, of which: Women 65. Youth 39. | Training attendance lists (disaggregated); pre/post knowledge assessment scores. | IGEBU, reporting to OBPE. | Training records: per session; knowledge assessments: baseline, mid-term, endline. | Trained staff remain in position. Training is practical/relevant. Women, youth and Batwa can participate without barriers (schedule, location, language). |

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| **Output 2.1:** Climate monitoring network and forecasting capacity expanded to inform timely deployment of the dual-purpose mobile flood barriers. | Output Indicator 2.1a: Number of institutions with staff trained in climate monitoring, forecasting and alert interpretation. | 0 institutions with staff/focal points trained through the project. Baseline year: 2026. | 3 institutions supported (1 national, 1 provincial, 1 of 3 communal). | 5 institutions supported (1 national — IGEBU; 1 provincial — Bujumbura; 3 communal — Mpanda, Bubanza, Bukinanyana). | Technical assistance records; procurement and installation records; capacity assessments. | IGEBU, reporting to OBPE. | Capacity assessments: baseline and endline. | Institutions commit staff to capacity-building activities. Operational budgets support maintenance. |
| | Output Indicator 2.1b: number of monitoring stations installed | Current monitoring stations: 10 hydrological stations and 3 meteorological stations in Bujumbura province. Limited coverage of Mpanda, Bubanza and Bukinanyana | Monitoring stations: 5 hydrological stations rehabilitated; 1 Automated hydrological monitoring stations incl PV, installation and protective measures;1 Automatic meteorological stations / equipment, incl PV, installation and protective measures | Monitoring stations: 10 hydrological stations rehabilitated; 3 Automated hydrological monitoring stations incl PV, installation and protective measures;3 Automatic meteorological stations / equipment, incl PV, installation and protective measures | Engineering and procurement records; field verification visits; | IGEBU, reporting to OBPE. | Once, upon completion of assessments (Year 2-3), validated through stakeholder review. | Monitoring stations are needed, working and fit into the wider system. |
| **Outcome 3:** Strengthened awareness and ownership of adaptation and climate risk reduction processes, especially climate-informed preparedness and response processes at local level in three target communes to enable timely and inclusive deployment of the dual-purpose mobile flood barriers. | Outcome Indicator 3: Number of people with strengthened awareness of climate change risks and how to better address them | 0 (no structured awareness of climate impacts, flood/drought risks or preparedness/response measures in the 3 communes). Baseline year: 2026. | 89,529 people (25% of total direct beneficiaries) with strengthened awareness, of which: Women 44,765; Youth 26,859. | 179,058 people 50% of total direct beneficiaries) with strengthened awareness, of which: Women 89,529; Youth 53,717. | Household/community awareness surveys (pre/post); training participation records. | OBPE (community engagement lead), with IGEBU and NGO (Batwa) inputs. | Household/community surveys: baseline, midline, endline. | Communities are willing to participate. Communication materials are accessible in local languages (Kirundi, French) and culturally appropriate. Commune authorities support and co-facilitate activities. |
| **Output 3.1:** Climate-informed preparedness/response plans developed and operationalized for | Output Indicator 3.2: Number of disaster preparedness plans developed and shared with stakeholders | 0 (no commune-level climate-informed preparedness/response plans exist). | 2 preparedness/response plans developed and | 3 commune preparedness/response plans developed and disseminated | Preparedness/response plans; quality review reports; distribution records. | OBPE, with IGEBU technical input. | Plans finalized and reviewed | Stakeholders engage in review and validation. Plans are implemented |

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| three (3) target communes (to prepare for the deployment of the dual-purpose mobile flood barriers) | Input: GAP activity 1.1.5.a, 2.1.5.a1 and 2.1.5.a2. | Baseline year: 2026. | disseminated (2 of 3 communes). | (Mpanda, Bubanza, Bukinanyana). | | | once per commune. | during actual events or simulations. |
| Output 3.2: CCDRRs trained and supported in technical and management functions for climate-informed preparedness and response in the three target communes.<br><br>Aligns with AF Output 3.3: Increased ownership of adaptation and climate risk reduction processes. | Output Indicator 3.3: Number of CCDRRs trained and supported in technical and management functions for climate-informed preparedness and response.<br><br>Input: GAP activity 1.1.5.a. | 0 of 3 target CCDRRs trained and supported through the project. Baseline year: 2026. | 2 CCDRRs trained and supported. | 3 CCDRRs trained and supported. (Mpanda, Bubanza and Bukinanyana). | Training records; coordination protocols; meeting and decision records; CCDRR membership rosters | OBPE, with IGEBU technical input | Annual | Commune authorities support CCDRR participation and members remain engaged in training, preparedness and response functions. |
| **Outcome 4:** Strengthened livelihood resilience against droughts and floods through the deployment of the dual-purpose mobile flood barrier technology | Outcome Indicator 4: Number of households with increased income or avoided decrease in income | 0 (households experience decrease of income during flood periods; no irrigation from flood barrier exists). Baseline year: 2026. | 1,000 households with increased/avoided decrease in income, of which ≥500 female-headed. | 2,000 households with increased/avoided decrease in income, of which ≥1,000 female-headed. | Household income survey (pre/post-intervention); crop production records. | OBPE, with independent income-survey panel commissioned in Year 1. | Survey pre- and post-intervention; repeated at mid-term and terminal evaluation. | Irrigation during dry season leads to higher crop production. Protection of crops from floods avoids income decrease during flood season. |
| **Output 4.1:** Mobile flood barrier technology and integrated water systems deployed and operational and maintained in three (3) target communes to protect lives, assets, and agricultural land from intensified flooding and to irrigate agriculture.<br><br>Aligns with AF indicator 8.1 | Output Indicator 4.1.1: Kilometers of mobile flood barriers deployed to withstand climate-induced floods<br><br>Input: GAP activity 2.1.1.a, 2.1.2.a, 2.2.2.a | 0 km (no mobile flood barriers deployed). Baseline year: 2026. | 3.5 km of mobile flood barriers deployed and operational across the 3 communes. | 6.5 km of mobile flood barriers deployed and operational across the 3 communes. | Deployment/asset tracking records; deployment plans; safety-audit reports. | OBPE (Component 2 lead), with IGEBU forecast input. | Deployment/asset tracking: continuous; safety and gender audits: annually. | Mobile flood barriers can be procured locally/regionally or imported duty-free. Deployment sites identified through Component 1 are suitable. |
| | Output Indicator 4.1.2: Hectares of agricultural land irrigated using the flood barrier's integrated water system | 0 ha (no irrigation from flood barrier exists). Baseline year: 2026. | 1.75 ha irrigated by the flood barrier. | 3.5 ha irrigated by the flood barrier for at least 6 months per year. | Irrigation records; field verification visits; crop production records. | OBPE (Component 2 lead). | Field verification: annually. | Equipment functions as intended. Water availability is sufficient for |

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| | Input: GAP activity 2.2.1.a | | | | | | | irrigation during dry season. |
| | Output Indicator 4.1.3: Number of people trained in operation and maintenance of the mobile flood barriers and integrated water systems<br><br>Input: GAP activity 2.1.3.a, 2.1.4.a | 0 (no people trained in operation and maintenance of the innovative dual-purpose mobile flood barriers). Baseline year: 2026. | 900 people trained, of which: Women 450.. | 1,800 people trained, of which: Women 900.. | Training attendance lists (disaggregated); skills assessment before/after training; certifications. | OBPE, with Civil Protection and Burundi Red Cross support. | Training records: per session; certification tracking: annually. | Training is practical and relevant. Trained individuals remain in communities. Equipment is available for hands-on training. |
| **Output 4.2:** Knowledge products on the benefits of the innovative dual-purpose mobile flood barriers and integrated water systems produced and disseminated. | Output Indicator 4.2: Number of knowledge products on the benefits of the mobile flood barriers and integrated water systems produced<br><br>Input: GAP activity 2.3.2.a, 4.2.a, 4.2.b, 4.2.c | 0 (no innovation-focused knowledge products/tools documenting benefits of dual-purpose mobile flood barriers). Baseline year: 2026. | 2 knowledge products produced. | 5 knowledge products produced (≥3 adaptation knowledge products; ≥1 technical manual; ≥1 replication guide). | Published knowledge products; technical review records; distribution/dissemination records. | OBPE, with IGEBU and universities/regional platforms. | Products finalized progressively Years 2-4. | Quality products are developed and disseminated to intended users. Stakeholders are interested. |
| **Output 4.3:** Peer-learning exchanges established to facilitate replication by other communes and institutions | Output Indicator 4.3: Number of knowledge exchanges conducted<br><br>Input: GAP activity 2.3.3b, 4.3.a, 4.3.b. | 0<br>Baseline year: 2026. | 1 exchange conducted. | 3 exchanges conducted (≥1 demonstration site event; ≥1 dissemination event; ≥1 peer-learning exchange). | Event participation records; lessons-learned documentation; media coverage records. | OBPE, with IGEBU, PFNPRGC, NBI/IGAD/EAC. | Events held progressively Years 3-4; reporting after each exchange. | Dissemination channels are effective. Stakeholders are interested. |

***Table 38*** *Summary of target AF core indicators*

| Core indicator | Targets | Comment |
|---|---|---|
| **Core Indicator 1**: Core Indicator 1: Number of beneficiaries [# of people, disaggregated by direct and indirect beneficiaries, by sex, by vulnerable groups, and by sector] | • Total population: 358,116 direct beneficiaries across 35 Collines and 516,670 indirect (874,786-358,116)<br>• Direct Women beneficiaries: almost 51 percent<br>• Direct Youth beneficiaries (15-34 years): almost 32 percent<br>• Direct Elderly and disabled: 5.6 percent<br>• Direct Farmers: 83 percent<br>• Direct Batwa and other minorities: 1 percent<br><br>Of which 4750 trained / participated in workshops and simulations. | Total Under Component 1 and 2 |
| | | |
| **Core Indicator 3** (Indicator 4): Physical assets improved or constructed to withstand climate | 6,5 km dual-purpose flood barriers | Component 2 |

| | | |
|---|---|---|
| variability and change<br>[disaggregated by km of linear infrastructure and # of point infrastructure, and by sector].<br><br>*This indicator is covered under outcome 8 | | |
| **Core Indicator 5 (**Indicator 6B): Households with increased income, or avoided decrease in income [# of households, disaggregated by female-headed households] | Increased income of beneficiaries of irrigation from the flood barriers | |

*Table 39 Expected trainings and expected numbers of participants in workshops/trainings*

| Output | Number of Trainings / Workshops | Total number of participants | Total |
|---|---|---|---|
| 1.1. | 3 (30 pers)<br>6 (15 pers) | 90<br>90 | **180** |
| 1.2 | 4 (20 pers)<br>4 (20 pers)<br>4 (20 pers)<br>8 (20 pers) | 80<br>80<br>80<br>160 | **400** |
| 2.1 | 1 (10 pers)<br>6 (20 pers) | 20<br>120 | **130** |
| 3.1 | 9 (20 pers)<br>9 (40 pers)<br>3 (500 pers) | 180<br>360<br>1500 | **2040** |
| 3.2 | 4 (20 pers) | 80 | **80** |
| 4.1 | 3 (20 pers)<br>6 (20 pers)<br>3 (500 pers)<br>6 (20 pers) | 60<br>120<br>1500<br>120 | **1800** |
| 4.2 | 3 (20 pers) | 60 | 60 |
| 4.3 | 2 (20 pers)<br>2 (10 pers) | 40<br>20 | **60** |
| Total | | **4750** | **4750** |

## F. Project alignment with the adaptation fund results framework[45]

*Table 40: Alignment with the Adaptation Fund's Result Framework (2025)*

| Project Objective | Project Objective Indicator | Fund Impact Indicator | Fund Outcome | Fund Outcome Indicator | Grant Amount (US$) |
|---|---|---|---|---|---|
| **Overall objective:** To enhance the resilience of vulnerable communities and institutions in Burundi to climate change-induced flood and drought events by deploying innovative adaptation technologies, strengthening climate information systems and early warning capacities, and promoting gender and vulnerable groups-responsive community empowerment and institutional capacity building. | **Core Indicator 1**: Number of beneficiaries<br><br>[# of people, disaggregated by direct and indirect beneficiaries, by sex, by vulnerable groups, and by sector] | Core Indicator: Number of beneficiaries<br><br>[# of people, disaggregated by direct and indirect beneficiaries, by sex, by vulnerable groups, and by sector] | **Outcome 1**: Reduced exposure to climate-related hazards and threats. | **Indicator 1:** Indicator 1: People using climate-related threat and hazard information<br>[# of people, by sex, by sector, and by hazard] | 558 000 |
| | | | **Outcome 2:** Strengthened institutional capacity to reduce risks associated with climate-induced socioeconomic and environmental losses. | **Indicator 2**: Indicator 2: Institutions with strengthened capacity to understand and better address climate risks and resilience<br>[# of institutions, disaggregated by scale, by sector, and by type of institution] | 325 000 |
| | | | **Outcome 3**: Strengthened awareness and ownership of adaptation and climate risk reduction processes. | **Indicator 3A:** People with strengthened awareness of climate change risks and how to better address them<br>[# of people, disaggregated by sex, by vulnerable groups, and by sector]<br>**Indicator 3B**: People implementing new or improved adaptation actions<br>[# of people, disaggregated by sex and by vulnerable groups] | 240 000 |
| | | | **Outcome 6**: Diversified and strengthened livelihoods and sources of income for vulnerable people in targeted areas | **Indicator 6B (Core Indicator 5):** Households with increased income, or avoided decrease in income<br>[# of households, disaggregated by female-headed households] | 154 000 |
| | | | **Outcome 8**: Innovation for effective, long-term adaptation to climate change accelerated, encouraged, and enabled to scale up) | ***indicator 8.A**: Innovations successfully reaching scale up that demonstrate local innovation participation and/or local innovation benefit*<br>*(# of innovations))* | 3 024 600 |

| Project Outcome(s) | Project Outcome Indicator(s) | Fund Output | Fund Output Indicator | Grant Amount (US$) |
|---|---|---|---|---|
| **Outcome 1:** Reduced exposure of vulnerable communities in three target communes to flood and drought hazards through the generation and dissemination of actionable climate risk information | **Outcome Indicator 1**: Number of people using climate-related flood and drought threat and hazard information | **Output 1.1:** Risk and vulnerability assessments conducted and updated | **Indicator 1.1:** Risk and vulnerability assessments conducted or updated<br>[# of assessments, by sector and scale] | 318 000 |
| | | **Output 1.2:** Targeted population groups covered by warning and advisory services for climate-related hazards and threats) | **Indicator 1.2A (Core Indicator 2):** Early warning systems established or improved<br>[# of systems, disaggregated by hazard and by scale]<br><br>**Indicator 1.2B:** People covered by new or improved early warning systems<br>[# of people, disaggregated by sex and by hazard] | 240,000 |
| **Outcome 2:** Strengthened institutional capacity covering the three target communes to reduce climate-induced flood and drought risks through | **Outcome Indicator 2:** Number of institutions with strengthened capacity to understand and better address climate risks and resilience | **Output 2.1:** Strengthened capacity of institutions to understand and better address climate risks | **Indicator 2.1**: Institutions supported to strengthen capacity to understand and address climate risks and resilience | 325,000 |



[45] Update to the Adaptation Fund Strategic Results Framework (2025)

| Project Outcome(s) | Project Outcome Indicator(s) | Fund Output | Fund Output Indicator | Grant Amount (US$) |
|---|---|---|---|---|
| expanded climate monitoring and improved forecasting. | | | [# of institutions, disaggregated by scale, by sector, and by type of institution] | |
| **Outcome 3:** Strengthened awareness and ownership of adaptation and climate risk reduction processes, especially climate-informed preparedness and response processes at local level in three target communes, including indigenous peoples, to enable timely and inclusive deployment of the dual-purpose mobile flood barriers. | **Outcome Indicator 3**: Number of people with strengthened awareness of climate change risks and how to better address them | **Output 3.2**: Strengthened capacity of national and subnational stakeholders and entities to capture and disseminate knowledge and learning | **Indicator 3.2:** Climate resilience knowledge products and/or tools developed and shared with stakeholders [# of products/tools, by sector] | 240,000 |
| **Outcome 4:** Innovative dual-purpose mobile flood barrier technology and integrated water systems are deployed and validated for replication and scale-up at different levels | **Outcome Indicator 4**: Number of households with increased income or avoided decrease in income | **Output 6.1**:Targeted individual and community livelihood strategies strengthened in relation to climate change impacts, including variability | **Indicator 6.1**: People receiving targeted support for new and/or improved livelihoods to manage climate risk [# of people, disaggregated by sex and by vulnerable groups] | 154 000 |
| | | **Output 8.1:** Innovations identified and piloted that collectively enhance local innovation capacity and contribute to the development of local, national and regional adaptation innovation ecosystems | **Indicator 8.1A**: Innovations identified that demonstrate local innovation participation and/or local innovation benefit [# of innovations]) | 2 194 000 |
| | | ***Output 8.2:*** Innovations identified and piloted which build the adaptation innovation evidence-base and institutional capacity | **Indicator 8.2:** Innovation-focused knowledge products disseminated and/or learning events facilitated that support and enable innovation capacity at a local, national, and/or regional level [# of knowledge products disseminated and/or learning events facilitated) | 830 600 |

# G. Detailed project budget

*Table 41 Budget overview*

| Project Components | Expected Outputs | Expected Concrete Outcomes | TOTAL | Year 1 12 m | Year 2 12 m | Year 3 12 m | Year 4 12 m | % total | % comp |
|---|---|---|---|---|---|---|---|---|---|
| Component 1: Climate information and warning systems and responses to flood and drought risks/threats | Output 1.1. Geospatial flood and drought hazard maps and risk profiles for three (3) target communes developed (to verify the most suitable locations for the dual-purpose mobile flood barriers) | **Outcome 1:** Reduced exposure of vulnerable communities in three target communes to flood and drought hazards through the generation and dissemination of actionable climate risk information (to be used to deploy the dual-purpose flood barrier) | 318.000 | 304.500 | 4.500 | 4.500 | 4.500 | 6,4% | |
| | Output 1.2: Early warning dissemination and communication systems strengthened (to inform the deployment of the dual-purpose mobile flood barriers | | 240.000 | - | 240.000 | - | - | 4,8% | |
| | Output 2.1: Climate monitoring network and forecasting capacity expanded (to inform timely deployment of the dual-purpose mobile flood barriers) | **Outcome 2:** Strengthened institutional capacity covering the three target communes to reduce climate-induced flood and drought risks through expanded climate monitoring and improved forecasting. | 325.000 | - | 325.000 | - | - | 6,5% | |
| | Output 3.1: Climate-informed preparedness/response plans developed and operationalized for three (3) target communes (to prepare for the deployment of the dual-purpose mobile flood barriers) | **Outcome 3:** Strengthened awareness and ownership of adaptation and climate risk reduction processes, especially climate-informed preparedness and response processes at local level in three target communes, including indigenous peoples, to enable timely and inclusive deployment of the dual-purpose mobile flood barriers. | 150.000 | - | 150.000 | - | - | 3,0% | |
| | Output 3.2: CCDRRs trained and supported in technical and management functions for climate-informed preparedness and response in the three target communes | | 30.000 | - | 30.000 | - | - | 0,6% | |
| | **TOTAL** | | **1,063,000** | 304,500 | 749,500 | 4,500 | 4,500 | 21.3% | 21.3% |
| Component 2: Innovative flood and drought risk reduction practices and technologies | Output 4.1. Mobile flood barrier technology and integrated water systems deployed and operational and maintained in three (3) target communes to protect lives, assets, and agricultural land from intensified flooding and to irrigate agriculture | **Outcome 4:** Innovation for effective, long-term adaptation to climate change accelerated, encouraged, and enabled to scale up through the dual-purpose mobile flood barrier technology and integrated water systems - enhancing ecosystem resilience and natural resource management, securing climate-resilient livelihoods for vulnerable communities | 2,348,000 | 4,500 | 2,220,500 | 118,500 | 4,500 | 47.0% | |
| | **TOTAL** | | **2,348,000** | 4,500 | 2,220,500 | 118,500 | 4,500 | 47.0% | 47.0% |
| Component 3: Knowledge management for post-project sustainability and innovation diffusion | Output 4.2. strong evidence base on the benefits of the innovative dual purpose mobile flood barriers and integrated water systems produced and disseminated | | 808,600 | 222,600 | 202,000 | 202,000 | 182,000 | 16.2% | |
| | Output 4.3 Demonstration sites, peer-learning exchanges, and knowledge-sharing platforms established to facilitate replication by other communes and institutions | | 82.000 | - | 20.000 | 62.000 | - | 1,6% | |
| | **TOTAL** | | **890,600** | 222,600 | 222,000 | 264,000 | 182,000 | 17.8% | 17.8% |
| Sub-total Project Components Costs | | | 4,301,600 | 531,600 | 3,192,000 | 387,000 | 191,000 | 86.0% | 86.0% |
| Project Execution Costs | Project Execution Unit | | 256,700 | 94,700 | 54,000 | 54,000 | 54,000 | | |
| | Travel | | 8,000 | 2,000 | 2,000 | 2,000 | 2,000 | | |
| | Operations | | 42,000 | 13,000 | 8,000 | 8,000 | 13,000 | | |
| Sub-total Project Execution Fee | | 6,66% | 306,700 | 109,700 | 64,000 | 64,000 | 69,000 | 6.1% | |
| SUB-TOTAL Component + execution fee | | | 4,608,300 | 641,300 | 3,256,000 | 451,000 | 260,000 | 92.2% | |
| Sub-total Project Cycle Management Fee | | 8,50% | 391,700 | 97,925 | 97,925 | 97,925 | 97,925 | 7.8% | |
| **Amount of Financing Requested** | | | 5,000,000 | 739,225 | 3,353,925 | 548,925 | 357,925 | 100.0% | |

*Table 42 Budget notes*

| Component | Output | Activities | Line item / notes | % | TOTAL | Year 1 | Year 2 | Year 3 | Year 4 | | Unit | Rate USD | Year 1 | Year 2 | Year 3 | Year 4 | T |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | | | | | | | | | | | | 12 | 12 | 12 | 12 | 48 |
| **Project component 1** | | | | | | | | | | | | | | | | | |
| Component 1: Climate information, warning systems and responses to flood and drought risks/threats | Output 1.1: Geospatial flood and drought hazard maps and risk profiles for three (3) target communes developed | 1.1.1. Conduct comprehensive and inclusive climate change vulnerability and hazard risk assessments for the three target communes, including mapping drought vulnerability zones | A firm, NGO or individual consultants. Incl. consultations with 35 collines in 3 target communes and 3 validation workshops | | **220.000** | 220.000 | | | | | Lump sum | 220.000 | 1 | | | | **1** |
| | | 1.1.2. Develop hydrodynamic flood models and mapping of flood risks for the target area (Rusizi River basin) | A firm or individual consultant(s) incl. software required | | **40.000** | 40.000 | | | | | Lump sum | 40.000 | 1 | | | | **1** |
| | | 1.1.3. Produce high-resolution integrated hazard risk and vulnerability maps | A firm or individual consultant(s) | | **10.000** | 10.000 | - | - | - | | Lump sum | 10.000 | 1 | | | | **1** |
| | | 1.1.4. Strengthen community-level disaster risk reduction committees (CCDRR) in target communes | A firm, NGO or individual consultants, incl. CCDRR training workshops (2×3 communes 6) | | **30.000** | 30.000 | | | | | Lump sum | 30.000 | 1 | | | | **1** |
| | | Project coordinator | Project coordinator - 12.5% activity allocation for coordination and follow-up of Component 1 activities, including IGEBU coordination, deliverable review and reporting inputs. | 12,5% | **18.000** | 4.500 | 4.500 | 4.500 | 4.500 | | Month | 3.000 | 1,5 | 1,5 | 1,5 | 1,5 | **6** |
| | **Sub-total** | | | | **318.000** | **304.500** | **4.500** | **4.500** | **4.500** | | | | | | | | |
| | Output 1.2: Early warning dissemination and communication systems strengthened | 1.2.1. Pilot the Common Alert Protocol (CAP) | A firm, NGO or individual consultant(s), incl trainings (4) | | **60.000** | - | 60.000 | - | - | | Lump sum | 60.000 | | 1 | | | **1** |
| | | 1.2.2. Implement the Simplified Early Action Protocol (EAP) | A firm, NGO or individual consultant(s), incl. trainings (4) | | **60.000** | - | 60.000 | | | | Lump sum | 60.000 | | 1 | | | **1** |
| | | 1.2.3. Establish forecast-to-action coordination protocols | A firm, NGO or individual consultant(s), incl. trainings (4) | | **20.000** | - | 20.000 | - | - | | Lump sum | 20.000 | | 1 | | | **1** |
| | | 1.2.4. Strengthen community-based early warning systems (CBEWS), improve public channel dissemination by establishing community networks, development of gender- and vulnerable groups-responsive | A firm, NGO or individual consultant(s), incl. trainings (8) | | **100.000** | | 100.000 | | | | Lump sum | 100.000 | | 1 | | | **1** |

| | | | | | | | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | communication approaches and conducting awareness campaigns in target communes | | | | | | | | | | | | | | | |
| **Sub-total** | | | | | **240.000** | **-** | **240.000** | **-** | **-** | | | | | | | | **0** |
| Output 2.1: Climate monitoring network and forecasting capacity expanded | 2.1.1. Operationalize dedicated monitoring room at IGEBU | Monitoring room infrastructure (computers (5), flatscreen monitors, servers, internet), specialised software, geoportal | | **70.000** | - | 70.000 | - | - | | Lump sum | 70.000 | | 1 | | | **1** |
| | 2.1.2. Strengthen IGEBU and key actor capacity, document alert generation methods, thresholds, protocols and designate and train provincial and communal focal points | A firm or individual consultant(s), incl. training for IGEBU staff (20 staff × 2 weeks), incl on climate scenario interpretation and alert protocols and training of provincial and commune staff (2x3) | | **60.000** | - | 60.000 | | | | Lump sum | 60.000 | | 1 | | | **1** |
| | 2.1.3. Expand the monitoring station network: Rehabilitate existing hydrological stations | Rehabilitate 10 hydrological stations in the target area @ USD 3000 each | | **30.000** | - | 30.000 | | | | Lump sum | 3.000 | | 10 | | | **10** |
| | | Automated hydrological monitoring stations incl PV, installation and protective measures (3x stations @ USD 20,000 each) | | **60.000** | - | 60.000 | | | | Lump sum | 20.000 | | 3 | | | **3** |
| | | Automatic meteorological stations / equipment, incl PV, installation and protective measures (3 stations @ USD 35,000 each) | | **105.000** | | 105.000 | | | | Lump sum | 35.000 | | 3 | | | **3** |
| **Sub-total** | | | | | **325.000** | **-** | **325.000** | **-** | **-** | | | | | | | | |
| Output 3.1: Climate-informed preparedness/response plans developed and operationalized for 3 communes | 3.1.1.Develop commune preparedness and response plans | A firm, NGO or individual consultant(s), incl. workshops (3x3) and plans produced | | **90.000** | | 90.000 | - | - | | Lump sum | 90.000 | | 1 | | | **1** |
| | 3.1.2 Conduct community-level trainings on disaster risks, preparedness, and response in target communes, incl. the develop gender- and vulnerable groups-sensitive communication materials and conducting inclusive community simulation exercises | A firm, NGO or individual consultant(s), incl. trainings (3x3); Visual aids / wall murals and pictorial guides development, training material printing and distribution; Simulation exercises in 3 communes (3 exercises) | | **60.000** | | 60.000 | - | | | Lump sum | 60.000 | | 1 | | | **1** |
| **Sub-total** | | | | | **150.000** | **-** | **150.000** | **-** | **-** | | | | | | | | |
| Output 3.2: CCDRRs trained and supported in technical and management functions for climate-informed preparedness and | 3.2.1. Train and support CCDRRs and other emergency response actors in technical and management functions for climate-informed preparedness and response | A firm, NGO or individual consultant(s), incl. training of CCDRRs and other emergency response actors on climate-informed preparedness and response, and support to forecast-to- | | 30,000 | - | 30,000 | - | - | | Lump sum | 30,000 | 0 | 1 | 0 | | 1 |

| | | | | | | | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | response in the three target communes | | action coordination (4 trainings) | | | | | | | | | | | | | | |
| | **Sub-total** | | | | 30,000 | - | 30,000 | - | | | | | | | | | |
| **TOTAL Component 1** | | | | **21.3%** | **1,063,000** | **304,500** | **749,500** | **4,500** | **4,500** | | | | | | | | |
| **Project component 2** | | | | | | | | | | | | | | | | | |
| Component 2: Innovative flood and drought risk reduction practices and technologies | Output 4.1. Mobile flood barrier technology and integrated water systems deployed and operational and maintained in three (3) target communes to protect lives, assets, and agricultural land from intensified flooding and to irrigate agriculture | 4.1.1.Procure innovative water-filled mobile flood barriers | Barrier procurement (6,500 metres; total provision USD 1,919,000, equivalent to approximately USD 295.23 per metre). One unit is approx. 5 metres and 55 kg. | | **1,919,000** | - | 1,919,000 | - | - | | Lump sum | 295.23 | | 6500 | | | **6500** |
| | | | 63 Pumps and hoses | | **126,000** | - | 126,000 | - | - | | Lump sum | 2,000 | | 63 | | | **63** |
| | | | Shipping and import logistics | | **40.000** | - | 40.000 | | | | Lump sum | 40.000 | | 1 | | | **1** |
| | | 4.1.2. Verify and finalize strategic deployment locations and teams in target communes; Establish barrier storage facilities | Site verification surveys and walks based on outcome output 1.1 | | **15.000** | | 15.000 | | | | Lump sum | 15.000 | | 1 | | | **1** |
| | | | Storage (container) provision, incl. security equipment, deployment tools, spare parts (3 sites × USD 12,000) | | **36.000** | | 36.000 | | | | Lump sum | 12.000 | | 3 | | | **3** |
| | | 4.1.3. Develop operation and maintenance (O&M) protocols and plans and conduct participatory planning and training with communes | A firm, NGO or individual consultant(s), incl. trainings (3) | | **40.000** | | 40.000 | | | | Lump sum | 40.000 | | 1 | | | **1** |
| | | 4.1.4. Train gender-balanced community-based deployment teams and conduct inclusive demonstration/simulation drill exercises | A firm, NGO or individual consultant(s), incl. trainings (6); 3 demonstration/simulation drill exercises | | **40.000** | | 40.000 | | | | Lump sum | 40.000 | | 1 | | | **1** |
| | | 4.1.5.Verify priority agricultural zones | Site verification surveys and walks based on outcome output 1.1 | | **14.000** | - | - | 14.000 | - | | Lump sum | 14.000 | | | 1 | | **1** |
| | | 4.1.6. Procure mobile irrigation system equipment | Mobile solar-powered pumps: 5 @ USD 8,000), incl. coupling pieces | | **40.000** | - | - | 40.000 | - | | Lump sum | 8.000 | | | 5 | | **5** |
| | | | Mobile hoses (5 x 500 meter @ USD 12 / meter | | **30.000** | - | - | 30.000 | - | | Lump sum | 12 | | | 2500 | | **2500** |
| | | 4.1.7. Operate the irrigation system efficiently with equal distribution. This includes developing water allocation protocols, linking irrigation activation to drought early warnings from Component 1 and training farmer cooperatives and associations | A firm, NGO or individual consultant(s), incl. trainings (6) | | **30.000** | - | - | 30.000 | - | | Lump sum | 30.000 | | | 1 | | **1** |

| | | | | | | | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | Project coordinator | Project coordinator - 12.5% activity allocation for coordination and follow-up of Component 2 activities, including barrier deployment, O&M arrangements and commune-level implementation. | 12,5% | **18.000** | 4.500 | 4.500 | 4.500 | 4.500 | | Month | 3.000 | 1,5 | 1,5 | 1,5 | 1,5 | **6** |
| | **Sub-total** | | | | **2,348,000** | **4,500** | **2,220,500** | **118,500** | **4,500** | | | | | | | | |
| **TOTAL Component 2** | | | | **47.0%** | **2,348,000** | **4,500** | **2,220,500** | **118,500** | **4,500** | | | | | | | | |
| **Project component 3** | | | | | | | | | | | | | | | | | |
| Component 3: Results tracking and knowledge management for post-project sustainability and innovation diffusion | Output 4.2. strong evidence base on the benefits of the innovative dual purpose mobile flood barriers and integrated water systems produced and disseminated | 4.2.1: Deliver training, implement and monitor the Stakeholder Engagement Plan, Gender Action Plan and Environmental and Social Management Framework, and Indigenous Peoples Planning Framework/Indigenous Peoples Plan (IPPF/IPP). | Project M & E officer | 100% | **105.600** | 26.400 | 26.400 | 26.400 | 26.400 | | Month | 2.200 | 12 | 12 | 12 | 12 | **48** |
| | | | Project ESMP implementation officer | 100% | **105.600** | 26.400 | 26.400 | 26.400 | 26.400 | | Month | 2.200 | 12 | 12 | 12 | 12 | **48** |
| | | | Gender officer | 100% | **105.600** | 26.400 | 26.400 | 26.400 | 26.400 | | Month | 2.200 | 12 | 12 | 12 | 12 | **48** |
| | | | Gender action plan budget | | **20.600** | 20.600 | - | - | - | | item | 20.600 | 1 | | | | **1** |
| | | | Travel | | **16.000** | 4.000 | 4.000 | 4.000 | 4.000 | | | 2.000 | 2 | 2 | 2 | 2 | **8** |
| | | | Specialized NGO for IPPF/IPP implementation and monitoring, including FPIC processes | | 60,000 | 20,000 | 20,000 | 20,000 | | | Lump Sum | 20,000 | 1 | 1 | 1 | | 3 |
| | | 4.2.2. Comprehensively document the project implementation processes, results and outcomes and lessons learned. This would also include conducting a detailed cost-benefit analysis comparing the integrated mobile barrier approach to traditional flood protection and irrigation infrastructure, as well as developing technical manuals, case studies, policy briefs and replication / scaling guidelines. | Policy and finance expert | 38% | **211.200** | 52.800 | 52.800 | 52.800 | 52.800 | | Days | 600 | 88 | 88 | 88 | 88 | **352** |
| | | | Documentation / KM specialist with relevant technical expertise | 100% | **144.000** | 36.000 | 36.000 | 36.000 | 36.000 | | month | 3.000 | 12 | 12 | 12 | 12 | **48** |
| | | | Travel | | **40.000** | 10.000 | 10.000 | 10.000 | 10.000 | | | 5.000 | 2 | 2 | 2 | 2 | **8** |
| | Sub-total | | | | **808,600** | **222,600** | **202,000** | **202,000** | **182,000** | | | | | | | | |
| | Output 4.3 Demonstration sites, peer-learning exchanges, and knowledge-sharing platforms established to facilitate replication by other communes and institutions | 4.3.1 Knowledge shared and disseminated at national, regional and international levels. | Demonstration events (2 events) | | **20.000** | | - | 20.000 | | | Lump sum | 10.000 | | | 2 | | **2** |
| | | | Regional partnership workshops (2) for knowledge exchange | | **30.000** | | - | 30.000 | | | Lump sum | 15.000 | | | 2 | | **2** |
| | | | Video documentary production (over year 2-3) | | **20.000** | | 20.000 | - | | | Lump sum | 20.000 | | 1 | | | **1** |
| | | | Conference participation and presentations (2-3 pers) | | **12.000** | | - | 12.000 | | | Lump sum | 12.000 | | | 1 | | **1** |
| | **Sub-total** | | | | **82.000** | **-** | **20.000** | **62.000** | **-** | | | | | | | | |
| **TOTAL Component 3** | | | | **17.8%** | **890,600** | **222,600** | **222,000** | **264,000** | **182,000** | | | | | | | | |

| | | | | | | | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| **TOTAL Components** | | | **86%** | **4,301,600** | **531,600** | **3,192,000** | **387,000** | **191,000** | | | | | | | | | |
| **Project execution costs** | | | | | | | | | | | | | | | | | |
| Project execution | Project Management Unit | Project coordinator | 75% | **108.000** | 27.000 | 27.000 | 27.000 | 27.000 | | Month | 3.000 | 9 | 9 | 9 | 9 | **36** |
| | | Project finance officer | 100% | **108.000** | 27.000 | 27.000 | 27.000 | 27.000 | | Month | 2.250 | 12 | 12 | 12 | 12 | **48** |
| | | Consultancy services for capacity development and support of the M&E, ESMP, Gender and finance officers to develop and implement data gathering and monitoring plans and for financial management and procurement in line with UNEP and AF requirements | | **40.700** | 40.700 | - | - | - | | item | 40.700 | 1 | | | | |
| | Travel | Travel | | **8.000** | 2.000 | 2.000 | 2.000 | 2.000 | | item | 500 | 4 | 4 | 4 | 4 | **16** |
| | Operations | Inception and completion workshops | | **10.000** | 5.000 | - | - | 5.000 | | workshop | 5.000 | 1 | | | 1 | **2** |
| | | Project steering committee meetings | | **12.000** | 3.000 | 3.000 | 3.000 | 3.000 | | Meeting | 1.500 | 2 | 2 | 2 | 2 | **8** |
| | | Office equipment | | **20.000** | 5.000 | 5.000 | 5.000 | 5.000 | | item | 5.000 | 1 | 1 | 1 | 1 | **4** |
| **TOTAL Execution costs** | | | **6.7%** | **306,700** | **109,700** | **64,000** | **64,000** | **69,000** | | | | | | | | |
| **TOTAL Project costs** | | | | **4.608.300** | **641,300** | **3,256,000** | **451,000** | **260,000** | | | | | | | | |
| | | | | 100.00% | 13.92% | 70.66% | 9.79% | 5.64% | | | | | | | | |

Table 43 Project cycle management fee (MIE fee) breakdown

| Project cycle management fee costs | | Description | Allocation | Amount (USD) | Year 1 | Year 2 | Year 3 | Year 4 |
|---|---|---|---|---|---|---|---|---|
| Project cycle management | UNEP overall project supervision | Staff costs for implementation support, and finance and budget support | 62.64% | 245,354 | | | | |
| | | Project evaluation, M&E advisory support and baseline assessment costs | 24.25% | 95,000 | of which 40,000 for teminal evaluation, 35,000 for mid-term review, USD 20,000 for the Baseline Data Report. | | | |
| | | UNEP monitoring visits | 4,0% | 15.668 | | | | |
| | | Environmental and social safeguards expert support | 4,0% | 15.668 | | | | |
| | | Legal support | | | | | | |
| | | Financial Audits | 5.11% | 20,000 | | | | |
| **TOTAL management fee** | | **Total** | **8,5%** | **391.700** | **97.925,0** | **97.925,0** | **97.925,0** | **97.925,0** |
| **TOTAL amount of financing requested** | | | | **5.000.000** | **739,225.0** | **3,353,925.0** | **548,925.0** | **357,925.0** |

*Table 44 Overview M & E budget*

| Type of M & E Activity | Activity | Total | Year 1 | Year 2 | Year 3 | Year 4 |
|---|---|---|---|---|---|---|
| Measurements of means of verification (baseline assessment and M & E plans) | Inception and completion workshops and reports (under project execution cost) | **$ 10.000,00** | $ 5.000,00 | $ - | $ - | $ 5.000,00 |
| | Consultancy services for capacity development and support of the M&E officer to develop and implement data gathering and monitoring plans (under project execution cost) | **$ 40.700,00** | $ 40.700,00 | $ - | $ - | $ - |
| Direct Project Monitoring | M & E officer (under comp 3) | **$105.600,00** | $ 26.400,00 | $26.400,00 | $26.400,00 | $26.400,00 |
| | Field Monitoring / Supervision Missions (under comp 3) | **$ 40.000,00** | $ 10.000,00 | $10.000,00 | $10.000,00 | $10.000,00 |
| Total | | **$196.300,00** | **$ 82.100,00** | **$36.400,00** | **$36.400,00** | **$41.400,00** |
| Total from MIE fee | 1. Mid-term and final evaluation 2. Baseline report UNEP monitoring missions | **$110.668,00** | | | | |
| **Total** | | **$306.968,00** | | | | |

## H. Disbursement schedule

The project will be implemented over a period of 48 months (4 years) with disbursements aligned to project implementation milestones and annual reporting cycles.

*Table 45 Disbursement Matrix*

| | Upon signature of Agreement | One Year after Project Start | Year 2 | Year 3 | Total |
|---|---|---|---|---|---|
| **Scheduled date** | Upon signature of agreement | 12 months after project start date | 24 months after project start date | 36 months after project start date | |
| **Project Funds** | 641,300 | 3,256,000 | 451,000 | 260,000 | 4,608,300 |
| **Implementing Entity Fees** | 54505 | 276,760 | 38335 | 22100 | 391,700 |
| **Total** | **695805** | **3,532,270** | **489335** | **282,100** | **5,000,000** |

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

### A. Record of endorsement on behalf of the government

| | |
|---|---|
| Mr. Hatungimana Berchmans,<br>Director General<br>Director's office of the Environment and Climate Change<br>Office Burundais pour la Protection de l'Environnement (OBPE),<br>MINEAGRIE. | Date*: 26 September 2025* |



Gitega, September, the 26th / 2025

REPUBLIQUE DU BURUNDI

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

Office Burundais pour la Protection de l'Environnement

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

Subject: Endorsement for Enhancing resilience to flood and drought through a unique combination of innovative climate adaptation tools, technologies, and practices in 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 the Burundi.

Accordingly, I am pleased to endorse the above project proposal with support from the Adaptation Fund. If approved, the project will be implemented by **United Nations Environment Programme (UNEP)** and executed by **Office Burundais pour la Protection de l'Environnement (OBPE)**.

Sincerely,

Ir. HATUNGIMANA Berchmans

GENERAL DIRECTOR OF OBPE

REPUBLIQUE DU BURUNDI
OBPE

B.P. 56.Gitega• Tél. (257) 22403031 •Télé/Fax: (257) 22403032
B.P. 2757 Bujumbura • Tél. (257) 22254255•
Email:obpe_burundi@obpe.bi



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## 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 (……list here….) and subject to the approval by the Adaptation Fund Board, commit to implementing the project/programme 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/programme. | |
| *Name & Signature*<br>Implementing Entity Coordinator | |
| Date: *(Month, Day, Year)* | Tel. and email: |
| Project Contact Person: | |
| Tel. And Email: | |



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# ANNEXES

## ANNEX 1: Governance and institutional baseline and in-depth assessment of climate services and early warning systems

**Governance and institutional baseline**

Traditional governance structures:

Community governance in target areas mostly operate through traditional systems based on clans and elders. Authority is typically held by male chiefs and elders who resolve disputes and maintain order. Decision-making about community resources and emergencies flows through these traditional hierarchies. While these structures provide social cohesion, they often exclude women and youth from meaningful participation.

Formal local government:

Four-level governance structure exists: Colline (hill), commune, province, and national. Communes have elected councils; formal committees address health, education, agriculture, and increasingly, disaster risk management. The interaction between traditional and formal structures is sometimes tense, with occasional competition for authority.

DRR institutional structure:

The National Platform for Risk Prevention and Disaster Management (PFNPRGC) coordinates national DRR efforts. At provincial and communal levels, Communal Committees for Disaster Risk Reduction (CCDRR) should have recently been established in target communes. However, these committees often lack training, resources, and decision-making authority.

**In-depth assessment of climate services and early warning system**



Overview and governance structure:

Burundi's climate services and early warning system operates through a framework established under the Roadmap for Operationalizing a Multi-Hazard Early Warning System for All (2024-2027). The system is organized around four interconnected pillars: knowledge of disaster risks (Pillar 1), detection, monitoring, analysis and forecasting (Pillar 2), dissemination of alerts and communication (Pillar 3), and preparedness and response capacities (Pillar 4). Despite this framework, Burundi currently lacks a comprehensive integrated early warning system based on a clear legal framework with defined mandates for warning coordination across institutions.

The National Platform for Risk Prevention and Disaster Management (PFNPRGC) serves as the central coordination body for the entire disaster risk management system. At the national level, the Burundi Geographic Institute (IGEBU) holds primary responsibility for climate information services, meteorological monitoring, and hydrological forecasting. IGEBU is the designated lead agency for Pillar 1 (disaster risk knowledge) and Pillar 2 (detection and forecasting), with technical support from the World Meteorological Organization. The Directorate General of Civil Protection and Disaster Management, operating under the Ministry of Interior, coordinates disaster response operations and leads Pillar 4 (preparedness and response) in collaboration with OCHA, the Burundi Red Cross (CRB), and IFRC.

Multi-Level **r**esponsibilities and capacity constraints:

A critical institutional gap exists in the vertical distribution of responsibilities. Only the Head of the Hydrology Service is responsible for producing forecasts and generating alerts at the national level, with no designated provincial or communal focal points for this function. This centralization creates bottlenecks and limits responsiveness to localized risks. At the provincial level, coordination units operate as decentralized extensions of the national directorate, with provinces now having contingency plans. However, no designated personnel are responsible for data processing, analysis, or alert generation at the provincial level, forcing complete reliance on information cascaded from the national level.

At the commune level, communes should now have developed contingency plans, and Communal Committees for Disaster Risk Reduction (CCDRR) have been established in the communes most at-risk. Local teams

(normally around 13[46]) should be equipped[47] for disaster prevention and emergency response[48]. However, like the provincial level, no designated personnel exist at the communal level for alert generation. Communities receive warnings through national radio (RTNB), social media, community meetings, and WhatsApp, though these channels reach only an estimated 20 percent of the population.

Climate services value chain and technical gaps:

Observation and data collection: Burundi operates 42 hydrological stations nationally, with only 10 in the target provinces of Bujumbura for meteorological observation, 20 stations exist nationally, with only three in Bujumbura. This sparse network represents a critical infrastructure deficit. Data gaps are particularly acute in specific communes and zones including Mpanda, Bubanza, and Bukinanyana.
Data processing and analysis: Data processing and analysis are conducted exclusively at the national level by IGEBU's Hydrology Service using the HEC-HMS hydrological modeling system. Capacity constraints are severe, with insufficient personnel, computers, servers, and specialized software preventing effective forecasting.
Forecasting and alert generation: While flood and drought indices (NDVI/VHI) are identified as important monitoring variables, the capacity to generate comprehensive forecasts and alerts is severely limited. Alert generation methods based on thresholds, protocols, and formats are not adequately documented. The system employs a four-level alert activation framework (information exchange, potential threats, confirmed threats requiring evacuation, and deactivation), with decisions made from the commune level upward to national level.
Communication and dissemination: Communication responsibility falls primarily to IGEBU at the national level, with no designated responsibility at provincial or community levels. The system lacks implementation of the Common Alert Protocol (CAP), which would standardize alert formatting and improve interoperability.

Priority Actions for System Strengthening:

The roadmap and consultations with IGEBU identified priority actions including acquisition of a meteorological radar (out of scope for this project), installation of automatic meteorological stations, acquisition of hydrological monitoring equipment, and strengthening of IGEBU personnel capacities through training. The operationalization of a monitoring room, establishment of internet connectivity for modeling, and creation of a geoportal are also prioritized.

Beyond infrastructure, the system requires operational risk management (preparedness and response) plans at the local level, systematic coordination protocols between national and sub-national actors, improved public dissemination systems with better coverage and accessibility, and implementation of the Common Alert Protocol. The strengthening of disaster risk reduction committees is essential.



The establishment of clear responsibilities at provincial and communal levels for data analysis and alert interpretation would enhance the system's responsiveness and local relevance. Strengthening linkages between community-based early warning systems and formal institutional mechanisms would ensure that local knowledge contributes to the overall warning process, creating a more robust and inclusive system that protects all Burundians from climate-related hazards. Table 46 provides an overview of the current climate service and early warnings system, the main gaps and which gaps will be addressed by the project.

Table 46 Gaps of climate service and early warnings systems to be addressed by the project

| Pillars | Current situation | Gaps | Gaps to be addressed by the project |
|---|---|---|---|
| **1:** Knowledge of Disaster Risks | **National**: IGEBU leads Pillar 1 with responsibility for disaster risk knowledge and mapping.<br><br>**Local:** Communal Committees for Disaster Risk Reduction (CCDRR) should have been established in communes most at risk. Community-level | No integrated national early warning system exists<br>Insufficient legal framework to establish clear mandates (out of scope)<br>Low public awareness and education on disaster risks and preparedness | **Local level (target province and communes)**:<br>Comprehensive climate change vulnerability and hazard risk assessments and mapping<br>Strengthen community-level disaster risk reduction committees |

[46] Typically representing local administrative officials (communal administrator or representatives); representatives from key communal services (agriculture, health, education, infrastructure); community leaders and representatives; local red cross volunteers; representatives from local civil society organizations; technical experts when available
[47] Typically: basic disaster response equipment (specifics vary by commune and hazard profile); communication tools for receiving and disseminating early warnings; risk mapping materials and tools; access to the national multi-risk mapping platform (online platform covering flooding, earthquakes, torrential rains, strong winds, and landslides); contingency plan documentation
[48] Mandated to: Conduct disaster prevention activities at the communal level; implement small-scale mitigation measures based on local risk assessments; respond to disasters when they occur in their communes; develop prioritized community risk maps; create and update community contingency plans for anticipatory actions; disseminate early warning information to communities; coordinate with provincial and national disaster management structures; implement anticipatory actions based on weather forecasts from IGEBU; monitor climate-related incidents and their impacts through citizen-centered data collection; plan and execute early actions in real-time when warnings are issued

| | | | |
|---|---|---|---|
| | contingency plans should have been developed. | | Integrate local knowledge and observations into formal risk assessment processes. |
| 2: Detection, Monitoring, Analysis and Forecasting | **National**: IGEBU leads with World Meteorological Organization (WMO) technical support. Satellite systems (CHIRPS/ IMERG/ Sentinel), 42 hydrological stations[49] nationally; 20 meteorological stations[50] nationally. IGEBU Hydrology Service conducts data processing using HEC-HMS modeling. Head of Hydrology Service produces forecasts and generates alerts. IGEBU can produce seasonal forecasts independently. Flood and drought indices (NDVI/VHI) identified as monitoring variables.<br><br>**Bujumbura province**: 10 hydrological stations and 3 meteorological stations. Limited coverage of Mpanda, Bubanaza and Bukinanyana. | **Infrastructure & technology**:<br>Sparse monitoring network: Need meteorological radar (out of scope) and geographic expansion to communes including Mpanda, Bubanza, Bukinanyana to monitor flood and drought hazard risks.<br>Deficits in historical data and real-time information<br>Absence of appropriate models, equipment, computers, servers, and specialized software<br><br>**Personnel & capacity**<br>No designated personnel at provincial or communal levels<br>Severe capacity constraints with insufficient personnel to operate advanced modeling tools<br>Alert generation methods, thresholds, protocols, and formats not adequately documented | **National level priority Infrastructure:**<br>Operationalize monitoring / forecasting room, including:<br>Computers and monitoring screens (5)<br>Specialized weather and hydrographic software for forecasting/modeling.<br>High-speed internet<br>Geoportal for data management<br><br>**Local level (target province and communes)**<br>Expand monitoring station network to underserved target areas:<br>Rehabilitate 10 existing stations<br>Acquire and install 3 automatic meteorological stations<br>Acquire and install 3 hydrological monitoring stations<br><br>**National level capacity strengthening and information**<br>Strengthen IGEBU personnel capacities through training (esp. modeling, forecasting)<br>Document alert generation methods, thresholds, protocols, and formats<br><br>**Local level capacity strengthening**<br>Designate and train provincial and communal focal points for data analysis and alert interpretation. |
| **3:** Dissemination of Alerts and Communication | **National:** PFNPRGC, RTNB (National Radio and Television), and Burundi Red Cross (CRB) share responsibility. IGEBU handles communication at national level through MyDewetra platform. Four-level alert activation framework established (information exchange, potential threats, confirmed threats/evacuation, deactivation).<br><br>**Local**: Dissemination through RTNB, social media, community meetings, and WhatsApp reaching around 20% of population with 5-minute average delay. Community-based early warning systems (CBEWS) established by Red Cross in select locations. Simplified Early Action Protocol for extreme precipitation developed. | No Common Alert Protocol (CAP) implementation<br>Limited coverage Implement the Simplified Early Action Protocol (EAP)<br>No clear and designated communication responsibility at provincial or commune levels<br>Inadequate coordination between forecasting and emergency response (forecast-to-action linkage) between IGEBU and emergency response actors (Civil Protection, Red Cross, local authorities, communes)<br>Only 20% population coverage for alerts and limited dissemination and channels. | **National and local level:**<br>Pilot the Common Alert Protocol (CAP) for standardized alert formatting.[51]<br>Implement the Simplified Early Action Protocol (EAP)[52]<br>Designate responsibilities at provincial and communal levels in target areas.<br>Establish systematic coordination protocols for forecast-to-action linkage<br>Strengthen community-based early warning systems and integrate with formal mechanisms.<br><br>**Local level:**<br>Improve public channel dissemination (e.g. community networks as identified appropriate by communes) |
| **4:** Preparedness and Response Capacities | **National**: PFNPRGC leads with OCHA, Red Cross, and IFRC. Directorate General of Civil Protection coordinates disaster response. All provinces have contingency plans (elaborated or updated). First anticipatory action activated October 2023 for extreme rainfall. | No designated personnel at provincial/communal levels for alert interpretation and response coordination and emergency coordination gaps persist.<br>Limited preparedness and response plans / operational risk management plans (PGIS) at local level | **National and local level:**<br>Designate personnel at provincial/communal levels for response coordination<br>Strengthen coordination protocols between national and sub-national actors<br><br>**Local level:** |

[49] Hydrological data (basic) collection is partially operational: water levels are measured twice daily, discharge data is collected 4 times annually through gauging, and flow velocity measurements occur 4 times yearly.
[50] Meteorological data including precipitation, air temperature, humidity, wind speed, and soil moisture are being collected in paper format with limited frequency.
[51] The CAP standardises how the alert about that forecast is formatted and disseminated to all relevant stakeholders and the public across multiple channels simultaneously. To be piloted in Bujumbura province and Mpanda, Bubanza and Bukinanyana communes
[52] EAP defines the triggers and actions based on climate forecasts (e.g., "When rainfall forecast exceeds X mm, then prepare the mobile flood barrier"). To be implemented in Bujumbura province and Mpanda, Bubanza and Bukinanyana communes


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|---|---|---|---|
| | **Provincial:** Provincial coordination units of civil protection operate as decentralized extensions.<br><br>**Communes**: communes should have contingency plans; CCDRR should have been trained for disaster prevention and emergency response. | Limited operational capacities and resources across all levels<br>Training and awareness programs insufficiently developed or disseminated | Develop commune preparedness and response plans / disaster risk management plans<br>Enhance capacity of emergency response actors through training<br>Implement community-level trainings on disaster risks preparedness and response |



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## ANNEX 2: Overview results testing of mobile flood barrier in Gahwazi, Burundi

| Element | Description | Value |
|---|---|---|
| Characteristics | Location | X:765178, Y:9651347, Z :854 |
| SLAMDAM | Length (m) | 200 |
| | Height (m) | 1 |
| Flood characteristics | Expected flood depth (m) | Medium |
| | Expected flow velocity (m/s) | Medium |
| | Return time flood (T) | Yearly (avril-Mars) |
| | Expected effectiveness (++/--) | ++ |
| Suitability of location | Type of ground surface | Close to the river: plants, contains pebbles deposited by the river. 10 m left to the river: agricultural area --> suitable |
| | Slope of ground surface | Flat, low slope |
| | Amount of debris / sharp objects (++/--) | Not sharp, much debris from upstraem |
| | Distance to water source (m) | Around 200 |
| Benefits | Reduction of agricultural areas with water depths > 0.5 m (m2) | 275000 |
| | Reduction of settlements with water depths > 0.5 m (m2) | 375000 |
| | Avoided damage to agricultural land (USD / Km2) | 340909 Based on rice with 02 haverst per year |
| | Possible indirect damages that can be prevented (such as blocked roads, electricity network, important buildings (schools, community buildings,) (USD) | The flood may destroye the RN 9 Bridge and the RN9 road, and a Water line Which supply mpanda and Musenyi community along the RN 9 |
| | Area of agricultural area able to irrigate during dry season (m2) | 375000 |
| | Number of people benefiting from water security in flood barrier | 2500 (1300 women and 1200 men) |
| Flood response team | Flood arrival time (h) | 2 to 5 |
| | Travel distance (km) | 0.7 |
| | Speed of deployment (h) | 1.5 |
| Operational criteria | Duration of deployment (season/event) | Events in rain season during the flood and While they are irrigating in rain season and the season during the dry season |
| | Accessibility (++/--) | +/- |
| | Trigger (++/--) | From mpada river during flood |
| Community | | Part of Mpanda community |



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*Table 47 Manufacturer specifications of filling pumps to be used*

| Parameter | Value |
|---|---|
| **Pump model** | Honda WT40X |
| **Max flow rate** | 1,640 L/min (~98.4 m³/h) |
| **Operators** | 30 |
| **Pumps per operator** | 2 |
| **Operating pumps (simultaneous)** | 60 |
| **Reserve pumps** | 3 |
| **Total fleet** | 63 pumps |
| **System capacity (60 pumps)** | 5,904.0 m³/h |
| **Required system flow (11,050 m³ / 2h)** | 5,525 m³/h |
| **Revised fill time** | 2 hours and 4 hours if one pump is handled by one operator. |
| **Tank run time at max discharge** | ~1.5-2 hours |
| **Refuelling** | Just before complete. |
| **Fuel for full fill (operating pumps)** | ~456.7 L |
| **Fleet cost at USD 2,000/pump** | USD 126,000 |



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## ANNEX 3: Overview of project stakeholders and consultations conducted

**Organizations present in target communes**

Commune Bubanza.

1. Cooperative of United Young People in Solidarity (Ruhororo 2)
2. Sangwe Cooperative.
3. Women's Forum.
4. Twuzuzanye Mukenyezi Cooperative.
5. Twiyunge Aho Tubaye Cooperative (Indigenous Batwa Peoples)
6. Association for the Protection of Natural Resources for the Well-Being and Development of the Population in Burundi (APRN/BEPB)
7. Let Us Unite for the Protection of the Batwa (UNIPROBA)
8. Association of War Disabled of Bubanza (AHAGUEBU)
9. ADISCO
10. Village Association for Mutual Aid and Community Development (AVEDEC)

Commune Bukinanyana (Buganda)

1. Sangwe Cooperative.
2. Women's Forum.
3. Association for the Protection of Natural Resources for the Well-Being and Development of the Population in Burundi (APRN/BEPB)
4. Let Us Unite for the Protection of the Batwa (UNIPROBA)
5. Support for Integrated Development and Community Solidarity (ADISCO)
6. Association of Disabled Persons (ADEPH)
7. Association of Young People (AJEUDAE)



Commune Mpanda.

2. Sangwe Cooperative.
3. Women's Forum.
4. Twuzuzanye Mukenyezi Cooperative.
5. Association for the Protection of Natural Resources for the Well-Being and Development of the Population in Burundi (APRN/BEPB)
6. Let Us Unite for the Protection of the Batwa (UNIPROBA)
7. Kira Cooperative.
8. Young People's Forum.

*Table 48 Overview of consultations conducted during the full proposal phase.*

| Type | Name | Person name | Position | Date | Location | Consultation objective | Consultation outcome | Consultation Conclusion | Evidence of consultation |
|---|---|---|---|---|---|---|---|---|---|
| Government | Ministry of Environment, agriculture and Livestock | Lievin | Institutional focal point role, with the DG as the official signatory. | 23 Sept & 26 Sept | OBPE offices in Gitega and Bujumbura | • Share mission plan<br>• Verify outcomes mission<br>• Map any government projects in target area<br>• Steering committee set-up | Identified complementarity. Strengthening Resilience to Extreme Weather Events - Drought and Flooding - for Smallholder Farmers in the Rural Regions of Burundi<br><br>Recommended to work with OBPE and IGEBU | Identified IGEBU as the key technical partner for early warning components.<br><br>Continued coordination with SSO and OBPE on the AF projects |  |
| | Office Burundais pour la Protection de l'Environnement (OBPE) | HATUNGIMANA Berchmans<br><br>MURENGERANTWARI Janvier | Director General<br><br>Technical Advisor of the Director General | 26 Sept 2025 and multiple calls | | • Share mission plan<br>• Verify outcomes mission<br>• Discuss project execution set-up | OBPE confirmed active support for the mission and provided a new endorsement letter.<br>Agreement to establish a Project Steering Committee with OBPE, UNEP, and key ministries. | A new endorsement letter, reaffirming UNEP's role as AE and OBPE as Executing Entity. |  |
| | Institut Géographique du Burundi (IGEBU) | Mr. NGENZIRABONA Augustin | DG IGEBU | 23 Sept and multiple call and e-mails | IGEBU offices in Gitega | • Identify needs regarding component 1 | IGEBU stressed that their technical mandate includes hydro-meteorological monitoring, while OBPE focuses on environmental regulation — underlining the need for clear institutional roles to avoid overlap.<br><br>IGEBU expressed willingness to lead technical implementation for Component 1 and identified needs. | IGEBU positioned as a key technical partner for Component 1.<br><br>Agreement on the need to define clear roles vis-à-vis OBPE.<br><br>IGEBU needs integrated in comp 1 |  |
| | Plateforme Nationale pour la Prévention de Risques et Gestion des Catastrophes (PNPRGC) | NZAMBIMANA Richard | Secrétaire | 24/09/2025 | Bujumbura | • Identify role of PNPRGC | Validated the project's alignment with national early warning systems. | integration of the project's hydrodynamic modeling into the national flood alert protocol; The Plateforme will serve as the institutional custodian of the GRM for all flood-related escalations above communal level. | |
| | Bujumbura province | NDAYIZEYE Samson | Governor of Bujumbura | 23 Sept 2025 | | • Confirm support of project<br>• Identify needs in the province | The Governor office welcomed the initiative and confirmed the province's full support for the mission and project development.<br><br>He highlighted recurrent flooding and drought issues affecting livelihoods in Mpanda and Mutimbuzi communes, stressing the urgency of interventions. | Recognition of the project's relevance to address flood and drought impacts in the province. |  |



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|---|---|---|---|---|---|---|---|---|---|
| | | | | | | | He emphasized the need to coordinate with local authorities for community engagement and site access. | | |
| UN and international organizations | FAO | Mohamed Diagne | e-mail sent | 14 Nov 2025 | Online | Check experience working with OBPE and IGEBU<br><br>Identify lessons from and avoid overlap and ensure complementarity with below:<br>• Resilient Food Systems (RFS) | Focus of FAO:<br>- (hill) Irrigation canals (rehab due to lack of maintenance)<br>- Land management in hills to reduce flood / erosion<br><br>Currently no overlap in Collines<br><br>No need to comply to water quality standards for irrigation | No need to comply to water quality standards for irrigation | Teams; e-mail |
| | IFAD | Nicolas Syed.<br><br>Sandra Nyambuza<br><br>Jaffar Rusigaje | Programme officer Burundi<br><br>Analyst<br><br>Agronomist | 30 Oct 2025 | Online | Check experience working with OBPE and IGEBU<br><br>Identify lessons from and avoid overlap and ensure complementarity with below:<br>• Value Chain Development Programme phase II<br>• Climate proofing food production investments in Imbo and Moso | Focus of IFAD work in Burundi:<br>- (hill) Irrigation canals (rehab due to lack of maintenance)<br>- Land management in hills to reduce flood / erosion<br><br>Challenges: inflation, no fuel, procurement capacity<br><br>No need to comply to water quality standards for irrigation | No need to comply to water quality standards for irrigation<br><br>Integrated identified challenges in risk management<br><br>Avoid work on irrigation infra as deteriorates fast / not sustainable | Teams; e-mail |
| | UNDP | Emma N'gouan Epse Anoh | Country Director and other team members | 24 Sept 2025 | UNDP offices in Bujumbura | Check experience working with OBPE and IGEBU<br><br>Identify lessons from and avoid overlap and ensure complementarity with below:<br>• Landscape restoration for increased resilience in urban and peri-urban areas of Bujumbura in Burundi<br>• Community Disaster Risk Management in Burundi | Shared HACT assessment on OBPE<br><br>Currently no overlap in Collines<br><br>Align approach for risk-informed land use planning, flood mapping methodologies and installment of monitoring stations. | Continue coordination on target communes and Collines and identify exact lessons / requirements for monitoring stations at inception. | |
| | WFP | Jean-Noël Gentile<br><br>Nitesh Patel | Country Director<br><br>Head of Programme | 24 Sept 2025 | WFP offices in Bujumbura | Check experience working with OBPE and IGEBU<br><br>Identify lessons from and avoid overlap and ensure complementarity with below:<br>• Forecast-Based Financing (FbF) / Anticipatory Action Project with Burundi Red Cross | WFP suggested to build on roadmap for early warning systems.<br><br>Requirement: coordination with IGEBU Confirmed positive past collaboration with OBPE<br><br>Complementarity:<br>- Fill identified funding gaps in the early warning system — particularly | Align with existing national early warning systems roadmap<br><br>Work with IGEBU |  |



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|---|---|---|---|---|---|---|---|---|---|
| | | | | | | | for data production, monitoring, and dissemination. | | |
| | WB | Diana Cristina Tello Medina dtellomedina@worldbank.org<br><br>Anders Jensen ajensen1@worldbank.org | Lead urban resilience emergency project<br><br>Lead Burundi Colline Climate Resilience Project | 24 Nov 2025 | Online | Check experience working with OBPE and IGEBU<br><br>Identify lessons from and avoid overlap and ensure complementarity with below:<br>• Urban Resilience Emergency Project<br>• Burundi Colline Climate Resilience Project (NAGURA) | • No overlap in Collines<br>• Align approach for risk-informed planning approaches and multi-hazard assessment methodologies. | Continue coordination on approach and lessons | Teams; e-mail |

**Community-level consultations**

| | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|
| NGOs | Unissons-nous pour la Promotion des Batwa (UNIPROBA) | NENGO Emmanuel | DG UNIPROBA | 24 Sept 2025 | UNIPROBA office Burundi | Identify marginalized / vulnerable groups project risks + data (Indigenous ethnic group Batwa and land rights | UNIPROBA highlighted its mandate of defending the rights and interests of the Batwa community and its experience working in Bujumbura, Bubanza, and Cibitoke provinces.<br><br>They explained that the Batwa face systemic exclusion from agricultural land ownership, water access, and social services, making them particularly vulnerable to floods and droughts.<br><br>UNIPROBA, representing the Batwa endorsed the IPPF | FPIC protocols will be jointly facilitated by UNIPROBA; ensure Batwa grievances bypass local gatekeepers. |  |
| | Organisation d'Appui à l'Autopromotion (OAP) | Ernest Niyonzima | DG OAP | 26 Sept 2025 | OAP office Burundi | Identify lessons from and avoid overlap and ensure complementarity with below:<br>• Projet d' Appui au Développement Agricole pour la Nutrition et l'Entrepreneuriat (PADANE) | Focus on community awareness, conflict resolution, and agricultural resilience.<br><br>OAP has experience with traditional adaptation practices: mixed cropping (e.g., cassava with beans), soil fertility management, and community-led water retention measures. They also develop community multi-year resilience action plans based on their own priorities.<br><br>Currently no overlap in Collines | Consider replicating method to develop multi-year resilience action plans |  |

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|---|---|---|---|---|---|---|---|---|---|
| Communities | Mpanda, Gihanga, Mutimbuzi, Bubanza and Bukinanyana (Buganda) (Mutimbuzi participation is additional, non-target-commune) | | | 22 Sept-3 Oct 2025 | Mpanda | Identify needs and possible concerns<br><br>Identify potential negative impacts of proposed project activities | Climate Impacts Identified:<br>• Floods causing 20-30% crop losses<br>• Droughts causing 25-40% yield reductions<br>• Soil erosion affecting 70%+ of infrastructure<br>• Price volatility (20% increases after weather events)Priority Needs:<br>• Flood protection and early warning systems using multiple channels<br>• Water infrastructure (irrigation, storage, drainage)<br>• Training programs (only 15% of farmers receive adequate training)<br>• Market access through cooperatives<br>• Gender-sensitive interventions | Focus on flood and drought adaptation |  |
| Vulnerable and marginalized groups | Focus Group Discussions: | | | 22 Sept-3 Oct 2025 | Mpanda | Identify needs and possible concerns<br><br>Identify potential negative impacts of proposed project activities | • Women: majority of food producers, limited resource access<br>• Batwa communities: Systemic exclusion from land/water access<br>• Youth: Limited employment options<br>• 40% of population experiencing climate-related stress and anxiety | | <br>105 |

*Table 49 Overview of consultations conducted during the concept note phase*

| N° | Name | Institute | Function |
|---|---|---|---|
| **Local and regional government** | | | |
| **1** | NZIGIYIMANA Cléophas | Province Bubanza | Gouverneur |
| **2** | NIBITANGA Nadine | Commune | Administrator |
| **3** | BUCUMI Gérard | Commune Mpanda | Executive Secretary Permanent |
| **Technical experts** | | | |
| **4** | NINDAMUTSA Astère | Institut géographique du Burundi (IGEBU) | Technical Advisor of the Director General |
| **5** | NGENZIRABONA Augustin | Institut géographique du Burundi (IGEBU) | Director General |
| **6** | HATUNGIMANA Berchmans | Office Burundais pour la Protection de l'Environnement (OBPE) | Director General |
| **7** | MURENGERANTWARI Janvier | Office Burundais pour la Protection de l'Environnement (OBPE) | Technical Advisor of the Director General |
| **8** | NDAYIZEYE Liévin | Office Burundais pour la Protection de l'Environnement | Designated National Authority for the Adaptation Fund |
| **9** | NIYIMPAYE Philippe | Commune Mpanda | Municipal Agronomist |
| **10** | MBONIMPA Joseph | Commune Mpanda | Zonal Agronomist |

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|---|---|---|---|
| **11** | NDIKUBAGANWA Emmanuel | Ministère de l'Environnement Agriculture et Elevage | Head of the Provincial Office of the Environment, Agriculture and Livestock (BEPAE) |
| **12** | HABARUGIRA Hussein | Office Burundais pour la Protection de l'Environnement | Head of Bubanza Branch |
| **Parliament** | | | |
| **13** | NIBIZI Epimeny | Assemblée nationale | Parliamentary responsible for the parliamentary group in charge of the environment sector. |
| **Indigenous people** | | | |
| **14** | Hon.NENGO Emmanuel | Unissons –nous pours la Promotion des Batwa (peuples autochtones) | Legal Representative |
| **Environmental protection** | | | |
| **15** | Mugani Christine | Association Protection des Ressources Naturelles pour le Bien Etre de la Population au Burundi (APRN/BEPB) | Member |
| **16** | NGEZAHAYO Belyse Elodie | Association Protection des Ressources Naturelles pour le Bien Etre de la Population au Burundi (APRN/BEPB) | Member |
| **17** | DUSHIME Chanelle | Association Conservation et communauté de Changement | Chargé des programmes |
| **Local community** | | | |
| **18** | NTUKAMAZINA J.M Vianney | Agriculteur modèle | Model Farmer on Rubira Hill |
| **19** | RUBERINTWARI Aloys | Coopératives agricoles | Representative of Farmers |
| **20** | NIKIZA Alexis | Association Protection des Ressources Naturelles pour le Bien Etre de la Population au Burundi (APRN/BEPB) | General Director |
| **21** | NDUWAYO Léonidas | Association Protection des Ressources Naturelles pour le Bien Etre de la Population au Burundi (APRN/BEPB) | Chargé des programmes de l' APRN/BEPB |
| **Women's organizations** | | | |
| **21** | NZOHABONIMANA Felicissima | Care Burundi | Gender and Community Development Expert |
| **Agricultural Sector** | | | |
| **22** | NZOBANDORA Eliphaz | ELAGA | Expert in Planning and Hydrology |
| **23** | MAHEBURWA Gaspard | Radio TV Buntu- The Voice of Orphans and Widows | Director |
| **24** | NGENDAKUMANA Evrard | Reuters | Journalist |
| **Research institutions** | | | |
| | MBARUSHIMANA Didier | Ecole Doctorale Université du Burundi | Researcher on landscape dynamics |
| | NDAYIKEZA Longin | Ecole Doctorale Université du Burundi | Biodiversity Researcher |



Below attendance sheets of the community consultations at full proposal phase are provided.

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PROPOSITION DE PROJET COMPLETE A SOUMETTRE AU FOND D'ADAPTATION

CONSULTATIONS DES PARTIES PRENANTES

**FICHES DES PRESENCES**

Date : le 26-3-2025

Lieu: Commune NTABANGANA (Zone MUTIMBUZI).

| N0 | Nom et Prénom | Sexe | Institution | Fonction | Provenance | Contact | Signature |
|---|---|---|---|---|---|---|---|
| 1 | BAZIRA Stéphane | H | Administrateur | Conseiller du C-Z | Zone Gihanga | 79949898 | |
| 2 | NSENGIYUMVA Paul | M | Administrateur | Conseiller du chef de zone | TONE V MUTIMBUZI | 69672293 | |
| 3 | NKURIKIYE Jackson | M | Agronome zone et éleveur Agronome | Conseiller du chef de Zone | zone Mutimbuzi | 69912890 | |
| 4 | SIBOMANA Daniel | M | Administration | Chef de service env, agr, élev et gestion foncière | Zone RUCE | 69870268 | |

| | | | | | | | |
|---|---|---|---|---|---|---|---|
| 5 | NDAYEJE Désiré | M | Administrateur | chef serv. Agr, élev. envir. et Gestion foncière | Zone RUGAZI | 69569858 | |
| 6 | NKURUNZIZA Adelin | M | 4 | Chef de serv. foncier, Agr, élev. | Zone RUBIRIZI | 69098904 | |
| 7 | KARIKUMUTIMA Jean | M | " | Chef du Dépt de l'Enregistrement de la propriété foncière | ZONE RUBURUGU | 69466766 | |
| 8 | NDAYIZIGA Jean Pierre | M | | Secrétaire exécutif de l'association des jeunes | Zone Gihanga | 69347275 | |
| 9 | NDAYISABA Daniel | M | CROIX-ROUGE | Président Communal | Zone Gihanga | 69507090 | |
| 10 | Ir Léon NTIGACUMPOZA | M | Administration | Chef de département env, énergie et foncier | commune Mpanda | 61367438 | |
| 11 | MUBANDA Bienvenu | M | Administration | Chef de Zone | Zone Batumba | 61224171 | |
| 12 | NTIHINYURWA Jean Pierre | M | CROIX-ROUGE | Coordinateur | Zone RUBIRIZI | 79758534 | |
| 13 | TURAKINGIWE Protais | M | | Artist au Burundi | Rutegama | 69664526 | |
| 14 | Ir NTIRAMPEBA Sadam | M | Administrateur | Chef de Serv. de l'Env, Agri, Elev et Gestion F | Zone Gatumba | 69382824 | |
| 15 | NAZARUZANIYE Alexandre | M | OBPE | OBPE Rukaramu | Controleur de l'OBPE | 69269173 | |
| 16 | NIHORIMBERE Simon | M | Administration | Chef de serv. Agr, élev environnement et gestion foncière | ZONE BURINGA | 61.144.127 | |
| 17 | NDAYISHIMIYE Pascal | M | Ferme d'élevage | Représentant des jeunes | Rukaramu | 69411621 | |
| 18 | NIMENDAZA Samson | M | Coopérative laitière | Gérant de la Coop-laitière | RUGAZI | 69760534 | |
| 19 | NDAYISHIMIYE Nestor | M | Administration | Chef de zone | ZONE GIHANGA | 69148923 | |

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PROPOSITION DE PROJET COMPLETE A SOUMETTRE AU FOND D'ADAPTATION

CONSULTATIONS DES PARTIES PRENANTES

**FICHES DES PRESENCES**

Date : le 26-3-2025

Lieu: Commune NTABANGANA (Zone MUTIMBUZI).

| N0 | Nom et Prénom | Sexe | Institution | Fonction | Provenance | Contact | Signature |
|---|---|---|---|---|---|---|---|
| 20 | Dr Jean Bamusesa CITEGETSE | M | Commune Ntabangana | Chef du dépt Env, Agric Elev | Commune NTABANGANA | 68-143081 | |
| 21 | NIMUBONA Alexis | M | Administrateur | Conseiller socio-économique développement | zone BURINGA | 68019273 | |
| 22 | KWIZERA Noé | M | OBPE | OBPE zonal | MARAMVYA | 61265973 | |
| 23 | SABUSHIMIKE Egide | M | Administrateur | Représentant Chef de Zone Buringa | GIHANGA | 69149859 | |

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|---|---|---|---|---|---|---|---|
| 24 | NTIRABAMPA Ernest | M | Administrateur | Chef de la zone | MUBUBUGU | 69545730 | |
| 25 | NZOSABAMPA Firmin | M | BPEAE | Agronome | ZONE TWIZIN DA | 61140253 | |
| 26 | NIYONKURU Safari | M | BPEAE | Agronome | ZONE GIHANGA | 68770453 | |
| 27 | HAVYARIMANA Juvénal | M | BPEAE | Directeur | ISARE | 69095982 | |
| 28 | NKURUNZIZA Jérôme | M | Enseignant Ecole Fondamentale | Représentant Ecole | Rutegama | 79193999 82305216 | |
| 29 | BAZOMPORA Alexis | M | BAGUN UMUPROBA | BATWA | RUBIRIZI | 79296161 69767688 | |
| 30 | BIGIRIMANA Christophe | M | Administration | Chef de département Etats de Mutambu | GIHUNGWE | 61613717 | |
| 31 | NDIHOKUBWAYO Alexis | M | Association | Représentant | Rutovoro | 69186426 | |
| 32 | BANGURIMANA Bernard | M | OBPE | Chef d'antenne provinciale | ISARE | 69552691 | |
| 33 | NIKIZA Pascasie | F | FNF | Représentante | NYAKIRI | 61953080 | |
| 34 | Ndikumana Aline | F | AS/OPDFS | AS Mabayi | Mabayi | 61103866 | |
| 35 | NDIKUMWAMI Godeberthe | F | BPEAE | Agronome | NJAHANGWA | 69693787 | |
| 36 | NDAYISHIMIYE Odette | F | OBPE | OBPE Zonal | Rubirizi | 69156243 | |
| 37 | NDAYIKEJE odette | F | DPDFS | AS | GIHANGA | 68141535 | |
| 38 | NAHISHAKIYE Pascasie | F | Association FNF | Représentante | GIHANGA | 61317990 | |



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**PROPOSITION DE PROJET COMPLETE A SOUMETTRE AU FOND D'ADAPTATION**

**CONSULTATIONS DES PARTIES PRENANTES**

**FICHES DES PRESENCES**

Date : le 26...9...2025.....
Lieu: Commune NTAHANGWA province MUTHAMA (Bujumbura).

| N0 | Nom et Prénom | Sexe | Institution | Fonction | Provenance | Contact | Signature |
|---|---|---|---|---|---|---|---|
| 39 | NDIHOKUBWAYO Odette | F | OBPE | Comptable de l'OBPE | Bujumbura | 66543876 | |
| 40 | MATESO Madeleine | F | OBPE | Comptable | Gitumba | 61889911 | |
| 41 | NDAUHIRUBUSA Astère | F | OBPE | Responsable Communale OBPE | Mutimbuzi | 71025051 | |
| 42 | HABAMUGIRA Hussein | M | OBPE | chef d'antenne | Gihanga | 79774102 | |

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|---|---|---|---|---|---|---|---|---|
| | Florence | | | | | | | |
| 43 | MATHIRAHANYUZA | M | ACPDH | D.Exécutif | Cobiha | Mutimbuzi | 61030038 | |
| 44 | NTEZIYORUMA Arcade | M | Représentant du Conseiller NTAHANGWA | Conseiller Juridique | MUTIMBUZI | 61030038 | | |
| 45 | NDAYIRUKIYE Prosper | M | Commune NTAHANGWA | CSRP | MUTIMBUZI | 69231287 | | |
| 46 | NIKIZA Alexis | M | Commune NTAHANGWA | DG ARRN/MEPB | BUJUMBURA | 79996628 | | |
| 47 | NIBIZI Epimeny | M | OBPE | cadre d'appui PP. PIA. | Buja | 69691224 | | |
| 48 | NSENGIYUMVA Gaston Cyrille | M | OBPE | Comptable | Bujumbura | 79935783 | | |
| 49 | NIBIGIRA Emmanuel | M | Bujumbura | Agent de l'OBPE | OBPE/Bja | 79665085 | | |
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**PROPOSITION DE PROJET COMPLETE A SOUMETTRE AU FOND D'ADAPTATION**

**CONSULTATIONS DES PARTIES PRENANTES**

**FICHES DES PRESENCES**

Date : le 25 - 9 - 2025.....
Lieu: Commune MPANDA.....

| N0 | Nom et Prénom | Sexe | Institution | Fonction | Provenance | Contact | Signature |
|---|---|---|---|---|---|---|---|
| 1 | NYUNGANIRA Hélvinède | M | Commune | Resp. d'aménagt du territoire | MPanda | 68029564 | |
| 2 | BUKEYENEZA Japhet-Prosper | M | Commune | Département de l'éducation | MPANDA | 69513772 | |
| 3 | NKURIKIYE Désiré | M | COMMUNE | ASSOCIATION des agri | MPANDA | 68587810 | |
| 4 | NSANGIRA Faustin | M | Commune | Département de l'Agromonitoring suivi - évaluation et j/c commandes | MPANDA | 61474376 | |

| | | | | | | | | |
|---|---|---|---|---|---|---|---|---|
| 5 | NDAYIZEYE Fabien Bosco | M | OBPE | Antenne communale de l'OBPE | MPANDA | 79453552 | |
| 6 | NGENDAHAYIWE Lazare | M | Assistant/ DPAEG | Assistant Social | Mpanda | 69077440 | |
| 7 | NIYAPAYE Philippe | M | Agronome (BPEAE) | Agronome Rural | MPanda | 69771352 | |
| 8 | YAMUREMYE Jean-Pierre | M | Commune | UNIPROBA | MPANDA | 68933593 | |
| 9 | NYANKURU Joseph | M | Commune | Agent Foncier | BURANZA | 68648339 | |
| 10 | BIRIHO Edouard | M | Croix-Rouge | Animateur Communautaire | MPANDA | 69731774 | |
| 11 | NIYONKURU Fréderic | M | Mouvement Coopératif | président | MPANDA | 68081084 | |
| 12 | HABAMUGIRA Hussein | M | OBPE | Antenne | Buranza | 79774102 | |
| 13 | NTAKIRUTIMANA Rémi | M | BPEAE | BUHA | BUHANTA | 61049630 | |
| 14 | NGIRIMANA Novene | M | OBPE | Chauffeur Bujum | MPANDA | 61193527 | |
| 15 | BUKURIMANA Jean Claude | M | Agronome (BPEAE) | Agronome Communal | MPANDA | 67051992 | |
| 16 | SINDAYIGAYA Adrien | M | Coopérative SHIGIKIRA-BIJA | MPANDA | MPANDA | 67064951 | |
| 17 | NAHAYO Mélanie | M | Agronome (BPEAE) | Agronome Zonal Buhanda | MPANDA | 66520997 | |
| 18 | BARUNDUKIYE Denis | M | Coopérative IBIRA BYAKUPAMBERE | Agriculteur | MPANDA | 68770462 | |
| 19 | SINZINKAYO Alexis | M | Coopérative IBIRA BYAKUYAMBERE | Agriculteur | MPANDA | 69371857 | |

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|---|---|---|---|---|---|---|---|---|
| 24 | NTIRABAMPA Ernest | M | Administrateur | Chef de zone MUBUGU | MUBUGU | 69545730 | |
| 25 | NZOSABAHA Firmin | M | BPEAE | Agronome | ZONE TWIZIN DA | 61140253 | |
| 26 | NIYONKURU Séfu | M | BPEAE | Agronome | ZONE GIHA NGA | 68770453 | |
| 27 | HAVYARIMANA Juvénal | M | BPEAE | Directeur | ISARE | 69095952 | |
| 28 | NKURUNZIZA Emmanuel | M | Chargé de suivi évaluation Représentant légal | Bururi | 79193992 62307216 | |
| 29 | BAZOMPORA Alexis | M | BATWA UNAPROBA | BATWA | RUBIRIZI | 79296161 69767688 | |
| 30 | BIGIRIMANA Christophe | M | Administrateur | Chef de dispositif Préfet de Rumonge | RUMONGE | 61613717 | |
| 31 | NDIHOKUBWAYO Alexis | M | Association | Représentant | BURONGO | 69186476 | |
| 32 | BANGIRINAMA Bernard | M | OBPE | Chef d'ant. Provinciale | ISARE | 69552691 | |
| 33 | NIKIZA Pacifique Bella | F | FNF | Représentante | MPANDA | 61953080 | |
| 34 | Ndikumana Aline | F | ASPOPES | AS Mabanga | Mabanga | 61103366 | |
| 35 | NDIKUMANA Godeliève | F | BPEAE | Agronome | NJAHANGWA | 69698787 | |
| 36 | MAYISHIMIYE Odette | F | OBPE | OBPE Zonal Rubirizi | Rubirizi | 69176243 | |
| 37 | NDAYIKEJE Odette | F | DPDFS | AS | GITHANGA | 68141535 | |
| 38 | NAHISHAKIYE Pascasie | F | Association FNF | Représentante | GITHANGA | 61317920 | |



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PROPOSITION DE PROJET COMPLETE A SOUMETTRE AU FOND D'ADAPTATION

CONSULTATIONS DES PARTIES PRENANTES

FICHES DES PRESENCES

Date : le 25 - 9 - 2025
Lieu : MPANDA

| N° | Nom et Prénom | Sexe | Institution | Fonction | Provenance | Contact | Signature |
|---|---|---|---|---|---|---|---|
| 39 | BUCUMI Gérard | M | Département de l'Environnement | Chef de département (MPANDA) | MPANDA | 69280521 | |
| 40 | NYANDWI Isaac | M | SEC (commune) | SEC | MPANDA | 69080556 | |



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RENFORCER LA RESILIENCE FACE AUX INONDATIONS ET A LA SECHERESSE GRACE A UNE COMBINAISON UNIQUE D'OUTILS, DE TECHNOLOGIES ET DE PRATIQUES INNOVANTS D'ADAPTATION AU CLIMAT AU BURUNDI »

PROPOSITION DE PROJET COMPLETE A SOUMETTRE AU FOND D'ADAPTATION

CONSULTATIONS DES PARTIES PRENANTES

FICHES DES PRESENCES

Date : le 29 - 9 - 2025
Lieu : Commune Bukinanyana (Zone Buganda)

| N° | Nom et Prénom | Sexe | Institution | Fonction | Provenance | Contact | Signature |
|---|---|---|---|---|---|---|---|
| 1 | NIYONKANA Augustin | M | Commune Bukinanyana | secretaire Econ & Fi | Bukinanyana | 79951116 61919215 | |
| 2 | NDAYISENGA Janvier | M | Conseiller Zone Buganda | Conseiller Zone Buganda | BUGANDA | 61979901 | |
| 3 | NKURUNZIZA Saïdi | M | Commune Bukinanyana | Représentant Admicom | Bukinanyana | 69161117 | |
| 4 | NDENZAKO Patrick | M | Chef de Service de l'Education de Zone BUGANDA | Chef de Service de l'Education | Buganda | 67572331 | |
| 5 | NTAHIRAJA Eraniste | M | Chef de Zone Buganda | Chef de Zone | BUGANDA | 61421068 69014658 | |
| 6 | BUTOYI Samson | M | OBPE | Chef d'antenne CIBITOKE | BUGANDA | 69999928 | |
| 7 | TUYAHARANIRE Ernestine | M | Conseiller chargé de la communication | Bukinanyana | Bukinanyana | 62305648 | |
| 8 | IRANKUNDA Kennedy | M | Chef de Commune Bukinanyana | Chef DCE | Bukinanyana | 61015476 | |
| 9 | HAGABIMANA PASCAL | M | MINEAGRIE | Agronome zonal BUHARA | BUKINANYANA | 62351034 | |
| 10 | MANIRAKIZA Reverien | M | MINEAGRIE | Agronome zonal BUZIRASAZA | BUKINANYANA | 64013614 | |
| 11 | NZABIMANA Emmanuel | M | MINEAGRIE | Agronome zonal BUTARA | BUKINANYANA | 61789840 | |
| 12 | NTAKIRUTIMANA Emile | M | MINEAGRIE | Agronome zonal GAHAHWE | BUKINANYANA | 69379853 | |
| 13 | NDAMUKIYE MANA Léonard | M | MINEAGRIE | Chef DEAE | BUKINANYANA | 61613976 | |
| 14 | NKURUNZIZA Philbert | M | MINEAGRIE | Chef de service EAE/Zone Bururi | BUGANDA | 68880916 | |
| 15 | RUGURAVE Jean Pierre | M | Conseiller Socio-économique et développement | Conseiller Socio-économique et développement | BUGANDA | 68226982 | |
| 16 | SINZOYIBUHANJA Thompson | M | Membre association/Coop | président | Buganda | 65162357 | |
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| 18 | BUSENGIMANA Michel | M | ADEPH | Membre | BUGANDA | 61918834 | |
| 19 | NDAHAGONYIMANA Clémentine | F | BUKINANYANA | Conseiller juridique | BUKINANYANA | 65 6 3746 | |

RENFORCER LA RESILIENCE FACE AUX INONDATIONS ET A LA SECHERESSE GRACE A UNE COMBINAISON UNIQUE D'OUTILS, DE TECHNOLOGIES ET DE PRATIQUES INNOVANTS D'ADAPTATION AU CLIMAT AU BURUNDI »

PROPOSITION DE PROJET COMPLETE A SOUMETTRE AU FOND D'ADAPTATION

CONSULTATIONS DES PARTIES PRENANTES

**FICHES DES PRESENCES**

Date le 23-9-2025

Lieu: Commune BURURI N.YANZA.C (Zone BUGANDA).

| N0 | Nom et Prénom | Sexe | Institution | Fonction | Provenance | Contact | Signature |
|---|---|---|---|---|---|---|---|
| 20 | Evelyne BANKUWABO | F | BPEAE | Chef de service Environnement, Agri-Elevage et Sécurité | NDAVA | 69373669 | |
| 21 | NDAYISABA Médiatrice | F | AJEUDAE | Membre | BUGANDA | 65251715 | |
| 22 | NAHIMANA Mireille | F | Zone BUGANDA | CHEF DE SERVICE SANTE | BUGANDA | 61258529 | |
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# ANNEX 4 — Environmental and Social Impact Assessment and Environmental and Social Management Plan (ESIA-ESMP)

## A4.0 — EXECUTIVE SUMMARY

| | |
|---|---|
| **Project** | Enhancing Resilience to Flood and Drought through Innovative Climate Adaptation Tools, Technologies and Practices in Burundi |
| **Implementing Entity** | UNEP |
| **Executing Entities** | OBPE; IGEBU (sub-contracted) |
| **Classification** | Category B — Moderate Risk (Overall); Category B (Components 1 and 2); Category C (Component 3) |
| **Beneficiaries** | 358,116 direct individuals; 51% women; 32% youth; 1% Batwa (3,579 persons) |

## A4.1 — COMPONENT RISK CLASSIFICATION

### A4.1.1 — Classification Matrix

| Component | Category | Basis |
|---|---|---|
| **A4.1.1a** Component 1 — Climate Information and Early Warning | B — Medium Risk | Soft interventions; reversible, localized impacts; risks concentrated in information governance, equity, and EWS dissemination access |
| **A4.1.1b** Component 2 — Flood and Drought Risk Reduction Technologies | B — Medium Risk | Physical infrastructure with site-specific, reversible impacts; elevated risks in elite capture, economic displacement, Batwa livelihood access, OHS |
| **A4.1.1c** Component 3 — Knowledge Management | C — Low Risk | Predominantly intangible activities; risks limited to knowledge governance, epistemic equity, platform inclusivity, and demonstration site siting |
| **A4.1.1d** Overall Project | B — Moderate Risk | Determined by highest-risk components; Component 3 does not elevate overall risk profile |



### A4.1.2 — Classification Justification

**A4.1.2.1** No project component generates significant, widespread, or irreversible adverse E&S impacts. Category A threshold is not triggered.

**A4.1.2.2** Three primary risk vectors drive the Category B classification:

- **(i)** Social and equity risks (Principles 2, 3, 5, 7) arising from the presence of 3,579 Batwa community members and prevailing poverty levels — mitigated through IPP, GAP, and FPIC-compliant consultation instruments
- **(ii)** Construction and implementation risks (Principles 13, 15) from earthworks and hydraulic infrastructure — mitigated through public health and sediment control protocols
- **(iii)** Ecological interconnectivity (Principle 9) from water management and agricultural intensification — mitigated through precautionary hydrological provisions

## A4.2 — AF ESP COMPLIANCE SCREENING

### A4.2.1 — Table 45: ESP Principles Compliance Checklist (Components 1 and 2)

| Ref. | Principle | Status | Justification and Operative Instrument |
|---|---|---|---|
| A4.2.1.1 | Compliance with the Law (P1) | ✓ No further plan | ESMP Legal Register tracks construction and water extraction permits. Compliance confirmed against Code de l'Environnement, Code Foncier, Code de l'Eau. Batwa customary land rights gap addressed via AF international safeguards. |

| | | | |
|---|---|---|---|
| A4.2.1.2 | Access and Equity (P2) | ✓ Plan required | Instrument: Stakeholder Engagement Plan (SEP). Binding community committee statutes; volumetric equity via rotational rationing. Quotas: landless households and Batwa 5–10%. |
| A4.2.1.3 | Marginalized and Vulnerable Groups (P3) | ✓ Plan required | Instrument: Inclusive Emergency Response Plan. EWS accessible to disabled and elderly; accessible evacuation routes. Batwa communities mapped. IPP annexed. |
| A4.2.1.4 | Human Rights (P4) | ✓ No further plan | Screened against UN Human Rights Due Diligence framework. GRM operationally sufficient. |
| A4.2.1.5 | Gender Equality and Women's Empowerment (P5) | ✓ Plan required | Instrument: Gender Action Plan (GAP). Minimum 30% women in Committees; independent women's access to drought-resilient inputs. |
| A4.2.1.6 | Core Labor Rights (P6) | ✓ Plan required | Instrument: Labor Management Procedures (LMP). OHS standards for construction workers; child labor prohibition. |
| A4.2.1.7 | Indigenous Peoples (P7) | ✓ Plan required — CRITICAL | Instrument: Indigenous Peoples Plan (IPP). Mandatory given 3,579 Batwa beneficiaries. FPIC compliance and culturally tailored benefit-sharing mechanisms. Clay Corridor access protocols defined. |
| A4.2.1.8 | Involuntary Resettlement (P8) | ✓ No further plan | Physical displacement avoided by design. Livelihood Restoration Protocol addresses economic displacement from riparian buffer zone restrictions. |
| A4.2.1.9 | Natural Habitats (P9) | ✓ Plan required | Instrument: Biodiversity Management Plan (BMP). No-Go Zones for machinery along Rusizi and Nyamagana riverbanks. Sites screened against Key Biodiversity Areas. |
| A4.2.1.10 | Biological Diversity (P10) | ✓ No further plan | No invasive species introduced. Native species protocol for slope stabilization in technical specifications. |
| A4.2.1.11 | Climate Change (P11) | ✓ No further plan | Negligible project emissions. Infrastructure designed to RCP 4.5/8.5 standards per Feasibility Study. |
| A4.2.1.12 | Pollution Prevention (P12) | ✓ Plan required | Instrument: Waste Management Plan (WMP). Contractor obligations: construction debris, plastic liner disposal, fuel spill prevention. |
| A4.2.1.13 | Public Health (P13) | ✓ Plan required | Instrument: Community Health and Safety Plan. Water-disease nexus: stored water is enclosed within sealed EPDM barrier compartments (no retention basins or storage structures exist in the design); weekly visual inspection of valve/off-take fittings for residual standing water, with larviciding as needed; construction-phase dust and noise management; **contingency protocol for mid-event puncture**: (1) the site commander activates the team for contingency response (2) the compromised 5-m segment is isolated via the inter-segment couplers; (3) a self-adhesive EPDM patch (held at commune storage) is inserted within 20 minutes by the on-site deployment team / technical team; (4) if breach not contained within 20 minutes, pre-planned community evacuation is activated per the commune preparedness plan (Output 3.1); (5) CCDRR notifies IGEBU and OBPE; (6) Final puncture repair occurs after the event using the EPDM patch kit. |
| A4.2.1.14 | Physical and Cultural Heritage (P14) | ✓ No further plan | No heritage sites in intervention zones. Standard Chance Find Procedure in contractor clauses. |
| A4.2.1.15 | Lands and Soil Conservation (P15) | ✓ Plan required | Instrument: Erosion and Sediment Control Plan (ESCP). Silt fences and gabions during canal excavation. |



**A4.2.1.16 — Distribution:** 10 principles trigger specific management measures; 5 require no additional plan. All triggered principles addressed through concrete ESMP operational protocols. No principle triggers a Category A response.

## A4.2.2 — Table 50: ESP Principles Compliance Checklist (Component 3)

*Editorial Note: Component 3 activities are predominantly intangible. E&S risks concentrate in four priority principles: P2, P7, P14, and P15. These are flagged as Priority Principles and receive extended treatment.*

| Ref. | Principle | Status | Risk and Required Action |
|---|---|---|---|
| A4.2.2.1 | Compliance with the Law (P1) | Further assessment | IP and data governance gap. National IP law may be inadequate for traditional knowledge protection; Nagoya Protocol provisions may apply. |

| | | | |
|---|---|---|---|
| | | | Demonstrate site permits must be confirmed prior to Output 4.3 site finalization. |
| A4.2.2.2 ⚑ | Access and Equity (P2) — Priority | Further assessment | Structural knowledge inaccessibility: Output 4.2 products risk defaulting to institutional formats inaccessible to non-literate beneficiaries, women, youth, and Batwa. Output 4.3 platforms risk excluding community-level actors. Action: Mandate parallel community-level formats (oral, visual, Kirundi, radio); inclusive platform design with logistical and financial provisions for marginalized participation. |
| A4.2.2.3 | Marginalized and Vulnerable Groups (P3) | Further assessment | Batwa ecological stewardship, women's adaptive practices, and youth innovation risk absence or inadequate attribution in Output 4.2. Inaccessible platforms replicate structural exclusion at sub-regional scale. |
| A4.2.2.4 | Human Rights (P4) | Further assessment | Output 4.2 may capture identifying information without adequate informed consent; sub-regional dissemination may expose individuals to harm. Action: FPIC for all contributors; anonymization-by-default for sensitive categories. |
| A4.2.2.5 | Gender Equality (P5) | Further assessment | Gender-blind knowledge production: failure to disaggregate renders women's adaptive contributions invisible. Action: Mandatory sex-disaggregated data; minimum female participation thresholds at Output 4.3 events. |
| A4.2.2.6 | Core Labor Rights (P6) | Further assessment | Informal knowledge worker engagement; volunteer arrangements risk coercion or uncompensated labor. Action: Fair remuneration and ILO-aligned terms for all Output 4.2 consultants and community data collectors and for the four mandated (women) roles (CCDRR and deployment-team membership, Site Commanders, cooperative Treasurers) |
| A4.2.2.7 ⚑ | Indigenous Peoples (P7) — Priority | Further assessment | Epistemic appropriation of Batwa TEK: documentation without community governance constitutes extraction of indigenous intellectual property. Action: FPIC framework for all Batwa knowledge documentation; community ownership protocols; co-production attribution in all Output 4.3 materials. |
| A4.2.2.8 | Involuntary Resettlement (P8) | Further assessment | Output 4.3 demonstration site establishment may involve unanticipated land use conflicts. Action: Resettlement screening checklist prior to all Output 4.3 site finalization; zero-displacement preference criterion. |
| A4.2.2.9 | Natural Habitats (P9) | Further assessment | Output 4.3 site infrastructure may encroach on sensitive riparian or wetland habitats without environmental screening. |
| A4.2.2.10 | Biological Diversity (P10) | No further plan | Low risk. Output 4.2 ecological soundness review prior to sub-regional dissemination. |
| A4.2.2.11 | Climate Change (P11) | Further assessment | Knowledge products without RCP scenario analysis will have reduced replication utility. Action: Mandatory Climate Relevance Statement in all Output 4.2 evidence products. |
| A4.2.2.12 | Pollution Prevention (P12) | Further assessment | Minor e-waste risk from documentation equipment. Action: Digital-first dissemination; certified e-waste disposal for all Output 4.2 and 4.3 equipment. |
| A4.2.2.13 | Public Health (P13) | Further assessment | Community gatherings and site visits present seasonal disease and safety risks. Action: Health and safety protocols at all Output 4.3 events; pre-visit briefings |
| A4.2.2.14 ⚑ | Physical and Cultural Heritage (P14) — Priority | Further assessment | Cultural appropriation through knowledge documentation: documentation of traditional practices without community ownership protocols constitutes intangible cultural heritage appropriation. Action: Community governance arrangements for all knowledge products; attribution standards; community right of review and conditional distribution restriction; Batwa veto right. |
| A4.2.2.15 ⚑ | Sustainable Development (P15) — Priority | Further assessment | Platform discontinuity: platforms without post-project transition arrangements will collapse upon closure. Action: Platform Transition Plan — hosting institution, governance transfer, funding continuity — finalized no later than midterm review (Month 30). MEL framework must embed replication tracking. |



## A4.3 — E&S RISK ASSESSMENT: COMPONENT-LEVEL ANALYSIS

### A4.3.1 — Table 58: Component 1 — Climate Information, Early Warning, and Hydro-Meteorological Systems

*Risk profile dominated by socio-institutional liabilities. Direct ecological footprint is negligible. Primary risks concentrate in information governance, epistemic equity, and last-mile access failures.*

| Ref. | AF Principle | Technical Risk Analysis | Probability (1–5) | Significance |
|---|---|---|---|---|

| | | | | |
|---|---|---|---|---|
| A4.3.1.1 | P1 — Law | Standard data protection and hydro-meteorological service regulation compliance. | 1 | Low |
| A4.3.1.2 | P2 — Access and Equity | Elite Capture: Granular flood risk mapping data may be co-opted by local elites for asset protection or speculative land use, excluding vulnerable communities from information system benefits. | 3 | **High** |
| A4.3.1.3 | P3 — Marginalized Groups | Data Exclusion: Batwa, landless, and disability-affected populations systematically absent from official datasets risk exclusion from vulnerability assessments, generating flawed targeting. | 4 | **High** |
| A4.3.1.4 | P4 — Human Rights | Privacy violations from household-level vulnerability identification without consent; stigmatization risk. | 3 | **High** |
| A4.3.1.5 | P5 — Gender Equality | EWS digital gender gap (34%): women receive alerts 2–4 hours later than men; male-dominated DRR committee governance further delays response. | 4 | **High** |
| A4.3.1.6 | P6 — Labor Rights | No heavy industrial hazards; standard OHS protocols sufficient. | 2 | Low |
| A4.3.1.7 | P7 — Indigenous Peoples | Batwa settlements at risk of exclusion from EWS coverage due to social stigma and inadequate mapping. FPIC non-compliance risk near Batwa ancestral lands. | 4 | **High** |
| A4.3.1.8 | P8 — Resettlement | Minor economic displacement from station fencing; no physical resettlement. Screen for economic displacement; mobile money compensation. | 2 | Low |
| A4.3.1.9 | P9 — Natural Habitats | Station access routes may facilitate encroachment in protected areas (Kibira, Ruvubu). Avoid core protected zones; coordinate with Park Rangers. | 2 | Low |
| A4.3.1.10 | P10 — Biodiversity | Construction sedimentation at gauge stations. Silt fences and dry-season scheduling. | 2 | Low |
| A4.3.1.11 | P11 — Climate Change | No direct impact; project constitutes adaptation intervention. | 1 | Low |
| A4.3.1.12 | P12 — Pollution | Standard construction waste management protocols. | 1 | Low |
| A4.3.1.13 | P13 — Public Health | No direct impact from Component 1 activities. | 1 | Low |
| A4.3.1.14 | P14 — Cultural Heritage | Intangible Heritage Erosion: technocratic forecasting pivot risks devaluing Batwa elder and women's traditional weather knowledge systems. | 3 | Moderate |
| A4.3.1.15 | P15 — Sustainable Development | No direct soil disturbance. | 1 | Low |



## A4.3.2 — Table 59: Component 2 — Innovative Flood and Drought Risk Reduction Practices and Technologies

*Risk profile shifts to tangible operational and infrastructure risks. Elevated significance concentrated in Access and Equity, Gender Equality, and Involuntary Resettlement.*

| Ref. | AF Principle | Technical Risk Analysis | Probability (1–5) | Significance |
|---|---|---|---|---|
| A4.3.2.1 | P1 — Law | Standard water abstraction permits and land use rights. | 3 | Moderate |
| A4.3.2.2 | P2 — Access and Equity | Elite Capture of Community Assets: barriers, pumps, and irrigation infrastructure risk capture by local elites, excluding smallholders. | 4 | **High** |
| A4.3.2.3 | P3 — Marginalized Groups | Participation Barriers: elderly, disabled, and land-poor households risk exclusion from sweat-equity-based benefits. | 3 | Moderate |
| A4.3.2.4 | P4 — Human Rights | Water Allocation Conflicts: peak dry-season flow reduction may compromise downstream subsistence users' right to water. | 3 | Moderate |
| A4.3.2.5 | P5 — Gender Equality | Role Reinforcement and GBV Exposure: exclusion of women from O&M roles; safety concerns at isolated water points. | 4 | **High** |
| A4.3.2.6 | P6 — Labor Rights | Standard construction OHS risks; no heavy industrial hazards. | 3 | Moderate |

| | | | | |
|---|---|---|---|---|
| A4.3.2.7 | P7 — Indigenous Peoples | Resource Access Disruption: Batwa inadvertent exclusion from irrigation schemes; temporary disruption of clay collection sites. | 3 | Moderate |
| A4.3.2.8 | P8 — Resettlement | Economic Displacement: land acquisition for storage tanks may result in crop loss or restricted access below formal resettlement thresholds. | 4 | **High** |
| A4.3.2.9 | P9 — Natural Habitats | Localized Modification: temporary siltation in modified agricultural and peri-urban riverbank zones. | 3 | Moderate |
| A4.3.2.10 | P10 — Biodiversity | Minor aquatic disturbance from flow regulation; fully reversible. | 2 | Low |
| A4.3.2.11 | P11 — Climate Change | Maladaptation through Infrastructure Dependence: over-reliance on physical barriers may erode traditional risk practices. | 3 | Moderate |
| A4.3.2.12 | P12 — Pollution | Temporary dust, noise, and sediment runoff during construction. | 3 | Moderate |
| A4.3.2.13 | P13 — Public Health | Standing water around valve/off-take fittings (no retention basins or storage structures exist in the project design) may create localized mosquito-breeding conditions; managed via weekly visual inspection and larviciding as needed per the enclosed EPDM barrier design; puncture of flood barrier may lead to small flood risk | 2 | Low |
| A4.3.2.14 | P14 — Cultural Heritage | Chance Finds: low risk of artefact discovery during excavation. Standard Chance Find Procedures embedded in contracts. | 2 | Low |
| A4.3.2.15 | P15 — Sustainable Development | Construction-Phase Erosion: slope destabilization during terracing in rainfall events. | 3 | Moderate |

## A4.3.3 — Table 60: Component 3 — Knowledge Management (Outputs 4.2 and 4.3)

*Risk profile shifts entirely to knowledge governance, epistemic equity, and institutional sustainability. Four principles carry High significance.*



| Ref. | AF Principle | Technical Risk Analysis | Probability (1–5) | Significance |
|---|---|---|---|---|
| A4.3.3.1 | P1 — Law | IP and data governance gap; Nagoya Protocol provisions potentially applicable; demonstration site permits required. | 2 | Moderate |
| A4.3.3.2 | P2 — Access and Equity | Technocratic Knowledge Capture: Output 4.2 products defaulting to inaccessible technical formats; Output 4.3 platforms defaulting to governmental participation excluding community actors. | 4 | **High** |
| A4.3.3.3 | P3 — Marginalized Groups | Structural Invisibility: Batwa ecological stewardship and women's adaptive practices risk absence in Output 4.2; physically and linguistically inaccessible platforms replicate structural exclusion. | 3 | Moderate |
| A4.3.3.4 | P4 — Human Rights | Consent Failures and Privacy Violations: documentation may capture identifying information about GBV survivors or indigenous members without adequate consent; sub-regional dissemination may expose individuals to harm. | 3 | Moderate |
| A4.3.3.5 | P5 — Gender Equality | Gender-Blind Knowledge Production: failure to disaggregate Output 4.2 renders women's adaptive contributions invisible; Output 4.3 replicating male-dominated participation patterns. | 3 | Moderate |
| A4.3.3.6 | P6 — Labor Rights | Informal knowledge worker engagement; volunteer arrangements risk coercion or uncompensated labor. | 2 | Low |
| A4.3.3.7 | P7 — Indigenous Peoples | Epistemic Appropriation of Batwa TEK: documentation of wetland management, clay harvesting, and seasonal knowledge without FPIC-governed community ownership meets the threshold of epistemic appropriation with legal, reputational, and cultural rights consequences. | 4 | **High** |
| A4.3.3.8 | P8 — Resettlement | Demonstration Site Land Acquisition: any physical Output 4.3 footprint must be screened against AF resettlement thresholds; zero-displacement preference required. | 2 | Low |
| A4.3.3.9 | P9 — Natural Habitats | Output 4.3 demonstration infrastructure may encroach on sensitive riparian or wetland habitats without prior environmental siting screening. | 2 | Low |

| | | | | |
|---|---|---|---|---|
| A4.3.3.10 | P10 — Biodiversity | Low risk of inadvertently documenting adaptive practices with unassessed biodiversity impacts. Pre-dissemination ecological soundness review required. | 1 | Low |
| A4.3.3.11 | P11 — Climate Change | Knowledge products documented under current climatic conditions without RCP scenario analysis will have reduced sub-regional replication utility. | 3 | Moderate |
| A4.3.3.12 | P12 — Pollution | Minor e-waste risk from documentation and recording equipment. | 2 | Low |
| A4.3.3.13 | P13 — Public Health | Community gatherings and site visits present seasonal disease and physical safety risks. | 2 | Low |
| A4.3.3.14 | P14 — Cultural Heritage | Cultural Appropriation: documentation and dissemination of traditional water management, clay harvesting, and indigenous seasonal calendars without community ownership protocols constitutes intangible cultural heritage appropriation. | 4 | **High** |
| A4.3.3.15 | P15 — Sustainable Development | Platform Discontinuity: exchange platforms and demonstration sites without post-project transition arrangements will collapse upon closure, eliminating sub-regional replication pathway. | 4 | **High** |

## A4.3.4 — Table 54: Risk Cluster Register — Component 3

| Ref. | Risk Cluster | Primary Output | Governing Principle(s) |
|---|---|---|---|
| A4.3.4.1 | Structural knowledge inaccessibility | 4.2 | P2, P3 |
| A4.3.4.2 | Traditional and indigenous knowledge appropriation | 4.2 | P7, P14 |
| A4.3.4.3 | Gender invisibility in evidence products | 4.2 | P5 |
| A4.3.4.4 | Unscreened land acquisition for demonstration sites | 4.3 | P8 |
| A4.3.4.5 | Exclusionary exchange platform design | 4.3 | P2, P3, P7 |
| A4.3.4.6 | Post-project platform sustainability failure | 4.3 | P15 |

**A4.3.4.7 — Mitigation Requirements:** Effective mitigation requires FPIC-governed knowledge documentation protocols; mandatory community validation of all Output 4.2 products prior to publication; inclusive platform design with logistical and financial provisions for marginalized participation; environmental siting screening for all Output 4.3 infrastructure; and binding post-project platform transition arrangements defined no later than the midterm review.



**A4.3.4.8 — Priority Mitigation Mandates:** Two clusters — Batwa TEK Appropriation (A4.3.4.2) and Platform Discontinuity (A4.3.4.6) — require the full four-tier mitigation hierarchy (Avoid / Minimize / Control / Offset-Restore). These are the two highest-priority mitigation mandates in Component 3 and constitute non-negotiable design requirements from project inception.

## A4.3.5 — Table 61: Cross-Component Risk Significance Summary

| Ref. | AF Principle | C1 | C2 | C3 | Overall Profile |
|---|---|---|---|---|---|
| A4.3.5.1 | P1 — Law | Low | Moderate | Moderate | Manageable — standard procedural compliance |
| A4.3.5.2 | P2 — Access and Equity | **High** | **High** | **High** | **Critical — consistent across all components** |
| A4.3.5.3 | P3 — Marginalized Groups | **High** | Moderate | Moderate | Elevated — requires targeted mitigation |
| A4.3.5.4 | P4 — Human Rights | **High** | Moderate | Moderate | Elevated — data governance and consent |
| A4.3.5.5 | P5 — Gender Equality | **High** | **High** | **High** | **Critical — consistent across all components** |
| A4.3.5.6 | P6 — Labor Rights | Low | Moderate | Low | Manageable — standard OHS and labor protocols |
| A4.3.5.7 | P7 — Indigenous Peoples | **High** | Moderate | **High** | **Critical — Batwa-specific risks across components** |
| A4.3.5.8 | P8 — Resettlement | Moderate | **High** | Low | Elevated in Component 2 — economic displacement |
| A4.3.5.9 | P9 — Natural Habitats | Low | Moderate | Low | Manageable — site-specific controls sufficient |
| A4.3.5.10 | P10 — Biodiversity | Low | Low | Low | Low — standard screening measures adequate |
| A4.3.5.11 | P11 — Climate Change | Moderate | Moderate | Moderate | Moderate — maladaptation risk across components |
| A4.3.5.12 | P12 — Pollution | Low | Moderate | Low | Manageable — standard ESMP controls |

| | | | | | |
|---|---|---|---|---|---|
| A4.3.5.13 | P13 — Public Health | Low | Moderate | Low | Manageable — vector and event safety protocols and flood puncture protocols |
| A4.3.5.14 | P14 — Cultural Heritage | Moderate | Low | **High** | Elevated in Component 3 — appropriation risk |
| A4.3.5.15 | P15 — Sustainable Development | Low | Moderate | **High** | **Critical in Component 3 — platform discontinuity** |

**A4.3.5.16 — Cross-Cutting Priorities:** Three principles register High significance across all components — P2 (Access and Equity), P5 (Gender Equality), and P7 (Indigenous Peoples). These constitute the project's primary cross-cutting risk priorities and are non-negotiable design requirements across all ESMP provisions, the GAP, and the IPP.

### A4.4 — CRITICAL RED FLAG ANALYSIS

#### A4.4.1 — Red Flag 1: Elite Capture of High-Value Assets

**A4.4.1.1 — Risk:** Mobile barriers, irrigated plots, and stored water are high-value assets. Elites may distort site selection, cooperative membership, and water allocation during drought periods.

**A4.4.1.2 — Consequences:** Increased inequality; benefits concentrated among better-off farmers; impoverished and Batwa households potentially materially worse off.

**A4.4.1.3 — Mitigation:**

- Poverty-weighted blind scoring algorithm: sites graded 1–10 on hydrology and population density before land ownership is disclosed, preventing elite lobbying from influencing siting
- Draft deployment maps posted publicly with mandatory 14-day objection period at Colline level in oral and visual formats
- Anti-Elite Capture Clause in Operations Manual prohibiting barrier relocation to private land without public vote, Women's Committee sign-off, and Batwa representative confirmation
- Third-Party Monitor (TPM) verification of site selection and beneficiary lists before Notice to Proceed is issued



#### A4.4.2 — Red Flag 2: O&M Sustainability Failure

**A4.4.2.1 — Risk:** Barriers and irrigation systems require regular technical maintenance. Burundi's fiscal and institutional context generates material risk of system deterioration following AF financing closure.

**A4.4.2.2 — Consequences:** Asset degradation within years of project closure; loss of resilience gains and community trust; possible reversion to pre-project vulnerability.

**A4.4.2.3 — Mitigation:** O&M Business Plan with government-endorsed annual budget lines; preference for simple locally maintainable technologies; MEL O&M fund health tracking. **Reviewer's Assessment — Project Weakness:** Stronger government commitments (line-budget allocations, policy decrees) and clearer enforceable cost-recovery and user-fee rules are required.

#### A4.4.3 — Red Flag 3: Maladaptation and False Sense of Security

**A4.4.3.1 — Risk:** Communities may over-rely on barriers and abandon traditional risk practices — drainage maintenance, conservative siting, timely evacuation — or assume protection thresholds barriers cannot guarantee under extreme events.

**A4.4.3.2 — Consequences:** Higher losses during residual or extreme events; erosion rather than enhancement of resilience.

**A4.4.3.3 — Mitigation:** Rebranding to "flood reduction" rather than "flood proofing"; mandatory failure simulation drills; conditioning deployment on evidence of local drainage maintenance and contingency planning. **Reviewer's Assessment:** Project addresses this more rigorously than comparable adaptation operations. Implementation follow-through requires close monitoring.

### A4.5 — ENVIRONMENTAL AND SOCIAL MITIGATION PROGRAMME

#### A4.5.1 — Mitigation Hierarchy

All measures apply: **Avoidance → Minimization → Restoration → Offsetting (last resort).**

A4.5.2 — Table 68: Mitigation Measures — Components 1 and 2

| Ref. | Risk / Impact | Phase | Mitigation Measures | Responsibility | KPIs and Frequency | Estimated Cost |
|---|---|---|---|---|---|---|
| A4.5.2.1 | Elite Capture of Assets (P2, P4, P7): Barriers and irrigation infrastructure diverted to protect wealthy landowners. | Pre-Construction | Avoid: Blind scoring algorithm; vulnerability-weighted site grading before land ownership disclosed. Minimize: Mandatory 14-day public objection period, oral and visual formats. Control: Anti-Elite Capture Clause in Operations Manual; barrier relocation requires public vote, Women's Committee sign-off, Batwa confirmation. | Exec: Technical Committee / IGEBU Verif: PIU Safeguards Officer / Civil Society Observers | 100% of sites match High Vulnerability scores in technical dossier. Zero unauthorized relocations. Prior to every site confirmation. | Low (Administrative) |
| A4.5.2.2 | Gender Exclusion in Deployment and Governance (P5): Women excluded from technical roles and committee governance. | Design and Implementation | Avoid: 50/30 Governance Standard — 50% female membership, 30% female executive roles in all CCDRRs. Minimize: Women trained as Site Commanders for barrier deployment. Control: Women's Committee formal sign-off required on all barrier deployment locations. | Exec: Gender Focal Point / PIU Verif: UNEP Gender Advisor | 100% of CCDRRs meet 50/30 quota. 30% women among certified Site Commanders. Quarterly. | Medium |
| A4.5.2.3 | Land Use and Tenure — Displacement and Land Access Disputes (P8) | Pre-Construction | Avoid: State-owned land prioritized for all infrastructure siting. Minimize: FPIC for all site selection. Control: Formal land use agreements with communal land offices prior to installation. Strict involuntary resettlement avoidance. | Exec: OBPE / Communal Land Services Verif: PSC / Ministry of Interior | 100% compensation paid prior to machinery entering land. | Medium |
| A4.5.2.4 | Water Resource Conflict — Inequitable | Implementation | Community-agreed water allocation protocols prioritizing | Exec: IGEBU / Local Community | Zero upstream-downstream water conflict | Low |



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|---|---|---|---|---|---|---|
| | Irrigation Distribution (P2) | | food security crops. Representative community committee. Technical studies confirming ecological flow maintenance. | Committee Verif: Ministry of Water | incidents. Monthly during dry season. | |
| A4.5.2.5 | Social Exclusion — Women, Youth, Batwa (P5, P7) | All Phases | Enforce 30% women's participation quota in all CCDRRs. Targeted Batwa consultations using culturally appropriate methods. Multi-entry-point GRM (verbal, SMS) for non-literate stakeholders. | Exec: PMU Gender Focal Point / Local NGOs Verif: UNEP Gender Advisor / PSC | CCDRR composition verified quarterly. Batwa consultation records maintained. | Low |
| A4.5.2.6 | Environmental Degradation — Soil Erosion and Construction Waste (P15, P12) | Construction | Waste Management Plans for all construction debris. Immediate revegetation of disturbed areas post-installation. Certified disposal and recycling for damaged EPDM barrier materials. | Exec: Civil Works Contractors Verif: OBPE Environmental Compliance Division | Turbidity differential ≤10 NTU above upstream baseline. Weekly during construction; daily during rainfall events. | Low |

## A4.5.3 — Table 69: Mitigation Measures — Component 3



*Editorial Note: Component 3 mitigation addresses knowledge governance, epistemic equity, cultural rights, institutional power asymmetries, and platform sustainability. Mitigation failure consequences are epistemic appropriation, structural exclusion from the project's knowledge economy, and collapse of the sub-regional replication mandate.*

| Ref. | Risk / Impact | Phase | Mitigation Measures (Hierarchy Applied) | Responsibility | KPIs and Frequency | Estimated Cost |
|---|---|---|---|---|---|---|
| A4.5.3.1 | Technocratic Knowledge Capture and Exclusionary Dissemination (P2) | Design and Dissemination | Avoid: Compulsory Community Accessibility Review for all Output 4.2 products; each product must specify community audience and demonstrate ≥1 accessible format. Minimize: Dedicated community-level dissemination events per major product; radio partnership agreements. Control: Independent gender audit of each product prior to sub-regional dissemination. | Exec: PIU Knowledge Management Officer Verif: Independent E&S Reviewer and Community Representatives | ≥70% of Output 4.2 products in ≥1 accessible format at release. ≥2 community-level dissemination events per major product. 100% of facilitators trained. Semi-annual audit. | Medium (Facilitation and Translation) |
| A4.5.3.2 | Gender Invisibility in | Design and Production | Avoid: Gender-disaggregated data | Exec: Knowledge Management | 100% of Output 4.2 products | Low |

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|---|---|---|---|---|---|---|
| | Evidence Products (P5) | | mandatory for all Output 4.2 evidence products. Minimize: Explicit attribution of women's adaptive contributions in all qualitative narratives. Control: Independent gender audit per product prior to sub-regional dissemination. | Officer / Gender Specialist Verif: Independent E&S Reviewer | contain sex-disaggregated data and explicit attribution of women's adaptive contributions. At each product release. | |
| A4.5.3.3 | Epistemic Appropriation of Batwa TEK (P7 — Indigenous Peoples) — **Highest-Significance Risk** | Pre-Documentation through Dissemination | Avoid: No documentation involving Batwa traditional practices, territories, or ecological knowledge may commence without a completed FPIC record covering scope, distribution channels, right to withdraw, attribution and benefit-sharing. Minimize: Batwa representatives designated as co-authors or acknowledged contributors on all products; community retains right to review drafts, request amendment, or restrict distribution. Control: Formal benefit-sharing agreement signed and independently verified prior to first documentation activity. Offset: Training for ≥10 Batwa community members per project in participatory documentation methods, enabling autonomous knowledge production. | Exec: Batwa Inclusion Officer / PIU Legal Officer Verif: Independent E&S Reviewer / Batwa Community Representatives | 100% of Batwa documentation activities preceded by signed FPIC record. Benefit-sharing agreement signed prior to first documentation activity. Zero products referencing Batwa practices published without Batwa validation sign-off. Prior to each documentation activity; each product release. | Medium (Legal Agreements and Capacity Building) |
| A4.5.3.4 | Privacy Violations and Consent Failures (P4) | Documentation and Dissemination | Avoid: Individual informed consent for every contributor whose testimony, photograph, or identifying information is incorporated. Minimize: Anonymization-by-default for all individual-level data; mandatory anonymization for sensitive categories | Exec: Knowledge Management Officer / PIU Legal Officer Verif: Independent E&S Reviewer | 100% of products subject to pre-publication privacy review. Zero privacy-related grievances following dissemination. | Low (Protocol and Review) |



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|---|---|---|---|---|---|---|
| | | | (GBV, ethnic identity, land tenure, health status) regardless of individual consent. Control: Independent pre-publication privacy review required for all Output 4.2 products before sub-regional release. | | | |
| A4.5.3.5 | Institutional Capture of Exchange Platforms (P2, P3) | Platform Design and Operation | Avoid: Minimum 40% community-level participation rate (farmers, women's groups, Batwa representatives, youth) mandated per Output 4.3 event. Minimize: Mandatory ≥2 Batwa representatives per event with dedicated speaking time. Control: Travel support, per diem equivalency, childcare provision, and accessible scheduling embedded as operational requirements. | Exec: PIU Community Engagement Officer Verif: Independent E&S Reviewer | ≥40% community-level participation per event. ≥2 Batwa representatives confirmed present and participating. ≥50% women among speakers, facilitators, and chairs per event. At each event. | Medium (Participation Support Grants and Facilitation) |
| A4.5.3.6 | Post-Project Platform Discontinuity (P15) | Design through Handover | Avoid: Platform Transition Plan — hosting institution designation, governance transfer protocol, funding continuity mechanism — finalized and validated no later than Month 30. Minimize: Sub-regional partner formalization and handover schedule operational by Month 48. Control: MEL framework embeds replication tracking: sub-regional adoption rates; platform continuity at 12 and 24 months post-closure. Restore: Contingency hosting arrangement activated if primary hosting institution fails. | Exec: PIU Knowledge Management Officer Verif: Steering Committee / AF Secretariat | Platform Transition Plan finalized, signed by hosting institution, and validated by AF no later than Month 30. ≥5 sub-regional actors formally adopting documented innovations by project end. Absence of validated Transition Plan at Month 30 flagged as a critical management gap. | Medium (Institutional Development) |



## A4.6 — MONITORING, ASSESSMENT, AND OVERSIGHT STRUCTURE

### A4.6.1 — Governance Structure

#### A4.6.1.1 — Table 63: Project Steering Committee (Strategic Oversight)

| Entity | Role | E&S and Gender Responsibilities |
|---|---|---|
| UNEP | Multilateral Implementing Entity — Oversight and Assurance | Retains ultimate AF safeguard accountability. Deploys E&S Specialists and Gender Advisors. Conducts annual field supervision missions. Issues "No Objection" clearance for high-risk activities conditional on safeguard precondition fulfilment. |
| Project Executing Unit / OBPE | Operational Duty-Bearer — Execution and Enforcement | Manages day-to-day ESMP, GAP, and GRM implementation. Integrates binding E&S clauses and non-compliance penalties in all tender and subcontractor documents. Submits quarterly E&S compliance reports to UNEP. |
| Project Steering Committee | Strategic Governance Body — Policy Alignment | Ensures alignment with national environment, land tenure, and gender legislation. Facilitates inter-ministerial coordination on high-level grievances and regulatory bottlenecks. Reviews and endorses annual safeguard performance reports prior to UNEP submission. |

#### A4.6.1.2 — Table 64: Project Management Unit (Operational Body)

| Key Staff | Functions | Implementation Role |
|---|---|---|
| National Project Coordinator; Financial Manager; M&E Specialist; Safeguards/Gender Officer | Execute procurement, contracting, field supervision. Manage GRM. Collect sex-disaggregated monitoring data. Enforce contractor E&S compliance. Coordinate with communes and beneficiaries. | Responsible for Components 1, 2, and 3 output delivery, financial management, and direct field implementation. |

### A4.6.2 — Implementation-Stage Surveillance

| Activity | Method | Frequency | Responsible Party | Output |
|---|---|---|---|---|
| Application of E&S Measures | Site inspections, checklist verification, visual observation | Daily / Weekly | Supervision Engineer and Contractor EHS Officer | Weekly Site Reports with photographic evidence and non-compliance logs |
| Farm and Producer Group Compliance | Spot checks on committee registers; member interviews | Quarterly | Social Safeguards Specialist / Local NGO | Quarterly Compliance Note per Producer Group |
| Community Monitoring — Strategic Oversight | Aggregation of site-level data to track project-wide compliance trends | Semi-Annual | PMU Coordinator / M&E Specialist | Semi-Annual Project Progress Report with E&S Risk Status section |
| Batwa Safeguards Site Monitoring | Daily KPI tracking: Batwa employment quota, No-Go Zone adherence, Non-Eviction Agreement compliance, analog EWS functionality | Daily / Weekly | Batwa Community Monitors (paid, one male / one female per site), reporting to UNIPROBA focal point | Daily monitoring logs submitted to UNIPROBA; flagged non-compliance escalated to OBPE Safeguards Officer within 24 hours |



**A4.6.2.1 — Corrective Action Loop:** Upon detection of non-compliance, the Safeguards Officer issues a Notice to Correct. A remediation plan must be submitted within five days. A follow-up re-inspection closes the non-compliance record.

### A4.6.3 — Reporting Hierarchy

**A4.6.3.1 — Weekly Site Logs (PIU Level):** Raw operational compliance data across all active sites and knowledge management activities. Components 1 and 2: dust, waste, PPE, trench inspection, toolbox talks. Component 3: documentation activity status, consent record completion, community validation schedules, platform preparation. Primary evidence trail for external audits.

**A4.6.3.2 — Quarterly Progress Reports (to Steering Committee):** Structured summaries of E&S incidents, GRM statistics disaggregated by grievance type and component, FPIC compliance status, gender participation rates, Stop Work or corrective action events. Component 3 coverage includes knowledge product release status, dissemination reach by format and audience, and platform event outcomes. Steering Committee must issue a written response to any High-Risk items within 15 days.

**A4.6.3.3 — Annual Project Performance Report — APPR (to Adaptation Fund — Public-Facing):** Three mandatory sections across all components:

- E&S Risk Status Matrix — current status (Active, Closed, or Emerging) of every identified risk across all 15 AF principles including Component 3 knowledge governance and cultural heritage risks
- Corrective Measures Narrative — account of every major intervention addressing non-compliance, including adaptive ESMP revisions and rationale
- Stakeholder Feedback Summary — synthesis of community satisfaction assessments, GRM resolution rates, Batwa-specific satisfaction surveys, and qualitative focus group feedback, disaggregated by gender, age, and community group

### A4.7 — GRIEVANCE REDRESS MECHANISM: THREE-TIER HYBRID ARCHITECTURE

This GRM is to be read in conjunction with the Batwa-specific GRM in Annex 6, Section 12, which specifies faster timelines and oral-first access channels applicable to all Batwa community members."

#### A4.7.1 — Architecture Overview

| Tier | Body | Scope | Resolution Timeline |
|---|---|---|---|
| **A4.7.1.1** Level 1 | Colline Grievance Committee (CGC) — Bashingantahe customary justice | Minor local social and environmental nuisances; consensus-based resolution; mandatory women's and Batwa representation | 7 days |
| **A4.7.1.2** Level 2 | Communal Technical Committee (CTC) | Appeals, high-value compensation, technical failures, GBV/SEAH preliminary triage; civil society oversight | 14 days |
| **A4.7.1.3** Level 3 | National Steering Committee (NSC) | GBV/SEAH, corruption, systemic human rights violations; strict no-mediation and confidentiality protocols | Immediate referral |



"For Batwa-specific grievances, the faster resolution timelines specified in the IPPF/IPP (Annex 6, Section 12) apply and take precedence."

#### A4.7.2 — Traffic-Light Triage Protocol

| Tier | Category | Scope | Response |
|---|---|---|---|
| **A4.7.2.1** | Green | Minor local social or environmental nuisances | Local mediation within 7 days |
| **A4.7.2.2** | Orange | Repeated problems, financial disputes, technical failures | Escalated to commune within 14 days |
| **A4.7.2.3** | Red | GBV/SEAH, serious human rights violations, corruption | Immediate referral; strict no-mediation and confidentiality protocols; Three NOs Rule applies |

#### A4.7.3 — Access Mechanisms for Vulnerable Populations

**A4.7.3.1** Cahier de doléances (complaint book) with fingerprint protocol and triplicate receipt system (white: archive; blue: digitization; pink: complainant proof of submission)

**A4.7.3.2** Toll-free Green Line — project-managed, not administered by local authorities

**A4.7.3.3** Maman Lumière pathway — women-centered oral grievance channel managed by female Protection Focal Points

**A4.7.3.4** Pink Phone Line — anonymous GBV/SEAH reporting channel managed by female UNIPROBA staff member

**A4.7.3.5** Knowledge Governance Grievance Channel — dedicated GRM pathway covering misattribution, exclusion from Output 4.3 events, FPIC non-compliance, and unauthorized use of community knowledge in sub-regional dissemination

### A4.7.4 — GRM Financial Architecture

| Budget Line | Purpose | Cap | Control |
|---|---|---|---|
| **A4.7.4.1** Investigation Allowance | Validated field travel >5km | Per mission | Mission Order signed by Zone Supervisor |
| **A4.7.4.2** GBV Survivor Support | Emergency transport to One-Stop Centre + PEP kit | USD 100/case | Managed by GBV Specialist |
| **A4.7.4.3** Witness Protection | Temporary relocation or transport for threatened whistleblower | USD 200/case | Authorized by Project Coordinator |

**A4.7.4.4 — Financial Controls:** No sitting allowances for routine meetings. Random spot checks by M&E Officer (10% of complainants contacted by phone to verify contact with the committee) guard against ghost complainants.

## A4.8 — MIDTERM AND FINAL EVALUATION PROGRAMME

### A4.8.1 — Table 71: Midterm Evaluation — Process and Compliance Review

| Parameter | Detail |
|---|---|
| **A4.8.1.1 Purpose** | Determine whether E&S management systems are functioning as designed at the halfway point. Identify implementation gaps, systemic exclusion patterns, and emerging risks. Enable course correction before most capital-intensive activities are completed. |
| **A4.8.1.2 Methodology** | Document review of all ESMP instruments (Legal Register, GRM logbook, FPIC records, permit tracking dashboard, community validation records, platform participation registers). Field visits across all three components. Key informant interviews with PIU staff, contractors, community leaders, Batwa representatives, and women's group leaders. Confidential focus group discussions with marginalized sub-groups. |
| **A4.8.1.3 Timing** | Project Month 30 |
| **A4.8.1.4 Evaluator** | Independent external consultant — demonstrated expertise in E&S safeguards, indigenous peoples rights, gender mainstreaming, and knowledge governance. No prior contractual relationship with the implementing entity. |
| **A4.8.1.5 Component 3 Mandatory Scope** | Knowledge product quality, accessibility, gender disaggregation, FPIC compliance, and attribution compliance. Output 4.3 platform inclusivity (gender, Batwa, community-level representation). Post-project Platform Transition Plan — must be finalized at or before midterm. |
| **A4.8.1.6 Output** | Midterm Evaluation Report including: ESMP effectiveness rating per AF principle; component-specific risk evolution analysis; GRM performance assessment; Component 3 knowledge governance compliance scorecard; finding on Transition Plan status; prioritized corrective action matrix with named responsible parties and 60-day implementation deadlines; updated risk register. |

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### A4.8.2 — Thematic Deep-Dive Evaluation: Indigenous Peoples and Knowledge Governance

| Parameter | Detail |
|---|---|
| **A4.8.2.1 Purpose** | Standalone assessment of Batwa rights and knowledge governance, addressing P7 (Indigenous Peoples) and P14 (Physical and Cultural Heritage). Evaluates: genuineness of FPIC processes; attribution and dissemination compliance for Batwa TEK; whether knowledge management activities strengthened or weakened Batwa communities' control over their knowledge assets; and whether reputational, legal, or relational harm has resulted from inadequate knowledge governance. |
| **A4.8.2.2 Methodology** | Participatory assessment conducted by and with Batwa community representatives using culturally adapted facilitation. Legal review of FPIC documentation against Nagoya Protocol and AF Indigenous Peoples Policy standards. Independent review of all Output 4.2 products referencing Batwa practices. Focus group discussions with Batwa elders, women, and youth. Cross-validation with external indigenous rights specialists. |

| | |
|---|---|
| **A4.8.2.3 Timing** | Project Month 48 — enabling corrective action before project closure |
| **A4.8.2.4 Evaluator** | Independent consultant specialized in indigenous people's rights and intangible cultural heritage. Engaged directly by the AF Secretariat — not through the implementing entity. |
| **A4.8.2.5 Output** | Thematic Evaluation Report on Batwa Rights and Knowledge Governance including: FPIC compliance assessment per Output 4.2 product; cultural attribution adequacy rating; Batwa satisfaction with knowledge governance; identification of any knowledge appropriation incidents with recommended remediation; recommendations for institutionalizing FPIC and knowledge governance standards in post-project dissemination. |

### A4.8.3 — Final Evaluation — Impact and Net E&S Footprint Assessment

| Parameter | Detail |
|---|---|
| **A4.8.3.1 Purpose** | Determine the ultimate E&S impact of the project: whether environment was left better or worse than baseline; livelihoods restored to or above pre-project levels; knowledge assets governed equitably; exchange platforms survived closure; Batwa communities and women materially better off. |
| **A4.8.3.2 Methodology** | Comparative baseline-versus-endline study across biological, social, economic, and knowledge governance metrics. Household income surveys for all PAP categories. Ecological transect surveys. Gender-disaggregated wellbeing assessment. Batwa-specific livelihood and participation impact assessment. Output 4.2 dissemination reach and replication uptake verification. Output 4.3 platform operational continuity at 12 months post-closure. |
| **A4.8.3.3 Timing** | Project Month 60; 12-month post-closure tracking appendix submitted separately |
| **A4.8.3.4 Evaluator** | Independent external consultant with expertise in impact evaluation, E&S safeguards, knowledge governance, indigenous people's rights, and sub-regional institutional analysis. Must differ from midterm evaluator. |
| **A4.8.3.5 Output** | Final Evaluation Report: Net E&S Impact Statement per component and per AF principle; baseline-endline comparative analysis; Component 3 Knowledge Governance Impact Assessment; lessons learned synthesis; post-project sustainability recommendations; 12-month post-closure tracking appendix. |

### A4.8.4 — Evaluation Standards — Non-Negotiable Requirements



**A4.8.4.1 Independence:** Final evaluator must not have had any prior contractual relationship with the implementing entity and must be engaged directly by the AF Secretariat.

**A4.8.4.2 Methodological Rigor:** Mixed-methods approach mandatory — quantitative statistical analysis combined with qualitative participatory methods. Qualitative findings from marginalized groups carry equal analytical weight to quantitative indicators.

**A4.8.4.3 Disaggregation:** All data disaggregated by gender, age, disability status, and ethnic/community identity including Batwa. Aggregated findings masking distributional inequities are not acceptable.

**A4.8.4.4 Adaptive Management Interface:** Midterm findings formally reviewed by Steering Committee within 30 days of submission; written corrective action response issued within 60 days. Final evaluation findings submitted to the AF Secretariat with the project completion report.

## A4.9 — POST-CLOSING SURVEILLANCE FRAMEWORK

*Framing Note: The Do No Harm obligation does not terminate with final tranche disbursement. E&S risks — particularly infrastructure O&M governance, livelihood restoration adequacy, knowledge platform continuity, and indigenous knowledge governance — require structured monitoring beyond the formal project period.*

### A4.9.1 — Post-Closing Surveillance Activities

| Ref. | Activity | Timing | Responsible Party | Output |
|---|---|---|---|---|

| | | | | |
|---|---|---|---|---|
| A4.9.1.1 | E&S Compliance Archive | Closure +3 months | PIU / Implementing Entity | Project Compliance Atlas — fully indexed digital archive; transmitted to AF Secretariat with signed completeness certificate |
| A4.9.1.2 | Lessons Learned Evaluation — All Components | Project Closure | PIU / Steering Committee | Best Practice Guide: Governing Knowledge for Climate Resilience — covering all components; dedicated Component 3 chapter; visual summary, radio adaptation, and vernacular executive summary included |
| A4.9.1.3 | Positive Impact Quantification — Environmental and Social Value | Project Closure | Specialized Independent Consultants | Impact Briefing Note: Valuing Resilience — Economic and Ecological Returns; submitted to AF Secretariat; published on Implementing Entity platform |
| A4.9.1.4 | Infrastructure O&M Sustainability Verification | +12 and +24 months post-closure | Independent Evaluator / Implementing Entity | O&M Sustainability Audit Reports — traffic-light assessment of each site category and corrective action log for below-threshold sites |
| A4.9.1.5 | Livelihood Restoration Verification — Displaced Persons | +6 and +18 months post-construction | External Evaluator / PIU Finance Officer | Livelihood Restoration Compliance Reports — individual case status for each registered PAP; Bridging Support activation log where income restoration not achieved |
| A4.9.1.6 | Long-Term Batwa Inclusion Verification | +12 and +24 months post-closure | Independent NGO / Implementing Entity | Batwa Post-Closing Inclusion and Knowledge Rights Reports — community satisfaction ratings, access verification, zero instances of unattributed re-dissemination of Batwa TEK |
| A4.9.1.7 | Platform Continuity Verification | +12 and +24 months post-closure | Knowledge Management Officer / Implementing Entity | Platform operational status reports — ≥40% community participation maintained; Batwa representation confirmed |
| A4.9.1.8 | Knowledge Replication Tracking | +12 and +24 months post-closure | Independent Consultant / Implementing Entity | Sub-regional uptake scorecard — ≥5 sub-regional actors formally referencing or adopting documented innovations |
| A4.9.1.9 | Legacy Repository Maintenance Verification | +12 and +24 months post-closure | Hosting Institution / Implementing Entity | Repository Maintenance and Accessibility Reports — access statistics, integrity verification, privacy compliance confirmation |
| A4.9.1.10 | Final Long-Term Impact Evaluation | +24 months post-closure | Independent Evaluation Team / AF Secretariat | Final Long-Term Impact Evaluation Report — definitive post-project accountability document |



### A4.9.2 — Post-Closing Surveillance Timeline

| Milestone | +3M | +6M | +12M | +18M | +24M |
|---|---|---|---|---|---|
| Compliance Archive finalized | ✓ | | | | |
| Livelihood Restoration Audit Round 1 | | ✓ | | | |
| O&M Sustainability Audit Round 1 | | | ✓ | | |
| Batwa Inclusion / Knowledge Rights Report Round 1 | | | ✓ | | |
| Platform Continuity Verification Round 1 | | | ✓ | | |
| Knowledge Replication Tracking Round 1 | | | ✓ | | |
| Repository Maintenance Audit Round 1 | | | ✓ | | |
| Best Practice Guide published | | | ✓ | | |
| Livelihood Restoration Audit Round 2 | | | | ✓ | |
| O&M Sustainability Audit Round 2 | | | | | ✓ |
| Batwa Inclusion / Knowledge Rights Report Round 2 | | | | | ✓ |
| Platform Continuity Verification Round 2 | | | | | ✓ |
| Knowledge Replication Tracking Round 2 | | | | | ✓ |
| Repository Maintenance Audit Round 2 | | | | | ✓ |
| Final Long-Term Impact Evaluation | | | | | ✓ |

### A4.10 — CONDITIONS FOR APPROVAL

### A4.10.1 — Condition 1: O&M Sustainability Commitments

Government-endorsed O&M Business Plan submitted within Year 1 including:

- Concrete annual budget lines for maintenance and barrier/irrigation O&M
- Exemption provisions for poorest households and Batwa communities
- Third-Party Monitor (TPM) verification of barrier and storage facility siting against vulnerability maps before Notice to Proceed is issued
- O&M indicators as disbursement-linked milestones for at least one project tranche

### A4.10.2 — Condition 2: Mandatory Annual System-Wide Drills and EWS–Barrier Stress Tests

At least one full-chain simulation per year in each target commune covering: forecast issuance → alert dissemination → barrier deployment → evacuation drills. Post-exercise evaluation reports with corrective actions reported to the AF Board in annual project performance reports.

### A4.10.3 — Condition 3: Formalization of Batwa Inclusion and Protection Measures

A concise, stand-alone Indigenous Peoples (Batwa) Plan finalized and disclosed, consolidating all ESMP measures. Explicit commitment: no wetland interventions will compromise Batwa cultural livelihoods — including clay sources — without FPIC and agreed livelihood alternatives.



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# ANNEX 5 — Gender Action Plan (GAP)

| | |
|---|---|
| **Project Title** | Enhancing Resilience to Flood and Drought through Innovative Climate Adaptation Tools, Technologies and Practices in Burundi |
| **Implementing Entity** | UNEP |
| **Executing Entities** | OBPE; IGEBU (sub-contracted) |
| **Policy Alignment** | AF Environmental and Social Policy Principles 2, 3, and 5; Burundi National Gender Policy (2012–2025); UNFCCC Lima Work Programme on Gender |

## SECTION 1 — TECHNICAL CONTEXT: DIFFERENTIATED VULNERABILITY ANALYSIS

The climate risk profile of Bujumbura Province is structurally bifurcated along gender lines. Three structural mechanisms constitute the Gender-Climate Nexus in Mpanda, Bubanza, and Bukinanyana:

**The Agrarian Adaptation Trap:** Women provide 90% of subsistence agricultural labor — the sector most exposed to drought — yet hold less than 20% of formal land tenure. This collateral deficit excludes women from credit markets required for adaptation investments, producing a cycle of diminishing resilience that intensifies with each successive climate event.

**Asymmetrical Warning Latency:** A 34% digital gender gap in rural Burundi means women routinely receive flood alerts 2–4 hours later than men — a delay that forces impossible choices between asset preservation and family evacuation.

**Infrastructure Bias:** Historically, protection assets prioritize commercial zones over social reproductive infrastructure (water points, washing basins, health post access routes). This bias compound women's time poverty post-disaster and reduces their capacity to participate in recovery processes.

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## SECTION 2 — STRATEGIC FRAMEWORK: GENDER-TRANSFORMATIVE APPROACH

### Preamble: Why "Do No Harm" Is Insufficient

Climate adaptation programming in sub-Saharan Africa documents a recurring pattern: gender-neutral design producing gender-regressive outcomes — irrigation schemes transferring water governance from women to male cooperative leadership; EWS reaching male household heads while women received warnings hours late or not at all; knowledge documentation exercises extracting community-generated adaptive intelligence and publishing it under institutional authorship without attribution. In each case, the implementing agency had designed for an imaginary gender-neutral beneficiary.

**This GAP begins from a different premise: gender neutrality in climate adaptation design is not a safe baseline — it is a form of structural negligence.**

In Mpanda, Bubanza, and Bukinanyana, the baseline is not equality — it is a set of deeply entrenched structural inequalities in land tenure, information access, occupational segregation, decision-making authority, and knowledge governance that shape both the distribution of climate risk and the distribution of adaptation benefits. A project that does not actively work against these inequalities will reproduce them.

This GAP therefore rejects the passive do-no-harm model and adopts a **Gender-Transformative Framework** — one that does not merely seek to include women in existing structures, but to transform the structures themselves. The distinction is operationally critical. Inclusion without transformation produces women who attend meetings but do not influence decisions; women listed as committee members whose

names are absent from bank accounts; women whose traditional ecological knowledge calibrates flood models, but who are not named in the methodology. Transformation requires the deliberate redistribution of authority, resources, and recognition — from institutions to communities, from men to women, from the formal economy to the informal survival economy.

**Budget and Policy Alignment**

The revised GAP allocates **USD 216,000 — approximately 5.2% of the activity budget** — across four strategic pillars, increased from the original USD 148,000 to incorporate Pillar IV, which addresses knowledge governance as an adaptation asset — a dimension entirely absent from the original framework.

| Instrument | Provision |
|---|---|
| AF Gender Policy (2016, revised) | Gender-transformative programming standard |
| UNFCCC Lima Work Programme on Gender and Gender Action Plan (2019) | Equitable participation and gender-responsive climate action |
| Burundi Politique Nationale Genre (2012–2025) | National gender equality obligations |
| CEDAW General Recommendation No. 37 | Gender dimensions of disaster risk reduction |
| SDG 5 | Gender equality and women's empowerment |

**PILLAR I — DE-MASCULINISING THE CLIMATE SERVICES VALUE CHAIN**

*(Component 1 — Outputs 1.1 through 3.2)*

**The Problem**

The climate information value chain in rural Burundi is, from production to dissemination, systematically structured to serve male information users. At the production end, hydrodynamic models are calibrated using data generated by predominantly male technical institutions. Women accumulated observational knowledge — knowledge of which valley flanks flood first, which crops signal drought stress before instruments detect it — is treated as anecdote rather than data, excluded not because it is inaccurate but because it is held by people without institutional affiliation and because modeling methodologies have no category for it.



At the dissemination end, the 34% digital gender gap translates directly into a 2–4-hour warning latency gap that, in a flash flood scenario, is the difference between orderly evacuation and a catastrophic choice between asset preservation and physical safety. This is not a technology problem — it is a gender problem that manifests as a technology problem. The governance layer compounds both failures: Community DRR Committees are predominantly male-led. An evacuation order passing through a male-led committee before reaching female household members in contexts where direct inter-gender communication is restricted is structurally slower than one issued by a woman to her own social network. **The 50/30 Governance Standard is not a quota — it is a functional efficiency requirement for EWS to operate at the speed a flash flood demand.**

**What This Pillar Does**

**Cognitive Justice in Data Production:** Ground-Truthing Walks — participatory validation exercises conducted by hydrologists together with female Community Memory Keepers — are a technical quality control mechanism. Historical flood data validated against observational records of women who have farmed the same land through multiple flood cycles is more accurate than model data calibrated solely against instrument records extending fewer than twenty years. The target — more than 30% of historical hydrological data points sourced or validated by women elders — is a minimum quality standard, not a participation goal.

The Double Vulnerability Hotspot Overlay under Output 1.1.3 — superimposing drought severity data on Female-Headed Household demographic maps — is the primary targeting instrument that determines where adaptation funds are legally ring-fenced. The gender data is not supplementary; it drives the resource allocation decision.

**Last-Mile Dissemination Architecture:** The EWS cascade protocol under Output 1.1.5 is designed around the social infrastructure women actually use — market leaders, VSLA secretaries, women's group chairpersons, and church network leaders — operating independently of smartphone ownership rates. Solar chargers and smartphones for 200 female focal points bridge the digital gap where possible; the cascade protocol ensures system function in the 34% of cases where it cannot. GIS risk maps converted into simplified, color-coded wall murals at water collection points and health centers — the spaces with highest female footfall — and female market leaders as Town Criers translating maps into oral formats for non-literate users are **access equity interventions**, not communication activities.

**Governance Authority, Not Governance Presence:** The 50/30 Governance Standard — minimum 50% female membership and 30% female occupancy of executive roles (Chair, Treasurer, Secretary) in all CCDRRs — is explicitly calibrated to the distinction between presence and authority. A committee in which women constitute 50% of members but occupy no executive roles has no institutional obligation to issue an evacuation order that a female committee leader would issue. The executive quota ensures women possess the administrative authority to trigger protective action.

**Intersectional Inclusion:** The Batwa Inclusion Protocol under Output 1.1.1 recognizes that "women" is not an internally homogeneous category. Batwa women face compound vulnerability — ethnic marginalization layered on gender marginalization — rendering standard consultation mechanisms inadequate. Deployment of Batwa-specific facilitators for separate focus groups is not a logistical preference; it is an FPIC requirement enabling Batwa women to articulate their specific evacuation vulnerability profiles — particularly the land tenure insecurity that transforms flood displacement into permanent dispossession — without fear of retaliation.



**PILLAR II — GOVERNANCE OF ADAPTATION ASSETS**

*(Component 2 — Output 4.1)*

**The Problem**

Physical infrastructure is the most politically contested adaptation asset in this project. The history of asset-intensive development programming in the Imbo Plain demonstrates a consistent pattern: when a technology is introduced as a community resource, it tends over time to migrate toward private control by local elites. If the deployment protocol for mobile barriers does not specify that barriers cannot be moved from community infrastructure protection zones to private commercial property, they will be moved. If site selection does not require women's explicit sign-off, sites will be selected based on men's priorities — which consistently favor commercial infrastructure over the social reproductive infrastructure whose flooding generates the most severe increases in women's time poverty and care burden.

Additionally, if barriers are operated exclusively by male technical teams: women remain dependent on male intermediaries; the "machines are for men" norm is publicly reinforced at every demonstration event; and long-term O&M sustainability is tied to a male workforce that may charge for services or condition access on social compliance from female community members.

**What This Pillar Does**

**Anti-Elite Capture Architecture:** The Protection-by-Design Audit under Output 2.1.1 requires that a Women's Committee formally validates every barrier deployment location before installation is authorized.

This validation is contractually binding — a condition of the deployment authorization, not a consultation courtesy. Deployment plans without a completed Gender Impact Note are not approved.

The Anti-Relocation Clause embedded in the O&M Protocol under Output 2.1.4 — requiring a public vote including women before barriers can be relocated from agreed community sites — is the long-term institutional safeguard against elite capture. Ratification by the Municipal Council elevates it from a project rule to a local governance instrument that survives the project's operational period.

**Occupational De-Segregation and Technical Authority:** The certification of women as Site Commanders for barrier deployment logistics under Output 2.1.2 is a deliberate norm-challenging intervention. Site Commanders direct placement, manage inventory, and coordinate logistics — they are the operational decision-makers, not support staff. The 30% target for female Site Commander certification is measured against a baseline of zero women in technical oversight roles at project inception.

Positioning women as Treasurers of community irrigation cooperatives under Output 2.2 extends this logic to financial governance. Control over the O&M fund — the mechanism determining whether irrigation infrastructure survives beyond the project period — is a form of authority over the long-term sustainability of a community adaptation asset. Financial control over community adaptation infrastructure is itself an adaptation outcome, and its distribution is a justice question.

The **Nutrition-First Zoning** standard under Output 2.2.1 — mandating that more than 50% of irrigated land area supports subsistence and nutrition crops — is a resource allocation equity measure calibrated to the documented gender asymmetry in crop control in the Imbo Plain. Women control subsistence crop production; men predominantly control cash crop production. An irrigation scheme that prioritizes cash crops does not distribute benefits equally.

**Protection Architecture in Infrastructure Design:** The GBV-Safe Storage Site Selection standard under Output 2.1.3 embeds a protection analysis into an infrastructure decision that would otherwise be determined purely by logistical criteria. The 50-lux lighting standard and internal locking requirement are the minimum physical parameters distinguishing a safe access environment from a design-induced GBV risk environment as defined by IASC GBV in Emergencies Guidelines.



**Accessible Design as Universal Adaptation:** The ergonomic and universal design consultation under Output 2.2.2 — requiring women and persons with disabilities to validate tap and pump physical design specifications before procurement — is a technical quality gate. Infrastructure that women and children cannot physically operate does not deliver its adaptation benefit to the majority of its intended users.

**PILLAR III — INTERSECTIONAL INCLUSION**

*(Cross-Cutting — All Components)*

**The Problem**

Standard DRM programming designs for an "Average Rural Woman" — Bantu, able-bodied, landed, adult, literate. This average mask multiple overlapping layers of discrimination placing specific sub-groups at categorically higher risk.

**The Batwa "Double Displacement" Dynamic:** In a non-disaster context, Batwa communities are already landless or near-landless. When a flood displaces a Batwa household, the displacement does not merely interrupt residency — it eliminates the informal arrangements constituting their only tenure security. Unlike Bantu neighbors who can invoke itongo (ancestral land) rights as the basis for return claims, Batwa women possess no legal documentation to anchor a return claim. The disaster provides administrative cover for what is, in effect, permanent dispossession — ethnic cleansing by climate proxy. In IDP settings, Batwa

women face a second layer of discrimination through documented refusals by non-Batwa residents to share latrines or water points, forcing Batwa women to travel longer distances to "unrestricted" water sources and dramatically increasing GBV exposure time in transit.

**Disability and the Evacuation Gap:** The EWS in Burundi relies on auditory signals and visual indicators. Deaf women receive no warning. Blind women receive no warning. For a woman with sensory impairments living alone, effective warning time is zero. Evacuation routes involve steep, muddy paths impassable for wheelchairs and crutches during rainfall. Sphere Standards mandate accessible latrines, but rapid-response construction defaults to squat-type latrines without handrails, rendering sanitation systems unusable for women with mobility impairments.

**Adolescent Girls:** The post-disaster period concentrates hygiene poverty, early marriage risk, and educational dropout pressures simultaneously. Loss of hygiene materials produces period confinement, preventing girls from attending food distributions, school registration sessions, and protection meetings — generating a cascade of exclusion that, in the most severe cases, terminates in permanent educational dropout.

**What This Pillar Does**

**FPIC as a Gendered Governance Instrument:** The FPIC protocol under Output 1.1.1 for Batwa inclusion is the operational mechanism through which the Batwa community's right to determine the terms on which their traditional ecological knowledge and vulnerability data are documented, stored, and used is protected. The Evacuation Vulnerability Profile — a dedicated risk assessment record for each Batwa settlement documenting land tenure status, physical access constraints, historical displacement trajectories, and community-identified evacuation priorities — transforms FPIC from a consultation process into a planning document with operational consequences.



**Universal Design as Inclusion Infrastructure:** Inclusive evacuation drills under Output 2.1.5, simulating the evacuation of pregnant women, the elderly, and persons with disabilities, test the project's core protective claim against actual mobility profiles of the most vulnerable community members. The multi-sensory EWS protocol — developed under Component 1 in coordination with disability organizations including UPHB — extends warning architecture to include tactile, vibration-based, and community-relay mechanisms reaching deaf and blind women in female-headed households. This is not a supplementary accessibility feature; it closes a life-safety gap that currently renders the EWS non-functional for a defined sub-population.

**Social Protection Linkages for Adolescent Girls:** The project integrates Dignity Kit distribution into first-wave community response — not as a luxury, but because the period confinement produced by absence of sanitary materials prevents adolescent girls from accessing food distributions, school registration sessions, and community protection meetings.

**PILLAR IV — GOVERNANCE OF KNOWLEDGE AS AN ADAPTATION ASSET**

*(Component 3 — Outputs 4.2 and 4.3)*

**The Problem: Epistemic Capture**

Epistemic capture is the process by which knowledge generated through the intellectual labor, traditional ecological expertise, and empirical observation of community members — in this project, specifically women farmers and Batwa communities — is extracted, documented, reframed in technical language, published under institutional authorship, and disseminated at sub-regional conferences without attribution to or benefit-sharing with the communities that generated it.

The consequences are material, not merely reputational. Sub-regional replication investment — funding, technical assistance, and policy attention that flows to communities whose adaptive practices are identified as scalable — goes to the institutions that published and disseminated those practices, not to the communities that innovated them. Communities that generated the knowledge receive neither recognition, nor economic benefit, nor influence over how it is applied in subsequent programming cycles. They become subjects rather than authors.

This risk is structurally embedded in the standard knowledge management architecture of climate adaptation projects. Technical manuals are written in French by consultants with doctoral degrees. Case studies are authored by project M&E officers. Replication guides are designed for consumption by government ministries and international NGOs. Community members — specifically women and Batwa communities — are positioned as data sources rather than co-authors. **Component 3 could replicate this pattern precisely while meeting all standard output requirements. This Pillar exists to prevent that outcome.**

**The Governance Architecture This Pillar Establishes**

**The FPIC Attribution Protocol for Output 4.2:** Every knowledge product incorporating Batwa traditional ecological knowledge must be governed by a three-stage FPIC Attribution Record: (1) pre-documentation consent specifying what knowledge is authorized and under what conditions; (2) pre-publication consent specifying attribution language, authorized distribution channels, and restrictions on institutional reuse; and (3) post-publication review confirming compliance with consent terms and providing the Batwa community a formal correction right. The Batwa community holds an explicit veto right at each stage. Products reaching the pre-publication stage without a completed three-stage FPIC Attribution Record are withheld from dissemination until compliance is confirmed. There is no exception for schedule pressure or budget constraint.



**The Co-Design Committee for Output 4.2:** All knowledge products are co-designed with women farmers from inception — not reviewed at the end of a production process controlled by technical staff. Co-design means active participation at four stages: defining the research question; validating the analytical framework; reviewing draft findings for accuracy and cultural appropriateness; and approving the final product before publication. A dedicated Co-Design Committee comprising at least two women farmers per Colline and two Batwa women per intervention zone is constituted at Output 4.2 inception and maintained throughout the production cycle. The distinction between co-design and consultation is enforced: a Co-Design Committee presented with a completed draft and asked to comment has been consulted, not co-designed with.

**The Kirundi Accessibility Mandate for Output 4.2:** All knowledge products are produced in a full Kirundi version — not a summary or digest, but a complete version equivalent in substantive content to the technical French version — at time of release. A visual format adapted for low-literacy audiences, validated by non-literate women community members in pre-release testing, is produced for all community-level products. The Kirundi Accessibility Mandate closes a structural loop: the same women whose observational knowledge constitutes the substance of the evidence base are able to access, verify, and use the documented version of their own knowledge without requiring literacy in a language that is not their primary medium of thought.

**The Women as Lead Demonstrators Protocol for Output 4.3:** All public-facing Output 4.3 demonstration events position women as lead demonstrators — the individuals who operate the equipment, explain the technique, and present results to visiting officials and sub-regional partners. Male technical staff may provide support but may not occupy the lead demonstrator role at public events. The sub-regional partner who returns from an Output 4.3 event having observed a woman farmer explain and demonstrate mobile flood barrier operation to a government minister has received direct, embodied evidence that no gender-mainstreaming language in a project document can transmit.

**The Gender-Parity Platform Design Standard for Output 4.3:** All exchange events achieve minimum 50% female participation among total attendees and minimum 50% female representation among panel presenters, session facilitators, and event chairs. These standards are measured and reported separately — an event achieving 50% female attendance, but 10% female presenter representation has not achieved gender-balanced platform participation; it has achieved female observation of a male-dominated intellectual exchange. Event design actively compensates for structural barriers: travel support and per diem equivalency for women from rural areas; childcare provision at all venues; scheduling avoiding school holidays and agricultural peak periods identified by women community members.

**The Batwa Platform Representation Standard for Output 4.3:** All Output 4.3 events include a minimum of two Batwa representatives with dedicated speaking time — not absorbed into generic "community" slots but scheduled as named presenters with time specifically allocated to Batwa-specific adaptive practices and knowledge contributions. Oral presentation formats are supported, recognizing that the oral tradition through which Batwa traditional ecological knowledge is transmitted and validated is the epistemological standard of the knowledge-holding community.

**The Knowledge Governance GRM Channel:** The Maman Lumière device is extended to cover knowledge governance grievances arising from Component 3 activities — covering misattribution, exclusion from Output 4.3 events, coercion in consent processes, and unauthorized use of community knowledge in sub-regional dissemination. These grievances are subject to the same resolution timeframes as social safeguard grievances. This institutionalizes the principle that the right to control one's own knowledge is a human right — enforceable, grievance-addressable, and subject to the same accountability standards as the right to physical safety or fair compensation.

**The Knowledge Attribution Economic Impact Analysis:** The Gender-Disaggregated Cost-Benefit Analysis under Activity 2.3.2.a is extended to quantify the economic value of attribution — defined as the replication investment attracted by sub-regional partners who can identify the originating community by name — and the economic cost of epistemic capture — defined as the replication investment that bypasses originating communities when knowledge is disseminated without attribution. This provides the policy advocacy evidence base for institutionalizing FPIC and attribution standards in future AF knowledge management programming across the Great Lakes sub-region.



**REVISED BUDGET SUMMARY — FULL GAP**

| Pillar | Component | Budget (USD) |
|---|---|---|
| Pillar I | De-Masculinizing the Climate Services Value Chain (Component 1) | $85,000 |
| Pillar II | Governance of Adaptation Assets (Component 2 — Output 4.1) | $63,000 |
| Pillar III | Intersectional Inclusion (Cross-Cutting) | Embedded across Pillars I, II, and IV |
| Pillar IV | Governance of Knowledge as an Adaptation Asset (Component 3 — Outputs 4.2 and 4.3) | $68,000 |
| **TOTAL** | | **USD 216,000 (≈5.8% of activity budget)** |

The increase from USD 148,000 to USD 216,000 reflects the addition of Pillar IV and is justified by three factors: the documented severity of the epistemic capture risk in knowledge management programming; the long-term policy advocacy value of the Knowledge Attribution Economic Impact Analysis as a sub-regional standard-setting instrument; and the binding nature of FPIC obligations under AF ESP Principle 7 and the Nagoya Protocol, which cannot be met without dedicated resource allocation.

**SECTION 3 — OPERATIONAL COMMITMENTS AND ACCOUNTABILITY**

**Budgetary Ring-Fencing:** Gender activities are embedded in specific output budgets, not held in a general gender pool. They cannot be cut during contingency reallocations without a formal budget revision requiring

PIU and Steering Committee approval. This applies equally to Pillar IV activities, embedded in Component 3 output budgets.

**Agency Indicators, Not Participation Counts:** Success is measured by whether women possessed the authority to change the outcome of meetings — not by the number of women who attended. Indicators distinguish systematically between presence and agency: the percentage of women reporting increased influence in community water decisions; the reduction in evacuation time for female-headed households; the number of Output 4.2 knowledge products in which Batwa contributors are named in the body text with role-specific attribution; and the number of sub-regional actors formally citing originating communities when replicating documented practices.

**Maman Lumière GRM Architecture:** The full gender GRM architecture — covering social safeguard grievances, SEAH grievances, and knowledge governance grievances — is managed through female protection focal points at Colline level, trained in active listening, survivor-centered response, specialist referral, and knowledge governance rights. All SEAH cases are managed under a no-mediation, direct-referral protocol. All knowledge governance cases are subject to a maximum 14-day resolution timeframe.

**Annual Gender Audit:** An independent gender audit is conducted annually by an external specialist with no institutional affiliation to the PIU, covering all four Pillars. Audit findings are presented to the Steering Committee within 30 days of completion, with mandatory corrective action plans for any indicator rated Below Target. Audit reports are published on the project's public information platform.

## SECTION 4 — DETAILED GENDER ACTION PLANS BY COMPONENT

### TABLE 84 — GENDER ACTION PLAN: COMPONENT 1

| Activity | Indicators and Targets | Timeline | Responsibilities | Budget (USD) | AF Principle Alignment |
|---|---|---|---|---|---|
| **1.1.1.a — Separate Space Risk Mapping:** Sex-segregated community mapping sessions to prevent male dominance. Women map "hidden" assets (safe bathing spots, firewood collection routes) ignored in general assessments. | Indicator: Ratio of women-identified vs. men-identified assets in final Risk Register. Target: Vulnerability index weights time poverty (water fetching distance) as a critical risk factor. | Y1, Q1 | PMU Gender Specialist; Local NGOs | In design budget | P3 (Marginalized Groups): Corrects bias toward public infrastructure priorities at expense of social infrastructure. |
| **1.1.1.b — Batwa Inclusion Protocol:** Batwa-specific facilitators conducting focus groups with indigenous women to record unique land-tenure vulnerabilities without fear of retaliation from dominant ethnic groups. | Target: 100% of Batwa settlements in the project zone have a specific Evacuation Vulnerability Profile recorded. | Y1, Q1 | Specialist Ethnographer / Mediator | In design budget | P7 (Indigenous Peoples): Ensures FPIC processes are gender-inclusive within indigenous groups. |
| **1.1.2.a — Participatory Ground-Truthing Walks:** Hydrologists walk flood lines with Community Memory Keepers (elderly women) to validate model data against historical flood levels. | Target: >30% of historical flood data points sourced or validated by women elders. Indicator: Discrepancy rate between model predictions and women's historical accounts documented. | Y1, Q2 | Hydrology Team; Community Animators | In design budget | Technical Quality: Improves model accuracy by using indigenous knowledge as a calibration tool. |
| **1.1.3.a — Double Vulnerability Overlay Analysis:** GIS overlay of drought severity maps with Female-Headed Household | Indicator: Production of a Gender-Drought Nexus Map. Target: Adaptation funds legally ring-fenced | Y1, Q3 | GIS Specialist; M&E Officer | In design budget | P2 (Access and Equity): Uses data science to target the most vulnerable; prevents resource |

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| demographic data to identify hotspot zones where water scarcity meets economic fragility. | for the top 3 identified hotspot zones. | | | | capture by better-off areas. |
| **1.1.4.a — Last-Mile Visual Communication:** Convert technical GIS maps into simplified, color-coded wall murals at water points and health centers. Use Town Criers (female market leaders) to explain maps to non-literate populations. | Target: 50 simplified murals in women-centric spaces. Indicator: % of non-literate women correctly identifying home risk level via KAP survey. | Y1, Q4 | Communications Officer; Art Cooperatives | In design budget | P12 (Education): Ensures risk information is accessible regardless of literacy level. |
| **1.1.5.a — 50/30 Leadership Quota:** Governance statute requiring CCDRRs to be 50% female, with women holding ≥30% of executive positions (Chair, Treasurer, Secretary). | Target: 100% of DRR Committees meet the 50/30 quota. Indicator: Number of early warning decisions formally authorized by female leaders. | Y1–Y4 | PMU; Local Administration | In design budget | P5 (Gender Equality): Moves from participation (attendance) to agency (authority). |
| **1.1.5.b — Mobile Tech for EWS:** Provide solar chargers and smartphones to 200 female committee members to bridge the digital gender gap and ensure direct alert receipt. | Target: 200 female focal points equipped. Indicator: Average time lag between alert receipt and dissemination to female networks. | Y1, Q4 | Procurement; ICT Officer | In design budget | Technological Access: Empowers women as independent nodes in the information network. |

## TABLE 76 — GENDER ACTION PLAN: COMPONENT 2

| Activity | Indicators and Targets | Timeline | Responsibilities | Budget (USD) | AF Principle Alignment |
|---|---|---|---|---|---|
| **2.1.1.a — Protection-by-Design Audit:** Women's Committee signs off on all barrier deployment locations before installation is authorized, ensuring barriers protect social infrastructure (washing zones) overlooked by male engineers. | Target: 100% of deployment plans have a signed Gender Impact Note. Indicator: % of barriers deployed to protect social vs. commercial infrastructure. | Y2, Q1 | PMU Engineers; Gender Specialist | In design budget | P5 (Gender Equality): Prevents elite capture of protection assets; ensures equitable risk reduction. |
| **2.1.2.a — Barrier Logistics Certification:** Train women as Site Commanders to direct barrier placement and inventory management, not as support staff. | Target: 30% of certified Site Commanders are women. Indicator: Income generated by women through Cash-for-Work deployment schemes. the four (women) mandated roles (CCDRR and deployment-team membership, Site Commanders, cooperative Treasurers) will be remunerated or burden-compensated | Y2, Q1 | Technical Trainers; PMU | In design budget | P6 (Labor Rights): Disrupts occupational segregation by placing women in technical oversight roles. |
| **2.1.3.a — GBV-Safe Storage Site Selection:** Safety audits for storage locations; sites must have lighting >50 lux and be lockable from inside to ensure women can access equipment at night without GBV risk. | Target: 100% of storage sites pass the Safety Audit. Indicator: Zero reports of workplace harassment or violence at storage depots. | Y2, Q2 | GBV Specialist; Procurement | In design budget | P4 (Human Rights): Addresses the risk of GBV in infrastructure projects. |
| **2.1.4.a — Anti-Relocation Clause:** Embed a clause in the O&M Operations Manual stating barriers cannot be | Target: Protocol ratified by Municipal Council. Indicator: Number of grievances filed by | Y2, Q2 | Legal Consultant; PMU | In design budget | Governance: Institutionalizes equity into the regulatory |

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| moved from agreed community sites to private properties without a public vote including women. Ratified by Municipal Council. | women regarding unauthorized equipment movement. | | | | framework of the technology. |
| **2.1.5.a — Inclusive Evacuation Drills:** Conduct drills simulating evacuation of pregnant women, elderly, and disabled persons to test barrier efficacy in buying time for slow-moving groups. | Target: 3 Vulnerable Group drills conducted. Indicator: Reduction in evacuation time for persons with limited mobility. | Y2, Q3 | Red Cross; UPHB | In design budget | P3 (Marginalized Groups): Tailors disaster response to the most physically vulnerable. |
| **2.2.1.a — Nutrition-First Zoning:** Priorities irrigation support for subsistence/nutrition crops (vegetables, pulses) over cash crops or mandate a 50/50 split. | Target: >50% of irrigated land area supports subsistence/nutrition crops. Indicator: Improvement in Household Dietary Diversity Scores (HDDS) in project areas. | Y2, Q4 | Agronomist; Nutritionist | In design budget | P15 (Land/Soil Conservation): Promotes diverse cropping systems over monoculture. |
| **2.2.2.a — Ergonomic and Universal Design:** Consult women and persons with disabilities on physical design specifications of taps and pumps (height, handle weight) before procurement. | Target: Designs validated by the User Group Committee. Indicator: Absence of physical barriers reported in user satisfaction surveys. | Y2, Q4 | Engineering Team | In design budget | P2 (Access): Ensures infrastructure is physically accessible to all beneficiaries. |
| **2.3.2.a — Gender-Disaggregated Cost-Benefit Analysis:** Monetize women's time saved from water fetching and avoided maternal health costs to demonstrate the full ROI of the intervention. | Target: CBA Report includes a Gender Economic Impact chapter. Indicator: ROI calculation explicitly values unpaid care work. | Y4, Q1 | Resource Economist | In design budget | Policy Advocacy: Provides economic data to justify gender-responsive budgeting by the Ministry of Finance. |
| **2.3.3.b — Female Tech-Demonstrators:** At all public demonstration days, women operate machinery and explain the technology to officials, challenging the "machines are for men" narrative. | Target: 50% of technical presenters are women. Indicator: Change in community perception of women's technical capabilities (qualitative survey). | Y4, Q2 | PMU | In design budget | Social Norm Change: Visually challenges patriarchal norms regarding technology and gender. |



## GENDER ACTION PLAN: COMPONENT 3 — KNOWLEDGE MANAGEMENT (OUTPUTS 4.2 AND 4.3)

**Strategic Rationale:** Component 3 introduces a distinct gender and inclusion risk — epistemic capture. Adaptive practices in the Imbo Plain are frequently developed through the empirical observation and labor of women farmers and Batwa communities. When such practices are documented and disseminated through institutional channels without explicit governance, attribution and influence shift away from community innovators toward technical institutions and administrative actors. This violates rights-based principles (recognition, consent, and benefit-sharing) and weakens technical quality by disconnecting knowledge products from the contexts that generated and validated them. The GAP treats knowledge as an adaptation asset requiring the same equity safeguards as physical infrastructure.

| Activity | Indicators and Targets | Timeline | Responsibilities | Budget | AF Principle Alignment |
|---|---|---|---|---|---|
| **Output 4.2 — Co-Design and Co-Production:** All knowledge products co-designed with women farmers and Batwa women | Indicator: % of Output 4.2 products with documented co-design at all four stages. Target: 100% of products demonstrate co-design evidence prior to release. | Y1 Q3 onward; verified at each product release | PIU Knowledge Management Officer; PMU Gender Specialist; Co-Design Committee; Batwa | Ring-fenced within Output 4.2 budget | P5; AF Gender Policy: prevents epistemic capture by shifting women from |

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| through a formal Co-Design Committee at scoping, drafting, validation, and approval stages. | | | focal representatives | | informants to co-authors. |
| **Output 4.2 — Kirundi and Visual Low-Literacy Versions:** Full Kirundi version (not summary) and visual low-literacy format available at time of each product release. | Indicator: % of products available in full Kirundi at release; % of community-facing products in visual low-literacy format. Target: 100% Kirundi at release; 100% visual format for community-facing products. | From first product release; continuous | KM Officer; Kirundi translator/editor; Communications Officer; Co-Design Committee | Within Output 4.2 production budget | P2 (Access and Equity): ensures effective access regardless of language and literacy. |
| **Output 4.2 — Mandatory Sex-Disaggregated Data:** All publications present sex-disaggregated performance data and gender-differentiated analysis. | Indicator: % of products presenting sex-disaggregated data and gender-differentiated findings. Target: 100% compliance for all Output 4.2 products. | Continuous; QA at each product release | M&E Officer; Gender Specialist; KM Officer | Integrated in M&E budget | AF Gender Policy: avoids gender-neutral aggregation that erases differentiated outcomes. |
| **Output 4.3 — Gender Parity in Participation and Platform Roles:** All exchange events achieve ≥50% female attendance and ≥50% women among speakers, facilitators, and event chairs. Both indicators measured and reported separately. | Indicator: % women among attendees; % women among speakers/facilitators/chairs per event. Target: ≥50% women in attendance and ≥50% women in platform roles per event. | Each event | KM Officer; Event Coordinator; PMU Gender Specialist; Local administration | Within Output 4.3 budget | P5: parity requires proactive design — travel support, childcare, accessible scheduling. |
| **Output 4.3 — Women as Lead Demonstrators:** Women are lead demonstrators at all public barrier deployment and agro-hydrological practice demonstration events. Male technical staff may not occupy the lead demonstrator role at public events. | Indicator: % women among lead demonstrators at public events. Target: ≥50% women lead demonstrators at all public demonstration events. | Each demonstration day | Technical Trainers; KM Officer; PMU Gender Specialist | Within Output 4.3 budget | Norm change: challenges "machines = men"; increases women's visibility as technical authorities. |



## SECTION 5 — CUMULATIVE VULNERABILITY ANALYSIS

### The Poly-Crisis Framework

For women in the Imbo Plain, a flood is not merely a hydrological event — it is a stressor that fractures an already brittle socio-economic lattice. Resilience is not about "bouncing back" to a status quo that is itself a state of crisis. Three compounding stressor layers collapse simultaneously in a disaster:

| Layer | Pre-Disaster Gendered Reality | Post-Disaster Multiplier Effect |
|---|---|---|
| **Base Layer — Ecological Fragility** | Women farm marginal, steep lands; yields already shrinking from erosion and over-farming. | A flood kills the crop and washes away topsoil, rendering the land unfarmable for years, not one season. |
| **Middle Layer — Biological and Health** | High baseline prevalence of malaria and anemia among women and children. | Displaced women, already anemic, are exposed to stagnant water. The secondary malaria surge, not the flood itself, often kills weakened children. |

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| **Top Layer — Macro-Economic** | Reliance on tontines (VSLAs) for weekly cash flow; no bank access. | Displacement scatters tontine members. The social insurance policy vanishes precisely when emergency cash is needed most. |

**The Rupture of Social Capital:** Informal care networks — neighbors providing childcare while women fetch water or farm — are the invisible infrastructure of community resilience. Displacement into IDP settings replaces familiar support networks with strangers, restricting women's mobility, preventing access to food distributions and work, and systematically dismantling the care infrastructure that sustains household function.

**Trajectory from Displacement to Destitution:** Post-flood acute-phase survival — typically the first three weeks — forces women to sell productive assets (livestock, tools) or take predatory loans (interest rates exceeding 100%) to cover emergency medical costs. This transforms women from producers into dependents, eliminating the capital base required to restart agricultural activities after waters recede.

**Economic Resilience: Value Chain Collapse and the Invisible Female Economy**

Standard Post-Disaster Needs Assessments (PDNAs) are structurally biased toward the formal, predominantly male economy — cash crops (coffee, tea, palm oil) with defined market prices, established supply chains, and tax records whose losses are quantifiable in USD or BIF. Women's subsistence crop production (beans, cassava, sweet potatoes) — primarily consumed within households or traded in informal local markets — rarely enters national accounting systems.

The **Shadow Hunger Effect** results from this misclassification: subsistence crop losses are categorized as household consumption, not sectoral economic loss. Consequently, recovery funding is directed to coffee washing station rehabilitation rather than cassava replanting, generating food security deficits that are structurally invisible to standard PDNA frameworks.



**VSLA Collapse:** Village Savings and Loan Associations (Nawe Nuze / Tontines) function as de facto banks for rural women. Unlike formal banks, they depend on physical ledgers and cash boxes. A single flash flood destroys both, eliminating credit histories, collapsing inter-member trust, and removing access to emergency liquidity — precisely when fast cash is most urgently needed. Women denied VSLA liquidity face only predatory lending or distressed asset sales, driving the trajectory from displacement to destitution.

**Strategic DRM Implications:**

- **Multidimensional Cash Transfers:** Inflation-indexed, sustained transfers through the lean season — not one-off grants — to prevent asset stripping.
- **Health-WASH Integration:** Mosquito net distribution for vector control is as critical as food assistance; malaria surge is frequently the secondary killer in poly-crisis events.
- **Social Preservation:** Resettlement strategies must prioritize movement of entire Colline neighborhoods together to preserve tontine and care networks.
- **VSLA Digitization:** Transition Nawe Nuze groups to digital wallets (Lumicash, Ecocash) to secure funds and records in the cloud against physical destruction.

**Protection Architecture: From "Safety" to "GBV Mitigation"**

GBV in post-disaster Burundi is frequently the direct result of infrastructure negligence and power asymmetries — not an inevitable social consequence. Latrines positioned on camp periphery to mitigate odour create "dark corridor" risk environments for women navigating poorly lit paths after sunset. Standard E&S assessments audit latrine presence, not access pathway safety. Emergency shelters accommodating multiple families under a single tarpaulin collapse domestic privacy, removing the social barriers that typically restrain intimate partner violence.

**SEAH as a Systemic Issue:** Local leaders and predominantly male humanitarian field staff controlling access to essential resources create hierarchical structures in which women must navigate transactional dynamics to secure necessities. Sextortion — trading sex for names on food distribution lists, shelter materials, or phone charging access — normalizes exploitation and fundamentally undermines women's agency.

**GRM Failures:** Standard complaint boxes are inaccessible to non-literate women. Fear of retaliation deters reporting. Reporting channels directed to male staff who know the perpetrator are effectively closed. The project addresses this through the Maman Lumière pathway, female Protection Focal Points, toll-free anonymous hotlines with automated voice-prompt systems for non-literate users, and direct distribution of food and NFI rations to the senior woman of the household.

**Health Systems and Biological Vulnerability**

Disaster mortality is not gender-neutral. The **Three Delays Model** in the Burundian context identifies the Second Delay — time to reach a health facility — as the primary maternal mortality driver. When floods wash out connector bridges, transit time to district hospitals can spike from 45 minutes to six hours. Manageable obstetric complications transition into uterine rupture or fistula. Post-disaster death registries record cause as "hemorrhaged," leaving the root cause — Infrastructure-Induced Access Failure — unrecorded and transport infrastructure deprioritized in health sector reconstruction budgets.

Disaster-induced disruption to contraceptive supply chains creates a Fertility Trap — three-month supply disruptions in IDP camps generate rebound spikes in unintended pregnancies, forcing women to carry pregnancies in conditions of malnutrition and high stress.

Women's domestic care labor generates disproportionate pathogen exposure. In the littoral zones of Lake Tanganyika, schistosomiasis and cholera exposure is strictly gendered: men interact with the lake via boat (surface contact); women interact via wading and washing (submersion contact). In household cholera nursing, women provide CTC-equivalent care without any PPE, creating a caregiver viral load that combined with chronic immunosuppression from the labor of caregiving produces severe morbidity when infection occurs.



**Strategic Operational Mandates:**

- Climate-proofed health corridors classifying feeder roads within 10km of health facilities as Critical Life-Safety Infrastructure with Q100 flood-return period standards.
- Anticipatory health financing with shock-responsive triggers releasing funds to District Health Offices 48 hours before predicted flood events for pre-positioning of reproductive health kits.
- Home-Based Care Kits (heavy-duty gloves, aprons, chlorine powder, ORS) recognizing the home as a clinical environment and the mother as an unpaid health worker requiring OSH protection.
- Decentralized Maternity Waiting Homes adjacent to hospitals in flood-prone zones, subsidizing high-risk pregnant women's pre-delivery residential stay under Performance-Based Financing to eliminate transport risk.

**Intersectional Marginalization: The Invisible Groups**

The Batwa Double Displacement, disability-specific EWS failures, and adolescent girl exclusion dynamics are documented in full under Pillar III above. Strategic DRM responses required for these sub-populations — FPIC-governed Evacuation Vulnerability Profiles for Batwa settlements, multi-sensory EWS extensions, and Dignity Kit first-wave distribution — are operationalized through the specific activities embedded in Pillars I, II, and III across all three project components.

# ANNEX 6 — Indigenous Peoples Planning Framework (IPPF) and Indigenous Peoples Plan (IPP)

| | |
|---|---|
| **Project:** | Enhancing Resilience to Flood and Drought through Innovative Climate Adaptation Tools, Technologies and Practices in Burundi |
| **Implementing Entity** | UNEP |
| **Executing Entities** | OBPE; IGEBU (sub-contracted) |
| **Target Zone:** | Province of Bujumbura — Communes of Mpanda, Bubanza, and Bukinanyana |
| **Indigenous Peoples Concerned:** | Batwa Community |

## EXECUTIVE SUMMARY

This document constitutes the IPPF and operative IPP for the project, financed by the Adaptation Fund and implemented by UNEP in partnership with OBPE.

The project is structured around three integrated components. Component 1 strengthens climate information and early warning systems through geospatial hazard mapping (Output 1.1), operationalization of the Common Alert Protocol (CAP) and Simplified Early Action Protocol (SEAP) for last-mile dissemination (Output 1.2), and expansion of the IGEBU climate monitoring network (Output 2.1). Component 2 deploys 6.5 kilometers of dual-purpose water-filled mobile flood barriers and integrated water storage and irrigation systems, supported by community preparedness plans developed in coordination with CCDRRs, Civil Protection, and the Burundian Red Cross (Output 3.1), with strengthened CCDRR capacity under Output 3.2 and full IPPF/IPP implementation across relevant project activities. Component 3 generates, documents, and disseminates knowledge through an evidence base on adaptive practices (Output 4.2) and a network of demonstration sites and sub-regional exchange platforms (Output 4.3).

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The Batwa community — estimated at approximately 3,579 people, representing 1% of the target population across 35 Collines — face differentiated and compounded risks across all three components. Landlessness, pottery-based livelihoods contingent on riverine clay access, near-total digital exclusion, and systematic underrepresentation in governance structures mean that a technically neutral implementation approach would replicate and, in some cases, accelerate existing exclusion.

This IPPF responds with a rights-based architecture built on five commitments: operationalization of FPIC as a continuous, iterative, and revocable process; prevention of displacement and green gentrification; protection of clay corridors and cultural heritage; governance of Batwa knowledge contributions under intellectual property protections aligned with the Nagoya Protocol; and a tiered GRM designed for oral, zero-cost, zero-intimidation access.

The framework applies across all project components and the full project lifecycle. It is fully consistent with AF ESP Principle 7, UNDRIP, ILO Convention No. 169, and the Sendai Framework (2015–2030). Where Burundian national law provides insufficient protection, this IPPF applies a standards-plus approach grounded in international law.

## PART I — CONTEXTUAL FRAMEWORK AND RATIONALE

### 1. Introduction: The Socio-Political Imperative

#### 1.1 Project Rationale within the Indigenous Context

The project operates in a context of technically demanding adaptation needs and deeply stratified socio-political conditions. Across the three target communes, significant socio-economic disparities between dominant Hutu and Tutsi communities and the indigenous Batwa minority shape access to resources, information, and governance. The Batwa experience structural marginalization that is historically entrenched and institutionally reproduced: landlessness, economic specialization in a trade under increasing pressure, near-total digital exclusion, and systematic absence from governance structures through which project benefits are delivered. An ethnically neutral implementation approach would not merely fail to reach them — it would actively consolidate their exclusion. This IPPF establishes binding safeguards, accountability mechanisms, and differentiated benefit-sharing arrangements reflecting Batwa rights under national and international law.

#### 1.2 The Climate–Marginalization Nexus

**Livelihood vulnerability and the clay cycle.** The Batwa economy is organized primarily around pottery — a survival strategy necessitated by landlessness. Batwa households depend on specific wetland clay deposits and forest resources. This clay cycle model is under increasing structural pressure from wetland privatization and conservation legislation, onto which climate change superimposes acute shocks. Floods disrupt clay supply chains, destroy unfired inventory, and inundate kiln sites. Drought hardens clay, increases extraction effort, degrades biomass availability, and raises bushfire risk. For Batwa potters, both hazard types translate into total cessation of cash flow — a vulnerability profile that standard agrarian resilience packages do not address. The project therefore adopts a differentiated livelihood strategy: elevated drying sheds, covered storage units, clay corridor access protection, energy-efficient kilns, and value chain diversification tailored to the pottery economy.



**Housing vulnerability and the Sisyphus cycle.** Batwa dwellings are overwhelmingly constructed from wattle and daub, sorghum stalks, and scavenged plastic — a rational economic response to tenure insecurity, not a cultural choice. When floods strike, the differential damage is catastrophic: a brick house suffers a maintenance incident; a Batwa dwelling is erased. The household loses shelter, economic inventory, and legal documents simultaneously, then rebuilds from zero before the next rainy season. This Sisyphus cycle is the structural mechanism through which the Batwa are locked into chronic compounding vulnerability. The project addresses this through extended lead-time EWS protocols for Batwa settlement zones, Community Resilience Caches on elevated ground, and emergency shelters sited through participatory mapping on socially neutral ground.

**Intersectionality — Batwa women's double marginalization.** Batwa women experience compounded ethnic and gender discrimination. As potters, they depend on communal water points for domestic use and clay processing — access frequently denied by members of dominant groups. Civil works generate labor influx risks that, in contexts of existing power asymmetries, translate into elevated GBV exposure. The project addresses this through segregated consultations facilitated exclusively by female UNIPROBA staff, a dedicated GBV reporting channel managed by a female UNIPROBA staff member, mandatory GBV awareness training for all site personnel, safe access audits, gender-sensitive emergency infrastructure, and a labor quota with an explicit Batwa women sub-quota.

### 2. Legal and Institutional Framework

#### 2.1 National Legal Context: Recognition and Contradiction

Burundi's legal framework presents a fundamental paradox: constitutional recognition of the Batwa coexists with a land tenure and natural resource regime that systematically undermines their economic rights and physical security.

The **Constitution (2018)** mandates affirmative representation for the Twa — three co-opted seats in the National Assembly and three in the Senate — legitimating both the design of targeted safeguards and requirements on local administration to ensure Batwa participation.

The **Land Code (Law No. 1/13 of 9 August 2011)** privileges formal land registration and the Mise en Valeur doctrine, linking ownership entitlement to "productive use" in formal agrarian terms. Batwa customary uses — clay harvesting, foraging, transient habitation — are routinely classified as "fallow" or "vacant," rendering occupied lands legally vulnerable to seizure. Without the protections of this IPPF, the project's physical works could become an instrument of forced eviction.

The **Water Code (Law No. 1/02 of 26 March 2012)** classifies rivers and wetlands as public domain, requiring formal permits for water use. For the Batwa, whose economy depends entirely on wetland clay access, this creates an additional legal basis for restricting access to economically critical zones. The project's environmental management plans must explicitly protect traditional clay corridors as a form of customary usufruct right.

### 2.2 The Standards-Plus Approach

Where Burundian national law provides insufficient protection, this IPPF applies a standards-plus approach grounded in AF ESP, UNDRIP, and ILO Convention No. 169. No Batwa community will be removed from their land regardless of formal tenure status without genuinely voluntary, compensated relocation agreed under full FPIC. The project explicitly rejects the Mise en Valeur doctrine as a basis for compensation; all assets and livelihood disruptions are compensated at full replacement cost including the value of clay access rights. Batwa Traditional Ecological Knowledge (TEK) is recognized as a valid, co-equal scientific input into climate risk assessment and EWS calibration alongside formal meteorological data.



### 2.3 Institutional Arrangements and Capacity Assessment

**OBPE** serves as the Executing Entity with final accountability for safeguards compliance. Its community engagement model routes through the standard administrative hierarchy — dominated by Hutu and Tutsi landholders — and systematically excludes Batwa representation. Three corrective institutional tracks are applied: internal power analysis training and field exchanges pairing OBPE officers with UNIPROBA specialists; community-level Social Focal Points and mandated segregated Batwa consultations; and disaggregated monitoring tracking active Batwa participation defined as decision-making and resource access — not attendance — supported by an independent annual social audit.

**UNIPROBA** (Unissons-nous pour la Promotion des Batwa) is mandated throughout the project as the primary third-party facilitator for all Batwa consultations, serving as cultural mediator, independent advocate, and institutional intermediary. A dedicated budget line covers UNIPROBA facilitation costs for the full project lifecycle.

**IGEBU** contributes climate data and forecasting capacity under Output 2.1, which must be translated into Batwa-accessible formats. The **Burundian Red Cross** and the **WFP FbF/SEAP** mechanisms are integrated into Component 1 operations and must apply inclusive dissemination standards consistent with this IPPF when operating in Batwa settlement zones.

## PART II — THE INDIGENOUS PEOPLES PLANNING FRAMEWORK (IPPF)

### 3. Identification Criteria and Scope

The IPPF applies the following criteria, consistent with AF ESP Principle 7, UNDRIP, and ILO Convention No. 169. The Batwa in Bujumbura Province self-identify and are collectively recognized as a distinct cultural group; demonstrate historical continuity with pre-colonial forest-dwelling societies; maintain distinct social, cultural, and economic institutions — including a pottery-based economy, oral traditions, and the Bashingantahe governance role; and experience structural marginalization across all socio-economic indicators. The estimated Batwa population in the project zone is approximately 3,579 people across 35 Collines.

### 4. IPPF Objectives and Operational Pillars

The IPPF pursues four strategic objectives: guarantee equitable and culturally appropriate benefits calibrated to Batwa livelihoods; mitigate adverse impacts by neutralizing specific causal chains through which project activities could harm Batwa interests; operationalize FPIC as a continuous, iterative process with a genuine veto right; and institutionalize meaningful Batwa participation in CCDRR governance through conditionality-based quotas.

**Pillar 1 — Safeguards Screening:** Verification of Batwa presence, settlement, or resource use at any potential sub-project site before any physical intervention is approved. **Pillar 2 — Participatory Social Assessment:** Site-specific social assessments evaluating direct, indirect, and cumulative impacts as a mandatory pre-condition for any site-specific IPP. **Pillar 3 — Management Planning:** Triggered whenever screening and assessment confirm Batwa communities are present or that their livelihoods, resources, or cultural heritage may be affected. **Pillar 4 — Monitoring, Evaluation and Reporting:** SMART indicators, tiered monitoring responsibilities, and a three-tier external audit cycle.

## PART III — ENVIRONMENTAL AND SOCIAL IMPACT ANALYSIS



### 5. Methodological Approach

The impact analysis applies a causal chain methodology — Intervention → Social Mechanism → Potential Adverse Impact — across all three components, recognizing that technically protective interventions are not socially neutral in stratified societies. The analysis focuses on the intersection of project activities with AF ESP Principles 3, 4, 5, 7, and 15.

### 6. Component 1 — Climate Information and Warning Systems

**Output 1.1 — Risk maps and hazard profiles.** Participatory mapping processes must include dedicated ground-truthing walks with Batwa elders and women potters to ensure Batwa settlement zones, clay extraction corridors, and customary land use areas are identified in the spatial vulnerability analysis. Batwa-identified No-Go Zones (sacred sites, burial grounds, clay deposits with spiritual significance) must be embedded as exclusionary polygons in engineering designs for all subsequent physical interventions under Output 4.1.

**Output 1.2 — EWS dissemination and CAP/SEAP implementation.** Digital EWS channels are structurally inaccessible to the Batwa population, characterized by high functional illiteracy and very low mobile phone penetration. This is not a communications challenge — it is a life-safety gap. The project deploys a fully redundant, low-technology early warning pathway for Batwa settlements: audible sirens within range of all clusters; color-coded signal flags at pre-agreed visible locations; and Town Crier relays recruited from within the community and compensated through the cash-for-work scheme. WFP FbF/SEAP trigger protocols must include a Batwa-accessible dissemination leg — coordinated between IGEBU, the Burundian Red Cross, and UNIPROBA community liaisons — with extended lead times for Batwa settlement zones. Batwa TEK bio-indicators — including bird behavior, insect activity, water-level

observation, and seasonal clay-cycle patterns — are integrated into EWS calibration as a valid, co-equal evidence source alongside formal meteorological data.

**CCDRRs (Output 3.1).** A double quota mechanism applies as a conditionality, not a target: every CCDRR must include at minimum two Batwa representatives — one male, one female — as a binding precondition for the commune to receive physical assets under Output 4.1. Non-compliance blocks disbursement under the Financial Gateway Mechanism.

**7. Component 2 — Mobile Flood Barriers and Integrated Water Systems**

**Output 4.1 — Barrier deployment and green gentrification risk.** Local administrators applying the Land Code may designate Batwa-occupied land as "vacant" or "public," creating legal pretext for clearance. Flood protection generates immediate land value appreciation creating economic incentives for private landlords to evict Batwa squatters from newly protected zones — converting the project's principal benefit into a driver of dispossession.

The response is pre-emptive and structural. Environmental and social screening verifies tenure and occupancy status of all candidate sites through on-site participatory verification — Batwa community members walk the land with project staff to demarcate dwelling zones and customary use areas, supplementing and correcting official cadastral maps where necessary. A **no-displacement covenant** is embedded in all project implementation agreements. **Non-Eviction Agreements** are signed with communal administrations before commencement of works. Community Resilience Caches provide asset protection independent of the tenure situation.

**Labor inclusion.** Civil works contracts must specify a mandatory minimum of 15% of unskilled labor positions sourced from Batwa community members, including a sub-quota for Batwa women. Compliance is monitored by paid Batwa community monitors and verified by the third-party monitor. Non-compliance triggers the Financial Gateway Mechanism.



**Clay corridor access.** Environmental management plans must explicitly map and protect traditional clay corridors. Any measure restricting Batwa access to marshes or clay deposits under conservation or public safety rationales is classified as economic displacement requiring FPIC and agreed livelihood alternatives. Access to clay corridors is treated as a usufruct right protected under the standards-plus approach, irrespective of formal recognition under the Water Code.

**8. Component 3 — Knowledge Management**

**Output 4.2 — Epistemic appropriation of Traditional Ecological Knowledge.** The Batwa possess accumulated TEK covering flood indicator species, clay deposit hydrology, wetland ecosystem dynamics, and agro-meteorological observation. Documentation without explicit community governance of what is documented, how it is attributed, and who benefits constitutes epistemic appropriation under UNDRIP Article 31.

The response is a **three-stage FPIC Attribution Protocol**: (1) pre-documentation consent specifying scope, authorized contributors, and conditions; (2) pre-publication consent specifying attribution language, authorized distribution channels, and restrictions on reuse; and (3) post-publication review confirming compliance with consent terms and providing a formal community correction right. The Batwa community holds an explicit veto right at each stage. Any product reaching the pre-publication stage without a completed Attribution Record is withheld from dissemination without exception.

A **Co-Design Committee** — comprising at minimum two Batwa representatives (one male, one female) nominated by UNIPROBA, at least two women farmers, at least one-woman trader, and youth representatives — governs all Output 4.2 knowledge products from scoping through approval. The distinction between co-design and consultation is operationally enforced. All Output 4.2 products are subject

to a mandatory **Community Accessibility Review**: a complete Kirundi-language version equivalent in substantive content must be released alongside any French technical version; a visual low-literacy format validated by non-literate community members is required for all community-level dissemination products.

**Output 4.3 — Exchange platforms and demonstration sites.** A gender and inclusion parity standard applies to all Output 4.3 events: minimum 40% community-level participation (farmers, women's groups, Batwa representatives, youth) and minimum 50% women in platform leadership roles per event. Women — including Batwa women — serve as lead demonstrators for barrier deployment and agro-hydrological practices. Travel support, childcare provision, and UNIPROBA facilitation are built into event design as operational requirements. Batwa TEK sessions facilitated by Batwa knowledge holders are a mandatory component of all Output 4.3 events held in communes with significant Batwa populations, governed by the FPIC Attribution Protocol.

## PART IV — THE INDIGENOUS PEOPLES PLAN (IPP): OPERATIONAL FRAMEWORK

### 9. Stakeholder Consultations and Engagement

### 9.1 Context and Approach

The consultation process moved beyond standard inform-and-consult approaches toward meaningful participation. Recognizing historical power imbalances and entrenched mistrust between the Batwa and both dominant social groups and state institutions, the project adopted a culturally safe, segregated consultation methodology with UNIPROBA as the principal facilitator throughout.

### 9.2 Consultation Methodology

All FGDs were conducted exclusively in Kirundi, avoiding technical jargon, with separate sessions for: Batwa women (pottery production, water access, household safety); Batwa men (labor opportunities, land tenure); and elders and leaders (cultural heritage, conflict resolution). Uniformed police and local Chefs de Colline were excluded from private Batwa sessions consistent with the No-Intimidation Rule. Consultations were held at times and locations convenient to Batwa communities — not in administrative offices.



### 9.3 Key Findings and Design Responses

Three recurring community statements were hardwired into project design:

| Community Statement | Design Response |
|---|---|
| *"You say warnings come by SMS. But we do not own phones and cannot read."* | Low-Tech Redundancy Protocol: 100% of Batwa settlements within audible range of a siren or designated Town Crier under Output 1.2. |
| *"We have no papiers. If you protect this land from floods, the rich will claim it and kick us out."* | No-Eviction Protocol: Certificates of Occupancy issued by UNIPROBA and Bashingantahe as proxy for formal title, combined with legally binding Non-Eviction Agreements with communal administrations. |
| *"The flood destroys our kilns every year. We need to bake our pots safely."* | Pottery Resilience Package: elevated Community Drying Sheds, Community Resilience Caches, and improved fuel-efficient kilns. |

Consultations with Batwa women (facilitated exclusively by female UNIPROBA staff in segregated sessions) identified three critical vulnerability vectors integrated into project design: the direct correlation between flood events and household insolvency through pottery destruction; physical hazards of clay extraction from eroding riverbanks; and harassment at communal resource access points.

### 9.4 GBV Risk Profile and Survivor-Centered Mitigation

The project adopts a survivor-centered GBV mitigation strategy. All contractors operate under a strict Code of Conduct with immediate dismissal for violations. Anonymous reporting is available through UNIPROBA

focal points, and a dedicated Pink Phone Line managed by a female UNIPROBA staff member. All GBV/SEAH cases are handled under the Three NOs Rule — No Mediation, No Public Hearing, No Investigation of the survivor — with immediate referral to the Tier 3 GRM pathway and coordination with the nearest One-Stop Centre.

### 9.5 Consultation Registry

All consultations are logged in the project file at OBPE, recording: date, location, target group, participant numbers disaggregated by gender and ethnicity, key topics, concerns raised, design responses, and facilitator identity. The registry constitutes primary documentation of the pre-FPIC consultation phase and is available for AF Secretariat review upon request.

## 10. Free, Prior and Informed Consent (FPIC): Operational Protocol

FPIC is defined under this project as a continuous, iterative, and rights-based negotiation process protecting the Batwa's right to self-determination. It is a binding agreement, subject to revision and revocation, applicable to any sub-project, activity, or knowledge product that may affect Batwa lands, natural resources, cultural heritage, livelihoods, or community narratives. The protocol applies across all three components and all project lifecycle phases.

### 10.1 Stage 1 — "Prior": The Temporal Framework

FPIC engagement follows a structured three-phase cycle:

**Information Phase:** Project teams disclose proposed activities, benefits, and risks in Kirundi using non-technical language and culturally appropriate visual facilitation. Disclosure covers intended location options, technical alternatives, anticipated impacts, implementation schedule, community rights under this IPPF, and available grievance channels. Disclosure must occur before engineering plans are finalized and before procurement is launched — enabling the Batwa to influence technology choice, site selection, implementation timing, and mitigation package. Under the IPPF/IPP, FPIC is specifically linked to hydrodynamic modeling outputs (Output 1.1) and protection-by-design audits (Output 4.1) so that Batwa territorial input is integrated at the origin of technical siting decisions.

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**Deliberation Phase:** A guaranteed minimum 21-day Silence Period is provided for internal community discussion without external pressure, persuasion visits, or repeated project contact. Project staff are explicitly prohibited from making follow-up contact during the Silence Period.

**Decision Phase:** The community's collective position is formally recorded through culturally appropriate means — oral statements, written minutes, thumbprints, and community validation sessions. Valid outcomes are consent, conditional consent with negotiated conditions, or non-consent. All three outcomes must be documented in the FPIC Audit Trail. FPIC must be renewed whenever design assumptions change.

### 10.2 Stage 2 — "Informed": Cognitive Accessibility

"Informed" requires cognitive accessibility — the ability of non-literate participants to understand substantive content, including technical risks, and to deliberate on that basis. Mandatory cognitive bridge tools include three-dimensional participatory modeling using physical terrain models to explain barrier siting options and flood scenarios; pictorial impact simulation cards covering best-case, expected-case, and worst-case scenarios including residual risks; and explicit disclosure of uncertainty — including site-specific effects on clay deposits, residual flood risk downstream of barriers, and limitations of hydrodynamic modeling. For Output 4.2 documentation activities, the informed stage must cover: intended audiences, dissemination channels, attribution language, intellectual property implications, anonymization options, and the community's right to restrict dissemination.

### 10.3 Stage 3 — "Free": The Non-Coercion Protocol

Consent must be free from manipulation, conditionality, or implicit threat. The project applies a strict non-coercion standard. No project staff, contractor, or local authority may imply that access to other services is conditional on Batwa consent. Uniformed police or military personnel are strictly prohibited from FPIC meetings and decision assemblies. Segregated FGDs are required for Batwa women and, where requested, for youth and elders, facilitated by culturally competent UNIPROBA staff. A credible third-party witness — UNIPROBA and/or an independent human rights organization acceptable to the community — must be present at decision-making assemblies. Where risks of intimidation are reported, the FPIC process is paused and corrective measures implemented before resuming.

### 10.4 Stage 4 — "Consent": Broad Community Support and the Redesign Loop

Consent is defined as **Broad Community Support**: consensus reached through customary procedures and ratified explicitly by women and youth representatives — not merely endorsed by male customary leaders. This standard prevents the common failure mode in which formal community consent reflects male-dominated leadership preferences that do not represent Batwa women or younger community members.

When consent is withheld, the project triggers a mandatory **Redesign Loop**: the technical proposal is revised through alternative siting, alternative technology, alternative implementation method, or a strengthened mitigation package, then re-disclosed under fresh Prior and Informed stages before the community deliberates again under a new Silence Period. If consent is still withheld after redesign, the specific sub-project activity is cancelled or relocated. **This IPPF explicitly and unconditionally forbids involuntary resettlement and forced expropriation of Batwa settlements or livelihood-critical resources.**

Consent outcomes are formalized through a legally recognized **Social License Agreement** detailing: agreed project footprint; negotiated benefit-sharing package; mitigation measures; monitoring commitments; grievance pathways; and penalties for project non-compliance. The agreement is signed by community-selected representatives — including thumbprints of elders and women's representatives — and independently witnessed by UNIPROBA.

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**FPIC for Component 3 knowledge activities.** For all Output 4.2 documentation activities involving Batwa TEK, FPIC is governed by a three-stage Attribution Record: pre-documentation consent; pre-publication consent; and post-publication review. The community retains the right to withdraw consent prior to publication. A formal benefit-sharing agreement specifying how reputational and policy benefits derived from documented TEK are shared with the knowledge-holding community is signed and independently verified before the first documentation activity commences.

### 10.5 Monitoring, Evaluation and Reporting

Safeguards compliance is monitored through a three-tier system designed to detect non-compliance early, trigger adaptive management, and maintain external accountability.

**Tier 1 — Participatory Community Monitoring.** Two paid Batwa community monitors — one male, one female — are deployed at each active sub-project site. Monitors track daily KPIs: Batwa employment against quota, machinery distance from No-Go Zones and clay corridors, functionality of analog EWS infrastructure, and adherence to the Non-Eviction Agreement. Monitors report directly to the UNIPROBA focal point, bypassing the construction contractor. Minimum 80% of Batwa respondents must report "meaningful participation" in semi-annual satisfaction surveys disaggregated by sex and age; dissatisfaction below this threshold triggers mandatory IPP revision.

**Tier 2 — Internal Compliance and Adaptive Management.** The OBPE Safeguards Officer holds delegated authority to issue Stop-Work Orders for critical non-compliance. A quarterly safeguards

dashboard — covering FPIC compliance, labor quota compliance, GRM statistics, CCDRR Batwa representation, and Output 4.2 attribution record status — is submitted to the Project Steering Committee, which must issue a written response to any flagged High-Risk item within 15 days.

**Tier 3 — External Social Audit.** An independent annual audit, conducted by an unaffiliated consultant using a triangulation methodology combining document review, key informant interviews, and participatory Batwa focus groups, provides the external accountability layer. Audit findings are made public. Non-Conformities require a Corrective Action Plan (CAP) within 30 days. Failure to implement the CAP within the required timeframe can trigger suspension of AF disbursements under the Financial Gateway Mechanism.

## 11. Operational Work Plan and Implementation Schedule

The work plan synchronizes indigenous people's safeguards with engineering and procurement lifecycles on a **gatekeeping model**: the project cannot advance to the next implementation phase until the specific safeguard deliverables of the current phase have been audited and cleared.

### 11.1 Phase 1 — Pre-Tender and Design: The "No-Objection" Phase

*Operational trigger: Drafting of preliminary technical designs and procurement documentation for Outputs 1.1, 1.2, 2.1, 3.1, and 4.1.*

The GIS team maps No-Go Zones as exclusionary polygons before engineering designs are developed. All design footprints are overlaid on Batwa occupation maps for collision checks, with ground-truthing conducted jointly by Batwa community members and the Social Safeguards Expert. The FPIC Negotiation Cycle — Kirundi disclosure, 21-day Silence Period, Social License agreement — is completed before any site is submitted for tender. Bills of Quantities for all civil works contracts must include a Provisional Sum for Social Management. Special Conditions of Contract must include the 15% Batwa Labor Quota clause, the GBV Code of Conduct, and the No-Go Zone compliance obligation. For Component 3, the Co-Design Committee and FPIC Attribution Protocol are established before any Output 4.2 documentation activity is scoped.



### 11.2 Phase 2 — Mobilization and Construction: The High-Risk Phase

*Operational trigger: Award of civil works contracts and commencement of physical works under Outputs 4.1 and 3.1.*

Mandatory GBV awareness training and safeguards briefing are conducted for all site personnel before works commence — no exceptions. Paid Batwa community monitors are deployed at each active construction site from day one, reporting daily to UNIPROBA. No-Go Zones are enforced in real time. The Chance Finds Procedure is in force from the first day of earthworks: construction crews stop work immediately if cultural artefacts or heritage sites are encountered and UNIPROBA is notified within two hours. Monthly safeguards compliance reports from contractors are submitted to the PMU. For Component 1, CAP and SEAP pilot activities under Output 1.2 must verify Batwa-accessible dissemination pathways before declaring operational readiness.

### 11.3 Phase 3 — Operation, Monitoring, and Handover

*Operational trigger: Completion of physical works and transition to operational phase.*

All benefit-sharing commitments — employment, Community Resilience Caches, pottery resilience assets, CCDRR representation — are verified as delivered per signed agreements before final works acceptance certificates are issued. Annual independent social audits are conducted throughout the operational phase.

The handover protocol explicitly requires that Batwa representation is maintained in post-project governance structures, including CCDRRs, and that Output 4.3 exchange platforms maintain minimum Batwa participation standards as a condition of institutional hosting agreements.

### 11.4 The Financial Gateway Mechanism

The ultimate enforcement mechanism of this IPPF is the **Financial Gateway**. No Commune can proceed to the next disbursement tranche if it has failed to meet safeguards conditionalities — including Batwa quota compliance, completion of the FPIC Audit Trail, signed Non-Eviction Agreements, CCDRR Batwa representation, and resolution of outstanding High Risk GRM grievances. This mechanism ensures that social safeguards carry binding economic consequences. The Financial Gateway applies equally to Component 3: Output 4.2 knowledge products reaching the pre-publication stage without a completed three-stage FPIC Attribution Record are subject to a mandatory product hold and associated budget tranches are frozen pending compliance.

## 12. Grievance Redress Mechanism: Batwa-Specific Design

The GRM is designed to be oral-first, zero-cost, and tiered, reflecting structural barriers preventing Batwa community members from accessing standard administrative complaints channels.

| Tier | Channel and scope | Resolution Target |
|---|---|---|
| **Tier 1 — Customary Level** | Complaints lodged verbally with the local Mushingantahe or elected Batwa Colline Representative. The Bashingantahe's physical boundary verification using the intahe staff is formally recognized as equivalent to documentary evidence. Scope: minor disputes and resource access concerns. GBV/SEAH, displacement, and rights violations are immediately triaged as Red Category and escalated directly to Tier 3 — they do not pass through Tier 1 mediation. | 48 hours |
| **Tier 2 — Project Level** | UNIPROBA CLO manages oral complaints through a WhatsApp voice-note hotline and physical Grievance Logbook. Triplicate receipt system: white copy (archive), blue copy (PIU Zone Supervisor for digitization), pink copy (complainant as proof of submission). Scope: livelihood impacts, contractor behavior, resource access restrictions, and labor quota violations. Mandatory acknowledgment within 24 hours. | 7 working days |
| **Tier 3 — Steering Committee Level** | Formal escalation to PMU Project Coordinator at OBPE for serious safeguards violations, unresolved Tier 2 cases, GBV/SEAH cases, displacement allegations, and FPIC non-compliance. Formal investigation launched within 48 hours. AF Secretariat notified within 72 hours of any Red Category complaint. For knowledge governance complaints under Component 3, Tier 3 response includes immediate product hold pending resolution. | 14 days |



**Red Flag Dashboard — Batwa-Specific Triggers:**

- **Silence Flag:** Zero grievances from a Batwa settlement Colline during active works, indicating suppression.
- **Platform Capture Flag:** Batwa representatives absent from two consecutive Output 4.3 events.
- **Consent Gap Flag:** Any Output 4.2 product reaching pre-publication stage without a complete FPIC Attribution Record.

Each Red Flag requires a documented root-cause analysis and corrective action record within five working days.

## 13. Budget Summary

| Item | Allocation |
|---|---|
| Total IPPF/IPP Budget — Activity 4.2.1 (Output 4.2) | USD 60,000 (USD 20,000/year, Years 1–3) |

| | |
|---|---|
| Coverage: UNIPROBA facilitation fees; paid Batwa community monitor salaries; cultural heritage mapping and legal documentation; pottery resilience assets (Community Resilience Caches, elevated drying sheds, fuel-efficient kilns); Non-Eviction Agreement legal costs; annual independent social audit fees | Within Activity 4.2.1 / Output 4.2 |
| FPIC Attribution Protocol governance costs — Component 3 | Covered under Activity 4.2.1 / Output 4.2 |
| CCDRR capacity building for Batwa representatives | Covered under Output 3.2 |



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

### A. Record of endorsement on behalf of the government

| | |
|---|---|
| Mr. Hatungimana Berchmans,<br>Director General<br>Director's office of the Environment and Climate Change<br>Office Burundais pour la Protection de l'Environnement (OBPE),<br>MINEAGRIE. | Date*: 26 September 2025* |



Gitega, September, the 26th / 2025

REPUBLIQUE DU BURUNDI

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

Office Burundais pour la Protection de l'Environnement

**To**: The Adaptation Fund Board
c/o Adaptation Fund Board Secretariat
Email: Secretariat@Adaptation-Fund.org
Fax: 202 522 3240/5

**Subject**: Endorsement for Enhancing resilience to flood and drought through a unique combination of innovative climate adaptation tools, technologies, and practices in 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 the Burundi.

Accordingly, I am pleased to endorse the above project proposal with support from the Adaptation Fund. If approved, the project will be implemented by **United Nations Environment Programme (UNEP)** and executed by **Office Burundais pour la Protection de l'Environnement (OBPE)**.

Sincerely,

Ir. HATUNGIMANA Berchmans

GENERAL DIRECTOR OF OBPE

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