



ADAPTATION FUND

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PROPOSAL FOR SOUTH AFRICA



ADAPTATION FUND

ADAPTATION FUND BOARD SECRETARIAT
TECHNICAL REVIEW OF PROJECT PROPOSAL FOR
"ADVANCING CLIMATE RESILIENCE IN SOUTH AFRICA THROUGH INTEGRATED
MULTIHAZARD EARLY WARNING AND CLIMATE SERVICES (ADVANCED EWS PROJECT)"

Project Title	ADVANCING CLIMATE RESILIENCE IN SOUTH AFRICA THROUGH INTEGRATED MULTIHAZARD EARLY WARNING AND CLIMATE SERVICES (ADVANCED EWS PROJECT)
Project ID	AF00000558
Category	Regular size project (over \$1 million)
Type	Single country project
Stage	Concept
Country	South Africa
Implementing Entity	SANBI
Financing Requested	USD 24,937,016.00
Reviewer	Lystra Fletcher-Paul Fletcher-Paul

Co-reviewer(s)

IE Contact Person

Funanani Muremi, Mandy Barnett

Secretariat's Overall Comment

The project ADVANCING CLIMATE RESILIENCE IN SOUTH AFRICA THROUGH INTEGRATED MULTHAZARD EARLY WARNING AND CLIMATE SERVICES (ADVANCED EWS PROJECT) aims to strengthen South Africa's climate resilience by establishing a nationally coherent, people-centred, multi-hazard early warning and climate information system that reliably generates, disseminates and enables the use of timely, impact-based warnings and climate services at national, sub-national and community levels.

The initial technical review raises several issues, such as more details about the Theory of Change, the need for a clear Alignment with the AF Results Framework and screening of environmental and social impacts, among others, as is discussed in the number of Clarification Requests (CRs) and Corrective Action Requests (CARs) raised in the review.

The second technical review addressed several of the issues raised in the first review, however some of the issues related to the project components, particularly the Learning and Knowledge Management aspects of the project, Cost effectiveness, Alignment with AF Results Framework, among others, as discussed in the number of Clarification Requests (CRs) and Corrective Action Requests (CARs) raised in the review.

Country Eligibility

Is the country party to the Kyoto Protocol, or the Paris Agreement?

Response: Pending

Secretariat: Yes.

South Africa has ratified the Kyoto Protocol (31 July 2002) and the Paris Agreement (01 November 2016).

Response: Yes

IE: N/A

Is the country a developing country particularly vulnerable to the adverse effects of climate change?

Response: Pending

Secretariat: Yes.

The country is highly vulnerable to climate variability and change due to its significant reliance on rain-fed agriculture and natural resources, prevalent poverty, particularly in rural areas, and limited adaptive capacity. Droughts, floods, and wildfires are identified as the three most significant drivers of climate-related disasters. Between 1980 and 2013, droughts affected an estimated 15 million people.

Response: Yes

IE: N/A

Project Eligibility

Has the designated government authority for the Adaptation Fund endorsed the project/programme?

Response: Pending

Secretariat: Yes.

As per the Endorsement letter dated 18 June 2026.

Response: Yes

Secretariat: I agree with the comments of the co-reviewer.

Response: Yes

IE: N/A

Does the length of the proposal amount to no more than Fifty pages for the project/programme concept, including its annexes?

Response: Pending

Secretariat: Yes.

The CN is 50 pages in total including annexes.

CR1: Please include the following:

- paragraph numbers for easier reference in the review process.
- captions on each table of the CN (including table in Part III).

CR2: Please ensure that figures do not contain spaces. For example, please use "12,000,000" instead of "12 000 000".

Response: Not Cleared

IE: CR1: Acknowledged and corrected throughout the revised.

CR2: Acknowledged and corrected throughout the revised CN.

Response: Cleared

Secretariat: CR1: Cleared

Paragraph numbers included

Paragraph numbers and captions on each table included (including table in Part III)

CR2: Cleared

Spaces removed from all figures

Sept 1, 2026

Does the project / programme support concrete adaptation actions to assist the country in addressing adaptive capacity to the adverse effects of climate change and build in climate resilience?

Response: Pending

Secretariat: Yes.

However, some amendments are needed.

Pages 12-25. The CN describes three components, three outcomes, and six outputs. However, some of the activities are conventional development activities and not framed explicitly as adaptation. In addition, the Theory of Change (ToC) and the Gender Assessment are broadly presented.

CR3: Please revise the programme objectives to ensure:

- General Objective. It should be oriented to impacts instead of describing the solutions or means to achieve the impacts. The part after "by establishing" describes the intervention to be financed by the AF. Please rephrase as, for example, "Strengthen South Africa's institutional capacity for early warning systems and the climate resilience of vulnerable communities".
- Specific Objective. Please reformulate them to refer to the expected results from the programme. These should be clearly defined, concise, and positioned as a second level under the overall objective. They should be measurable (to be included later in the results framework)
- Include a specific objective that covers all learning and knowledge management activities.

CR4: Please revise the components and ensure that they cover distinct areas of the intervention, avoiding overlaps. For example, please assess whether Components 1 and 2 should be consolidated into a single component.

CR5: Please revise all Outputs and amend accordingly, considering that outputs are the direct, tangible products (e.g., trainings held). For example, Output 1.2 "Community governance strengthened (VOs/PUUs) and women and youth participation institutionalized; stakeholder engagement, grievance and screening procedures operationalized" corresponds to an outcome.

CR6: Please include targets for all outcomes and outputs.

CR7: Please include information about the use of the community-led participatory risk assessment and mapping,

CR8: Please include a ToC narrative in the main document (not as part of the Annex) to describe the vertical logic of the proposed intervention toward adaptation. In addition, in the ToC diagram, please include: (i) assumptions and risks, as cross-cutting elements across all the above; and (ii) the main problem the programme is intended to address. These should be specific rather than generic.

CR9:

1. Please revise the components description to clearly specify what will be financed under each one as a high level, including entities involved, among other details. Please avoid confusion with activities and consider the size of the financing to establish the project scope.

CR10: Please clarify whether the proposed project includes activities that can be categorized as Unspecified Subprojects (USPs). If this is the case, and considering their use is intended for exceptional cases, it requires compliance with the AF requirements. Please refer to USP guidance at <https://www.adaptation-fund.org/document/guidance-document-for-project-programme-with-unidentified-sub-projects/>

CR11: Please explain how the proposed programme will ensure the participation of women, youth and other vulnerable groups. Are they identified?

CAR1: Please strengthen the Initial Gender Assessment (Annex 3) and include a summary or reference to this information under the corresponding sections. As a first approach, this may be based on a desk review and should provide relevant contextual information, including education levels, access to financial services, and other gender gaps relevant to the operation.

Response: Not Cleared

Secretariat: I agree with the comments of the co-reviewer.

In addition,

CR9:

2. For activities under Component 1 which involve the procurement and installation of equipment and infrastructure, please provide an indication of the numbers to determine whether the budget requested is adequate or the activity.

3. There should also be an indication of the agencies which will be responsible for the coordination and implementation of the proposed activities.

CAR2: Please indicate the AF Strategic Objectives which are supported by the activities at Part II Section A.

Response: Not Cleared

IE: CR3: The project objectives have been revised throughout Part I (Project Objectives) and reflected consistently in Part II.A, Part III.A (Results Framework Alignment Table), and Annex 2 (Theory of Change). Specific changes include:

- The General Objective has been reformulated to express the intended impact rather than the intervention mechanism. The revised statement focuses on the climate resilience outcome for South Africa's institutions and vulnerable communities, without describing the EWS/CIS delivery model/mechanism.
- The three Specific Objectives have been reformulated as concise, results-oriented statements that describe the expected change each component will deliver. Each is written to support measurable indicators in the Results Framework (Part III.A).
- A new Specific Objective 4 has been added to cover all learning and knowledge management activities, establishing LKM as a distinct strategic objective of the programme rather than a cross-cutting function only. Please refer to Part I, "Project Objectives" section (paragraphs 24 through 29, as well as tables 4 and 10) of the revised Concept Note.

CR4: The three-component architecture addresses distinct aspects of the early warning value chain and reflects different implementation modalities:

- Component 1 focuses on national meteorological infrastructure (radar systems, observation networks, data processing capacity) requiring SAWS's technical expertise in meteorological equipment procurement and commissioning.
- Component 2 develops institutional capacity and governance frameworks at provincial and district levels (DRM protocols, multi-sectoral coordination, institutional arrangements) requiring SANBI's expertise in environmental governance and multi-stakeholder coordination.
- Component 3 builds community-level preparedness and response capacity (local DRM committees, early action protocols, public awareness) requiring grassroots engagement and participatory approaches.
- Components 1 and 2 should not be consolidated because they represent fundamentally different intervention types: Component 1 is capital infrastructure investment following procurement modalities; Component 2 is institutional capacity building following training and protocol development pathways.

The revised CN includes additional text under the Theory of Change heading in Part II.A (paragraph 32 through 36) on component complementarity.

CR5: Acknowledged. All project output statements have been revised to describe direct, tangible deliverables consistent with AF output formulation standards. These changes have been applied throughout the revised CN.

CR6: Acknowledged. Targets for all outcomes and outputs have been included in Table 10, Part III.A. Where baselines and/or targets are uncertain at this CN stage, these are indicated as 'to be confirmed (TBC)' at PFG stage where detailed consultations and assessments will be undertaken, if approved.

CR7: SANBI's previous Adaptation Fund project, the Community Adaptation Small Grants Facility, used participatory approaches to ensure that climate-risk assessment and mapping were led by communities and grounded in local realities, as demonstrated in the linked case study below.

The process combined several complementary methods, including screening workshops to identify and map project risks, community-led collaborative workshops facilitated by civil society organisations, and group-led discussions that helped communities identify local vulnerabilities, priority risks, and practical adaptation responses. These activities were supported by experienced project developers, managers, and local government institutions, who provided technical input while ensuring that community perspectives remained central. Together, these methods ensured that risk identification, mapping, and adaptation planning were genuinely community-led, context-specific, and strengthened by relevant technical expertise. The approach also built local capacity and contributed to more effective and sustainable adaptation interventions that extended beyond project implementation.

The A-EWS project will follow similar approaches to community-led participatory risk assessment and mapping. Link to case study: <https://www.sanbi.org/wp-content/uploads/2021/10/5.-Participatory-Project-Development-for-Small-Grants-Lessons-from-the-SGF-Project-funded-by-the-AF.pdf>

CR8: Acknowledged. A ToC narrative has been added to Part II.A (paragraph 32 through 36), and the necessary changes to the ToC diagram in Annex 2 have been actioned.

CR9.1: Acknowledged. Each component description in Part II.A now includes a high-level statement of what is financed, the approximate budget envelope, and the lead entities (paragraphs 37, 44, and 54, also see paragraph 30 and Table 4, Part I).

Summary of high-level financing by component:

- Component 1 - National capacity and infrastructure for integrated EWS and CIS (USD 12,000,000 total: Output 1.1 USD 9,500,000; Output 1.2 USD 2,500,000). Finances: (i) a national infrastructure gap assessment and investment plan aligned with WMO standards; (ii) targeted upgrades to core observation and forecasting systems (Automated Weather Stations, radar, high-performance computing, and data management platforms); and (iii) advanced training for SAWS technical staff on impact-based forecasting and operation and maintenance

of new systems. Lead entity: SAWS (Executing Entity), under SANBI as National Implementing Entity. Scope is national and is sized to close critical observation and computing gaps rather than to rebuild the full national network.

- Component 2 - Sub-national impact-based forecasting and climate information (USD 6,000,000 total: Output 2.1 USD 4,000,000; Output 2.2 USD 2,000,000). Finances: (i) nationwide technical training and standard operating procedures for warning reception, localisation, and dissemination covering all 44 district disaster management centres; and (ii) participatory risk communication strategies and community preparedness tools developed and tested in the three target municipalities (eThekweni, Vhembe, Waterberg). Lead entities: SAWS with NDMC and SALGA coordination support; district disaster management centres as primary trainees and protocol owners. Scope is national for training and protocols, with deeper co-production work limited to the three target municipalities.
- Component 3 - Community-level interventions and innovative practices for EWS, CIS and DRR (USD 2,800,000 total: Output 3.1 USD 900,000; Output 3.2 USD 1,900,000). Finances: (i) participatory community risk assessments, awareness campaigns, and knowledge resources in target communities; and (ii) last-mile warning dissemination assets, community-based alert systems, and community disaster preparedness and response plans, including a limited IoT sensor pilot. Lead entities: SAWS with municipal disaster management structures and community DRM committees; SANBI oversight as NIE. Scope is deliberately concentrated in selected high-risk communities within the three target municipalities so that intensive last-mile investments remain proportionate to the budget.
- Cross-cutting learning and knowledge management (Outcome 4) is financed within component envelopes rather than as a separate budget line. Project execution costs are USD 2,183,425 and the Implementing Entity fee is USD 1,953,591, bringing the total financing requested to USD 24,937,016.

CR9.2: Component 1 Activity 1.1.2 (Infrastructure Upgrades) allocates USD 9.5m (R150 million) for observation infrastructure, data management, and forecasting capacity enhancements. Based on SAWS technical specifications and gap assessment findings, indicative equipment quantities and budget allocation are: Observation Infrastructure (USD 8.0 million / R126.5 million):

- S-Band Weather Radar: 1 unit at USD 4.3m (R70m) (addressing eastern-region coverage gap with 250km range and 1km resolution)
- Automatic Weather Stations (AWS): 60 units at USD 22,000 (R350,000) per unit = USD 1.3m (R21m) (SAWS in-house manufacturing reduces costs by 40-60% compared to commercial USD 38,000-50,000 / R600,000-800,000 alternatives)
- Automatic Rain Stations (ARS): 250 units at USD 1,580 (R25,000) per unit = USD 0.4m (R6.25m) (densifying rainfall observation network in high-vulnerability districts)
- Upper-Air Observation Systems: 2 units at USD 491,000 (R8m) per unit = USD 0.982m (R16m) total (radiosonde systems for atmospheric profiling)
- Lightning Detection Network: Expansion at USD 0.19m (R3m) (real-time severe weather nowcasting)
- Installation, Integration, and Commissioning: USD 0.614m (R8.25m) (civil works, power systems, communications links, calibration)
- Contingency: USD 0.214m (R2m)

Data Management and Forecasting Capacity (USD 1.5 million / R23.5 million):

- Data Management System upgrades: USD 0.95m (R15m) (interoperability, real-time ingestion, WMO GBON compliance)
- Forecasting tools and software licences: USD 0.54m (R8.5m) (numerical weather prediction models, impact-based forecasting platforms)

This allocation prioritizes observation infrastructure (20-plus-year operational lifespan) as the foundation for sustainable early warning capacity, aligned with SAWS existing operation and maintenance budget capacity. The package addresses critical gaps identified in the Activity 1.1.1 gap assessment: eastern region radar coverage, automated observation density in flood-prone catchments, upper-air data for severe weather forecasting, and

interoperable data management meeting WMO standards. Budget adequacy is demonstrated through alignment with SAWS technical requirements, WMO infrastructure standards (WMO-No. 8, GBON), and benefit-cost analysis showing 2:1 to 3:1 ratios for avoided disaster losses. SAWS in-house manufacturing capability for AWS and ARS delivers cost efficiencies of 40-60% compared to commercial alternatives, maximizing adaptation impact within the AF envelope.

The revised CN includes additions to Part II.A (Activity 1.1.2 (paragraph 40) and Part II.C (paragraphs 75 through 77, and Table 6) for detailed equipment specifications and cost-effectiveness analysis.

CR9.3: Institutional coordination is structured through clearly defined roles, formal governance mechanisms, and existing statutory frameworks:

- National Implementing Entity (SANBI): Provides fiduciary oversight, financial management, compliance monitoring (AF Environmental and Social Policy, Gender Policy), progress reporting to AF Secretariat, and coordination through SANBI's National Adaptation Finance Advisory Body (NAFAB). SANBI chairs the Project Steering Committee ensuring strategic alignment with national climate adaptation priorities.
- Executing Entity (SAWS): Implements Component 1 (infrastructure upgrades, forecasting capacity, technical training) under statutory mandate as South Africa's meteorological authority (SAWS Act No. 8 of 2001). SAWS provides technical leadership, procures and commissions equipment, delivers meteorological training, and integrates upgraded systems into operational forecasting workflows.
- Component 2 Implementing Partners: National Disaster Management Centre (NDMC) leads institutional capacity building across 44 districts under Disaster Management Act (No. 57 of 2002) coordination mandate. NDMC delivers training curricula, facilitates District Disaster Management Forums (quarterly knowledge exchange), and embeds dissemination protocols into national disaster management frameworks. South African Local Government Association (SALGA) supports municipal implementation through existing local government forums, peer-learning platforms (bi-monthly webinars), and provincial working groups.
- Component 3 Implementing Partners: Target district municipalities (eThekweni, Vhembe, Waterberg) implement community-level preparedness activities through municipal disaster management structures. SAWS provides technical support for localised early warning protocols; NDMC provides coordination guidance; SALGA facilitates peer learning.
- Coordination Mechanisms: Project Steering Committee (quarterly meetings) comprises SANBI, SAWS, NDMC, SALGA, DFFE, and target municipalities, providing strategic oversight and adaptive management decisions. SANBI Project Management Unit (PMU) coordinates day-to-day implementation, convenes technical working groups, consolidates quarterly reporting, and ensures inter-component coherence. Coordination leverages existing platforms (District Disaster Management Forums, SALGA municipal forums, NAFAB) rather than creating parallel structures, ensuring efficiency and post-project sustainability.

See Part III.B for detailed institutional arrangements.

CR10: A-EWS does not involve USPs.

All project components, target locations, implementing entities, and activity types are defined at concept stage and will be executed through direct implementation by the National Implementing Entity (SANBI) and Executing Entity (SAWS), supported by established government institutions at national, provincial, and district levels.

Geographic specificity: Three target municipalities (eThekweni Metropolitan Municipality, Vhembe District Municipality, and Waterberg District Municipality) are identified through a structured, multi-criteria vulnerability and climate risk assessment (CN Part I, Target municipalities). No additional district or community selection will occur during implementation.

Activity specificity: All outputs are defined with clear deliverables:

- Component 1: Infrastructure upgrades at known SAWS facilities (AWS network, weather radar, HPC systems, data management platforms) guided by a gap assessment aligned with WMO standards and South Africa's multi-hazard risk profile.

- Component 2: Nationwide training delivered to all 44 pre-identified district disaster management centres and development of standardised warning dissemination protocols.
- Component 3: Community-level preparedness interventions in the three target districts, including participatory risk assessments, awareness campaigns, and installation of last-mile warning assets (sirens, public address systems, digital displays, pilot IoT sensors).
- Implementation modality: Direct implementation through SANBI/SAWS and government disaster management structures. No intermediary mechanisms, competitive sub-project selection, small grants facilities, or on-granting arrangements are involved.
- Budget allocation: Resources are allocated by component and output with clear cost estimates tied to defined activities (CN Table 4, Part I). No unallocated funding pools for competitive selection exist.

The project design is consistent with approved AF early warning system precedents that establish national/sub-national EWS infrastructure through direct implementation (e.g., AF projects WMO Gambia/Tanzania EWS; WMO Lake Chad Basin Regional EWS), which similarly do not involve USPs.

The revised CN now includes an “Implementation Modality” sub-section clarifying the abovementioned points (Part III.B, paragraph 110).

CR11: Initial screening during the 2024 Rapid Assessment identified and consulted key climate-vulnerable groups, including women, small-scale farmers and elderly persons. The project will further refine this identification using Project Formulation Grant resources, particularly for Component 3, to ensure more targeted engagement of groups facing intersecting climate, socio-economic and early warning access barriers.

The project recognises the following vulnerable groups as priority stakeholders: rural women and women in informal settlements; youth; elderly persons; persons with disabilities; informal settlement residents; rural smallholder, subsistence and livestock farmers; and marginalised ethnic, linguistic and migrant communities. Their identification is informed by the gender analysis in Annex 3a and 3b, which assesses differentiated vulnerabilities, barriers to early warning access and constraints to participation.

Meaningful participation will be ensured through inclusive mechanisms across the project. Component 1 will integrate gender and vulnerability considerations into technical training, baseline assessments and accessible warning standards. Component 2 will promote inclusive disaster management training, participatory development of dissemination protocols, and engagement with women’s organisations, youth groups, disability networks, faith-based groups and holders of indigenous knowledge. Component 3 will apply gender-responsive participatory risk profiling, including separate focus groups where appropriate, community workshops, radio, door-to-door outreach, school programmes and women’s group meetings. It will also support accessible community warning systems, preparedness plans that address evacuation assistance and safe spaces, and inclusive community DRM committees with gender-balanced representation and participation of youth and persons with disabilities.

Cross-cutting measures include a Gender and Social Inclusion Specialist in the PMU, representation of women’s organisations in project governance, accessible participation arrangements under the Stakeholder Engagement Plan, a gender-sensitive and disability-inclusive Grievance Redress Mechanism, and sex- and vulnerability-disaggregated monitoring to support adaptive management where underrepresentation or reduced warning comprehension is identified.

CAR1: The revised CN includes a comprehensively strengthened gender analysis. Due to page limit constraints, an abridged version is included in the CN as Annex 3a, while the full version is embedded in the CN as a hyperlink, i.e., Annex 3b. The revised analysis directly addresses all requirements of CAR1 and CAR9. The revised analysis is based on a systematic desk review of authoritative national and sector-specific sources and provides detailed contextual information, national and sector-wide gender gap analysis, and explicit linkages to women’s specific needs in the context of early warning systems.

CAR2: The AEWS project directly contributes to 5 of the 8 Adaptation Fund Strategic Outcomes:

- Outcome 1: Reduced exposure to climate-related hazards and threats: AEWS Components 1 and 2 enhance observation infrastructure and dissemination systems, enabling timely warnings that reduce exposure of 7.2 million people in target districts to floods, droughts, severe storms, and extreme heat.
 - Outcome 2: Strengthened institutional capacity to reduce risks associated with climate-induced socioeconomic and environmental losses: Component 2 builds institutional capacity across 44 district disaster management centres through training, standard operating procedures, and multi-sectoral coordination mechanisms for warning reception and localisation.
 - Outcome 3: Strengthened awareness and ownership of adaptation and climate risk reduction processes at local level: Component 3 develops community awareness through participatory risk assessments, knowledge resources, and community DRM committees, ensuring local ownership of early warning and preparedness processes.
 - Outcome 4: Vulnerable development sectors, infrastructure, and built environment assets strengthened in response to climate change impacts: Component 1 strengthens national meteorological infrastructure (observation networks, forecasting systems) as critical development sector assets for climate resilience.
 - Outcome 8: Support for innovative adaptation practices: Component 3 pilots IoT sensor networks for last-mile dissemination and tests participatory co-production approaches for locally relevant early action protocols.
- An AF Strategic Outcomes mapping paragraph has been added to the Component Descriptions section (Part II.A, paragraph 36) of the revised CN immediately following the Theory of Change narrative, clarifying alignment and demonstrating how A-EWS interventions contribute to the AF's strategic mandate

Does the project / programme provide economic, social and environmental benefits, particularly to vulnerable communities, including gender considerations, while avoiding or mitigating negative impacts, in compliance with the Environmental and Social Policy and Gender Policy of the Fund?

Response: Pending

Secretariat: Yes.

However, some amendments are needed.

Part II.B (pages 25-27). The proposal highlights economic, social, and environmental benefits of the project.

However, it does not explain how specific vulnerable groups (women, youth, others) will be targeted equitably.

More information is required.

CR12: Please clarify how the project interventions pose any risk of negative development or any potential effects of the adaptation measures proposed, that could increase the vulnerability of beneficiaries or non-beneficiaries or reduce their capacity to adapt to climate change.

CR13: Please outline how the benefits will be equitably distributed, considering the vulnerable groups included in the proposed interventions (women and youth, among others).

CR14: Please strengthen the narrative to clearly identify the benefits of each project component across the economic, social, environmental, and other relevant dimensions, and explain their relationship to alternative options

Response:

Not Cleared

IE: CR12: Acknowledged. Potential unintended negative consequences of proposed interventions have been identified, and Part II.B of the revised CN updated accordingly with a dedicated sub-section (paragraph 72). Six primary risks and corresponding mitigation measures have been classified:

- Risk 1 (Exclusion and increased information inequality): If warning dissemination prioritises digital channels without adequate non-digital channels, populations with limited device access (disproportionately rural women, elderly persons, persons with disabilities, low-income informal settlement residents) could be further marginalised, increasing information inequality. Mitigation: Multi-channel dissemination combining digital channels with non-digital channels explicitly designed to reach digitally excluded populations (outdoor sirens, visual displays, community radio, interpersonal networks, door-to-door dissemination); co-development of protocols with women's groups, elderly persons' associations, and disability networks; disaggregated monitoring with adaptive management triggered if digital-only dissemination creates exclusion.
- Risk 2 (Increased care burden and time poverty for women): If training, consultations, and preparedness activities are scheduled without regard to women's unpaid care responsibilities, participation requirements could increase women's time poverty, forcing choice between participation or exclusion. Mitigation: Gender-responsive participation design (scheduling accommodating care responsibilities, childcare provision where feasible, accessible venues, compensation for time, multiple session formats, home-based or community-based outreach).
- Risk 3 (Reinforcement of gender inequalities in household decision-making): If warnings are channelled primarily through male-dominated formal structures, women may not receive warnings directly, reinforcing existing gender inequalities in access to information and decision-making authority. Mitigation: Direct-to-women dissemination strategies (multi-channel dissemination, partnerships with women's organisations, women's representation on community DRM committees targeting ≥40-50%, knowledge co-production integrating women's indigenous knowledge).
- Risk 4 (Increased exposure to gender-based violence during disasters): If preparedness planning and emergency shelter design do not address GBV risks, evacuation and displacement could increase women's and girls' exposure to GBV. Mitigation: Integration of GBV awareness and prevention into community preparedness planning (safe shelter design with adequate lighting, gender-separated facilities, female staff, security; GBV support service information in warning products; GBV awareness training for community DRM committees; gender-sensitive Grievance Redress Mechanism; women's leadership in co-design of preparedness plans).
- Risk 5 (Maladaptation through displacement of local knowledge): If formal early warning system emphasises technical forecasts to the exclusion of indigenous knowledge (particularly knowledge held by women, elderly persons, smallholder farmers), maladaptation could occur through displacement of effective local coping strategies, reducing adaptive capacity. Mitigation: Knowledge co-production and validation (Activity 2.2.2) documenting and validating indigenous weather indicators held by women, elderly persons, and smallholder farmers; integration into warning message design; positioning formal forecasts and indigenous knowledge as complementary; recognition of knowledge holders as experts and partners.
- Risk 6 (Non-beneficiary resentment and social tension): If Component 3 community-level interventions in three target districts are perceived as inequitable by non-target districts, resentment and social tension could reduce social cohesion and cooperation needed for effective early warning, potentially increasing vulnerability of non-target communities including women. Mitigation: Transparent targeting criteria; nationwide capacity building (Component 2) for all 44 districts; Component 3 as demonstration sites with documented lessons for replication; post-project scaling strategy; regular communication with all districts ensuring transparency and feedback opportunities.

CR13: The revised CN has been strengthened to explicitly outline how project benefits will be equitably distributed across vulnerable groups. A new dedicated subsection "Equitable distribution of benefits across vulnerable groups" has been added to Part II.B (paragraph 70). This subsection identifies the specific vulnerable groups targeted (women, youth, elderly persons, persons with disabilities, informal settlement residents, rural smallholders, and marginalized communities), describes the differentiated barriers each group faces in accessing early warning information and adaptation benefits, and details the tailored mechanisms through which the project will ensure equitable access and benefit distribution.

Key mechanisms include: component-specific equity measures (multi-channel dissemination in Component 1, gender and disability quotas in Component 2 training, accessible community assets in Component 3); targeted outreach and participation strategies ensuring meaningful inclusion of vulnerable groups in design, implementation, and monitoring; accessibility standards embedded in all infrastructure and communication products; disaggregated monitoring and adaptive management to track benefit distribution by gender, age, disability status, and socio-economic group; and institutional accountability through the Gender Action Plan, ESMP, and grievance redress mechanism.

Cross-references to the strengthened gender assessment (Annex 3) and the consultative process (Part II.H) demonstrate how the project's equity approach is evidence-based and responsive to differentiated needs identified through participatory assessments.

CR14: Part II.B of the revised CN (paragraphs 63 through 70) has been strengthened to include component-specific economic, social, and environmental benefits:

- Component 1 (Infrastructure): Improved forecast accuracy and lead times enable anticipatory action preventing disaster losses. International evidence demonstrates benefit-cost ratios of 4:1 to 10:1 for hydrometeorological infrastructure. South Africa's 2022 KZN floods (~USD 1 billion damages) and 2015-2018 Western Cape drought (~USD 310 million losses) illustrate potential avoided costs. Enhanced environmental monitoring supports anticipatory management of erosion, pollution, wildfires, and ecosystem stress.
- Component 2 (Institutional Capacity): District-level capacity enables efficient resource deployment, reducing emergency costs and enabling targeted responses. Improved warnings protect agricultural livelihoods (5% of workforce) and informal economies. Multi-channel dissemination ensures equitable access for vulnerable groups.
- Component 3 (Community Preparedness): Direct loss reduction for vulnerable households, particularly informal settlement residents. Mortality reductions of 80-95% demonstrated internationally. Participatory approaches build social capital and empower marginalized groups through inclusive risk mapping and preparedness planning.

Alternative (business-as-usual): Continued reactive disaster management with rising losses as climate change accelerates hazard frequency and infrastructure degrades.

Response: Cleared

Secretariat: CR12: Cleared.

Potential unintended negative consequences of proposed interventions have been identified, and Part II.B of the revised CN updated accordingly with a dedicated sub-section (paragraph 72).

CR13: Cleared

The revised CN has been strengthened to explicitly outline how project benefits will be equitably distributed

across vulnerable groups. A new dedicated subsection "Equitable distribution of benefits across vulnerable groups" has been added to Part II.B (paragraph 70). This subsection identifies the specific vulnerable groups targeted (women, youth, elderly persons, persons with disabilities, informal settlement residents, rural smallholders, and marginalized communities), describes the differentiated barriers each group faces in accessing early warning information and adaptation benefits, and details the tailored mechanisms through which the project will ensure equitable access and benefit distribution.

CR14: Cleared

Part II.B of the revised CN (paragraphs 63 through 70) has been strengthened to include component-specific economic, social, and environmental benefits:

September 2, 2026

Is the project / programme cost effective?

Response: Pending

Secretariat: Yes.

However, more information is required.

Part II.C (pages 27-28). The CN proposes several approaches to cost-effectiveness and an overall quantitative estimation of the cost-effectiveness of the proposed programme. However, some details are required.

CAR3:

1. Please strengthen the narrative logic to explain the cost-effectiveness of each component, as those included in Table 5 are too generic and do not clearly explain how they are more cost-effective than alternative options.
2. Please provide information on the cost-effectiveness of the project from a sustainability perspective, specifically by including the actions that will ensure sustainability under the section titled "Adaptive Management and Continuous Improvement."

Response: Not Cleared

IE: CAR 3.1: The revised CN strengthens the list of alternate options and costing for equipment and rationale for selection of preferred alternatives. A sub-section titled "Cost-effectiveness Relative to Technological Alternatives" (paragraph 78) has been added for ease of reference, and component-specific references have been inserted where they were missing.

CAR3.2: Acknowledged. The revised CN strengthens the "Adaptive Management and Continuous Improvement" subsection (paragraph 78 and Table 6) in Part II.C so that sustainability actions are presented as integral to cost-effectiveness. The revised text links four sustainability dimensions to the avoidance of stranded assets, repeated capacity investments, and post-project service collapse:

- Long-term financial sustainability of infrastructure. Component 1 procurement favours standards-compliant, energy-efficient equipment with local service availability and e-waste take-back, lowering lifecycle costs. Assets are sited at existing public facilities where possible, reducing new civil-works and security costs. Operations, maintenance, calibration and redundancy provisions are built into design so that AF capital investment does not create an unfunded O&M deficit at project close. By integrating upgraded systems into SAWS core operational budgets and statutory mandate, recurrent costs are absorbed into existing institutional platforms rather than sustained as project-only lines.
- Institutional sustainability and capacity retention. Training under Components 1 and 2 uses a master-trainer /

train-the-trainer model so skills outlast individual staff rotations. Curricula, toolkits and SOPs are version-controlled and integrated into SAWS and NDMC training calendars with periodic refresher cycles and after-action reviews. District dissemination protocols are designed for formal adoption by district councils and integration into municipal disaster management plans and performance targets, locking in institutional ownership beyond the project period.

- Environmental sustainability. Equipment siting and O&M follow the ESMP and national regulations (NEMA screening, licensed e-waste handling, noise and crowd-safety management for public warning assets). Enhanced environmental monitoring (rainfall, river flows, soil moisture, temperature extremes) supports anticipatory management of secondary impacts, extending the environmental return on the same infrastructure investment.
- Adaptive management as a cost-effectiveness mechanism. Mid-term review, annual evaluations, systematic monitoring, and post-event debriefs enable real-time reallocation toward highest-performing interventions and rapid integration of innovations. If monitoring shows under-used assets, weak protocol uptake, or uneven benefit distribution, corrective actions are triggered within the existing budget envelope rather than through new financing. This results-driven loop protects the value of AF investment over the full operational and legacy period.

Together, these measures ensure that cost-effectiveness is assessed not only at appraisal (unit costs versus structural alternatives) but across the post-funding horizon, when the dominant risks are asset decay, skill loss, and institutional reversion to reactive disaster response. The design therefore maximises the benefit-cost ratio over the system's useful life, consistent with Part II.J sustainability arrangements (paragraph 107) and the lifecycle costing narrative in Part II.C (paragraph 81).

Response: Not Cleared

Secretariat: CAR 3.1: Cleared

The CN has been revised to include a list of alternate options and costing for equipment as well as the rationale for selection of preferred alternatives. A sub-section titled "Cost-effectiveness Relative to Technological Alternatives" (paragraph 78) has been added and component-specific references have been inserted where they were missing.

CAR3.2: Cleared.

The CN has been revised to strengthen the "Adaptive Management and Continuous Improvement" subsection (paragraph 78 and Table 6) in Part II.C so that sustainability actions are presented as integral to cost-effectiveness. In addition, a section on Sustainability as a cost effective mechanism in paragraph 82 has been included. The revised text links four sustainability dimensions (Financial, Institutional, Environmental and Adaptive Management) to the avoidance of stranded assets, repeated capacity investments, and post-project service collapse:

CR15: Not cleared.

This CR has not been addressed

September 2, 2026

Is the project / programme consistent with national or sub-national sustainable development strategies, national or sub-national development plans, poverty reduction strategies, national communications and adaptation programs of action and other relevant instruments?

Response: Pending

Secretariat: Yes.

However, more information is required.

Part II.D (page 29). The CN outlines the alignment of the proposal with seven national strategies. However, it appears that additional sector-specific strategies should also be included.

CAR4:

1. Please include any other relevant strategies related to gender, education, the labor market, and other sectors relevant to the proposed interventions.

Response:

Not Cleared

Secretariat: I agree with the comments of the co-reviewer.

In addition,

CAR4:

2. Programmes related to poverty reduction should also be included among the other sectors relevant to the proposed interventions

Response:

Not Cleared

IE: CAR4.1: Acknowledged. Part II.D of the revised CN (paragraph 85) has been strengthened by demonstrating the project's alignment with additional strategies on education, gender, youth, spatial planning, and persons with disabilities.

CAR 4.2: The project does not claim direct poverty alleviation as a primary objective, as its focus is building climate-resilient early warning and preparedness systems rather than implementing poverty reduction programmes. However, the project contributes substantively to livelihood security in target municipalities, thereby indirectly supporting poverty alleviation by preventing climate shocks from eroding the livelihoods and assets of vulnerable populations, consistent with NDP 2030 objectives for building resilient communities. See Part II.B (paragraphs 63 through 65) for detailed economic benefits to vulnerable households.

Response:

Cleared

Secretariat: CAR4.1: Cleared.

Part II.D of the revised CN (paragraph 85) has been strengthened to include information on the project's alignment with additional strategies on education, gender, youth, spatial planning, and persons with disabilities.

CAR 4.2: Cleared

The project does not claim direct poverty alleviation as a primary objective, as its focus is building climate-resilient early warning and preparedness systems rather than implementing poverty reduction programmes. However, the project contributes substantively to livelihood security in target municipalities, thereby indirectly supporting poverty alleviation by preventing climate shocks from eroding the livelihoods and assets of vulnerable populations, consistent with NDP 2030 objectives for building resilient communities. This is explained in Part II.B (paragraphs 63 through 65) for detailed economic benefits to vulnerable households.

September 2, 2026

Does the project / programme meet the relevant national technical standards, where applicable, in compliance with the Environmental and Social Policy of the Fund?

Response: Pending

Secretariat: Unsure.

More information is required.

Part II.E (page 30). The proposal identifies three broad groups of legal frameworks aligned with the project. However, the information provided should be further elaborated.

CAR5: Please provide the list of standards in a table. This table should include:

- Specific title of the law or framework
- Objective of the standard
- The public entity in charge
- In the case that compliance is required, the main steps needed to comply with it.

CR16: Please ensure that the table listing is comprehensive. Applicable standards may include any other sector-specific related regulations relevant to the project interventions.

Response: Not Cleared

IE: CAR5: The CN has been revised to present all relevant technical standards in a structured table format as requested. Table 7 in Part II.E (paragraph 86) now includes, for each applicable standard: the specific title, the objective of the standard, the responsible public entity, and the main compliance steps. The table has been developed with input from SAWS and covers procurement and information technology standards, environmental assessment standards, construction and building standards, WMO meteorological observation standards, occupational health and safety standards, data protection and privacy standards, and telecommunications and spectrum standards. CR16 has been addressed concurrently by ensuring the table is comprehensive and includes sector-specific regulations relevant to the project's meteorological, ICT, environmental, construction, and community-level interventions.

CR16: The table has been substantially revised to include a wider range of applicable standards and legislation (paragraph 86 and Table 7).

Response: Cleared

Secretariat: CAR5: Cleared

The CN has been revised to present all relevant technical standards in a structured table format as requested. Table 7 in Part II.E (paragraph 86)

CR16: Cleared

The table has been revised to include a wider range of applicable standards and legislation (paragraph 86 and Table 7).

September 2, 2026

Is there duplication of project / programme with other funding sources?

Response: Pending

Secretariat: Unsure.

More information is required.

Part II.F (pages 30-31). A list with 6 identified projects is provided, including a summary and potential synergies. However, the information is broad and requires specific details.

CAR6: Please provide the identified projects in a comprehensive table listing, including, for example, other AF funded projects. For each identified project, please include:

- (i) Project title, Timeline and specific Location within the country,
- (ii) Main project interventions, and Target population,
- (iii) Implementing entity,
- (iv) Lessons learned, how they are considered/ reflected in the proposed project design,
- (v) Overlaps and synergies with the proposed project (specific rather than generic).

CR17: Please ensure that, the no duplication statement should be clearly justified (e.g. by indicating the distinct geographic locations and/or types of interventions) for each related project identified.

Response: Not Cleared

IE: CAR6: Part II.F (paragraph 88) has been restructured as requested, including a table with: (i) fund source, title, timeline, and specific location; (ii) main interventions and target population; (iii) implementing entity; (iv) lessons learned and their implications for AEWS design; and (v) specific overlaps and synergies demonstrating non-duplication. Each entry in the table provides specific geographic, thematic, and institutional justification for complementarity rather than generic non-duplication statements. Part II.F now includes the only other active AF-funded project in the country, the AF Small Grants Facility (SGF), which is implemented by the same NIE (SANBI), but in different target municipalities. The SGF project is at endorsed CN stage, with PFG activities set to commence in the 3rd quarter of 2026. AEWS coordination with the AF Small Grants Facility is ensured through SANBI's NIE governance structure, with both projects overseen by the same institutional framework to prevent duplication and maximise synergies.

CR17: The no duplication statements in the table have been revised with additional detail as described in the response to CAR6 above.

Response: Cleared

Secretariat: CAR6: Cleared

Part II.F (paragraph 88) has been restructured as requested, to include a table with: (i) fund source, title, timeline, and specific location; (ii) main interventions and target population; (iii) implementing entity; (iv) lessons learned and their implications for AEWS design; and (v) specific overlaps and synergies demonstrating non-duplication. Each entry in the table provides specific geographic, thematic, and institutional justification for complementarity rather than generic non-duplication statements. Part II.F now includes the only other active AF-funded project in the country, the AF Small Grants Facility (SGF), which is implemented by the same NIE (SANBI), but in different target municipalities. The SGF project is at endorsed CN stage, with PFG activities set to commence in the 3rd quarter of 2026. AEWS coordination with the AF Small Grants Facility is ensured through SANBI's NIE governance structure, with both projects overseen by the same institutional framework to prevent duplication and maximise synergies.

CR17: Cleared

The no duplication statements in the table have been revised with additional detail as described in the response to CAR6 above.

September 2, 2026

Does the project / programme have a learning and knowledge management component to capture and feedback lessons?

Response: Pending

Secretariat: Yes.

However, more information is required.

Part II.G (page 32). The proposed project includes Learning and Knowledge Management activities across components. In addition, while the products are clear, the information provided is broad and it is not clear the arrangements to sustain them after the project concludes.

CR18: Please consider adding a dedicated component to operationalize Learning and Knowledge Management (LKM) activities.

CAR7: Kindly include the following:

1. The entities in charge of each LKM activity and how the activities will be carried out, including frequency and feedback mechanism to assess and refine material and capacity building activities.
2. Explain how the knowledge generated will be maintained once the project concludes and describe the institutional or operational arrangements required to ensure its long term sustainability.

Response: Not Cleared

IE: CR18: The revised CN now details the project's LKM framework in Part I (paragraph 29 and Table 4) and Part II.G (paragraphs 89 through 90). The project operationalizes Learning and Knowledge Management (LKM) as a cross-cutting function with a dedicated Specific Objective and outcomes in the theory of change, rather than as a fourth standalone component. This ensures systematic LKM integration across all components while avoiding duplication of management structures.

For example, Specific Objective 4: Enhanced learning, knowledge management, and scaling includes outcomes for knowledge capture, documentation, dissemination, and replication. LKM activities are embedded within Components 1-3: infrastructure standards and protocols (Component 1), institutional capacity models and training curricula (Component 2), and community-level innovations and participatory methodologies (Component 3).

LKM is therefore financed within component envelopes and managed through Project Management Unit coordination. This cross-cutting approach parallels gender-responsiveness and M&E integration, ensuring substantive knowledge outcomes without creating parallel implementation structures.

CAR7: Part II.G of the revised CN has been rewritten (paragraphs 89 through 90) to demonstrate the project's approach to LKM operationalization. The section now specifies responsible entities, implementation mechanisms, feedback cycles, and post-project sustainability arrangements. The following measures are now included in the CN:

Implementation Entities and Mechanisms

SAWS (Component 1): Quarterly documentation of infrastructure standards, technical specifications, and operational protocols. Annual technical workshops for knowledge exchange with provincial meteorological services and SADC partners.

NDMC (Component 2): Quarterly knowledge review through District Disaster Management Forums (44 districts, every 3 months), capturing lessons from warning dissemination and institutional coordination. Bi-annual national learning events synthesizing cross-district experiences.

SALGA (Component 2): Quarterly peer-learning sessions through existing local government forums. Bi-monthly

webinars with all district municipalities. Quarterly provincial working groups and national Environment and Climate Resilience Working Group refining capacity-building products and protocols based on implementation feedback.

SANBI PMU: Quarterly learning reports compiled from Executing Entity templates capturing implementation lessons. Annual knowledge syntheses consolidating findings across all components.

Maintenance and Sustainability

Feedback and Adaptive Management: Quarterly review cycles across all platforms enable real-time refinement of training materials, dissemination protocols, and community engagement approaches based on implementation evidence and user feedback.

Maintenance and Sustainability

Feedback and Adaptive Management: Quarterly review cycles across all platforms enable real-time refinement of training materials, dissemination protocols, and community engagement approaches based on implementation evidence and user feedback.

Post-Project Sustainability: Knowledge products (technical guidance, training curricula, standard operating procedures, toolkits) will be institutionalized within permanent platforms: SAWS operational manuals, NDMC training calendars, SALGA municipal capacity-building programmes, and district Integrated Development Plans. Best-practice policy briefs and case studies will be developed during project closure (Year 5) and disseminated through government knowledge repositories and SADC networks. Institutional anchoring ensures knowledge remains accessible and updated through routine organizational functions beyond project completion.

Response: Not Cleared

Secretariat: CR18: Not Cleared

The revised CN LKM framework is described in Part I (paragraph 29 and Table 4) and Part II.G (paragraphs 89 through 90). The project operationalizes Learning and Knowledge Management (LKM) as a cross-cutting function with a dedicated Specific Objective and outcomes in the theory of change, rather than as a fourth standalone component. By so doing it is hoped to ensure systematic LKM integration across all components while avoiding duplication of management structures.

For example, Specific Objective 4: Enhanced learning, knowledge management, and scaling includes outcomes for knowledge capture, documentation, dissemination, and replication. LKM activities are embedded within Components 1-3 include: infrastructure standards and protocols (Component 1), institutional capacity models and training curricula (Component 2), and community-level innovations and participatory methodologies (Component 3).

LKM is therefore financed within component envelopes and managed through Project Management Unit coordination.

However, as indicated in CR4, the inclusion of Outcome 4 and Outputs 4.1 and 4.2 in Table 4 is confusing since there are only three Components. Please include the LKM outputs in the relevant Components or consider including all LKM activities under a single Component 4.

CAR7: Cleared

Part II.G of the revised CN has been revised (paragraphs 89 to 92) so that the section now specifies responsible entities, implementation mechanisms, feedback cycles, and post-project sustainability arrangements.

Sept 3, 2026

Has a consultative process taken place, and has it involved all key stakeholders, and vulnerable groups, including gender considerations in compliance with the Environmental and Social Policy and Gender Policy of the Fund?

Response: Pending

Secretariat: Yes.

However, more information is required.

Part II.H (pages 32-33) and Annex 4. The CN states that “the project concept was developed through a sequenced, multi-stakeholder consultative process conducted in alignment with the Adaptation Fund’s Environmental and Social Policy and Gender Policy.” This analysis was based on a 2024 rapid assessment and technical working sessions held during 2025 and 2026. However, it is not clear how vulnerable groups were included in these consultations, nor which entities participated in them. Additional details should be provided.

CAR8: Please include a Table with the following information per consultation (one line per consultation):

- (i) consulted entity/ group, especially if they correspond to gender organizations. They should be specifically named.
- (ii) numbers of participants, disaggregated by gender.
- (iii) key issues raised and how they were considered in project design (name specific outputs and outcomes currently in the proposal).
- (iv) background information to verify whether marginalized and vulnerable groups have been consulted.
- (v) A summary of the subjects/issues discussed and any agreements reached, for each session.
- (vi) Indicate how the participants’ interests have been incorporated in the proposed project, including how gender and other vulnerable group considerations were addressed.

CR19: Please indicate how future consultations will ensure meaningful and inclusive participation of women and other vulnerable groups.

CAR9: Please strengthen the Initial Gender Analysis to provide information about the gaps between men and women from a national or sector-wide perspective. The information provided should inform and guide the identification of women’s specific needs.

Response: Not Cleared

IE: CAR8: Part II.H (Consultative Process) and Annex 4a (Abridged Stakeholder Engagement Report) have been substantially revised to address this CAR, noting Concept Note page limit constraints. The revised sections detail:

- **Stakeholder Range and Participation:** 126. Between late 2024 and June 2026, SANBI and SAWS convened 15 consultation events engaging 144 participants (72 women, 72 men; 50% female participation). Events included national co-design workshops, provincial and district workshops, technical working groups, and bilateral institutional meetings. Consultations were conducted in-person and virtually with accessibility provisions including venue accessibility, virtual participation options, and translation support.
- **Gender-Disaggregated Data:** Participation data systematically recorded by gender for all events, with women comprising 51% of total participants. Detailed event-by-event gender-disaggregated participation is provided in Annex 4a Table.
- **Influence on Project Design:** Stakeholder inputs directly shaped project design. Key themes included infrastructure redundancy needs (informing Component 1 radar and observation network priorities), lack of standardised protocols across 44 districts (informing Component 2 nationwide capacity building), last-mile communication barriers (informing Component 3 multi-channel alert systems), and gender-differentiated warning needs (informing Component 3 gender-sensitive protocols and safe evacuation planning). Annex 4a

provides a detailed mapping of themes to design responses.

- Consultation Strategy: At Concept Note stage, consultations focused on institutional and municipal stakeholders to manage expectations and minimise stakeholder fatigue. Comprehensive community-level consultations will be undertaken during full proposal development once target communities are identified through PFG-supported vulnerability assessments, ensuring representation of vulnerable groups (women, youth, elderly persons, persons with disabilities, informal settlement residents).
- A detailed Full Stakeholder Engagement Report (Annex 4b) is available via hyperlink from Annex 4a, providing further information on consultation methods, participation, and thematic outcomes.

See Part II.H (paragraphs 93 through 98) and Annex 4a and 4b for complete details.

CR19: Forthcoming consultations will build on the consultation approach outlined in Part II.H and the component-specific participation mechanisms described in Part II.A. Specifically:

- Lessons from Activity 3.1.2 on community workshops and awareness sessions will be used to refine community-level stakeholder consultation processes. Future consultations will apply inclusive design and targeted outreach to ensure meaningful participation of vulnerable groups throughout the project lifecycle, including women, youth, elderly persons, persons with disabilities, informal settlement residents, rural smallholder farmers, and marginalised ethnic, linguistic and migrant communities.
- Consultations will occur across five stages: the PFG phase, for gender assessments, baseline work, stakeholder mapping and technical consultations; the Year 1 inception phase, for validation of plans and governance structures; the implementation phase, for co-development of dissemination protocols, risk profiles, awareness campaigns, preparedness plans and community DRM arrangements; the monitoring phase, for participatory M&E, beneficiary feedback and the mid-term review; and the completion phase, for validation of sustainability arrangements and knowledge products.
- Established project governance structures, including reference groups and local task teams, will provide key consultation modalities in targeted implementation sites. Outreach will also use women's organisations, youth organisations, schools, disability rights organisations, ward committees, farmer associations and trusted community intermediaries. Arrangements will accommodate care responsibilities, disability access, language needs, safety concerns and seasonal constraints, using accessible venues, multilingual and plain-language facilitation, separate and mixed-group sessions, and safe spaces for sensitive issues.
- Consultation outcomes will be documented with participant data disaggregated by gender, age, disability, settlement type and vulnerable group, with traceability of how inputs inform design and implementation. Feedback will inform quarterly adaptive management reviews, with participation gaps triggering corrective actions. Accountability will be provided through the Stakeholder Engagement Plan, the Gender and Social Inclusion Specialist in the PMU, Project Steering Committee oversight, and an accessible, gender-sensitive Grievance Redress Mechanism.

The approach will draw on relevant SANBI experience, including ongoing consultation processes under the GCF Eco-DRR project, the EbA Farm project in final design, and lessons from previous Adaptation Fund projects, including the first Small Grants Facility completed in 2022 and currently undergoing ex-post evaluation.

CAR9: The revised CN includes a comprehensively strengthened gender analysis. Due to page limit constraints, an abridged version is included in the CN as Annex 3a, while the full version is embedded in the CN as a hyperlink, i.e., Annex 3b. The revised analysis directly addresses all requirements of CAR1 and CAR9. The revised analysis is based on a systematic desk review of authoritative national and sector-specific sources and provides detailed contextual information, national and sector-wide gender gap analysis, and explicit linkages to women's specific needs in the context of early warning systems.

Response: Cleared

Secretariat: CAR8: Cleared

Part II.H (Consultative Process) (para 93 - 98) and Annex 4a (Abridged Stakeholder Engagement Report) have been revised accordingly.

CR19: Cleared

Future consultations will build on the consultation approach outlined in Part II.H and the component-specific participation mechanisms described in Part II.A to ensure meaningful and inclusive participation of women and other vulnerable groups. The approach will draw on relevant SANBI experience, including ongoing consultation processes under the GCF Eco-DRR project, the EbA Farm project in final design, and lessons from previous Adaptation Fund projects, including the first Small Grants Facility completed in 2022 and currently undergoing ex-post evaluation.

CAR9: Cleared

The gender analysis in the revised CN has been strengthened. Due to page limit constraints, an abridged version is included in the CN as Annex 3a, while the full version is embedded in the CN as a hyperlink, i.e., Annex 3b. The revised analysis directly addresses all requirements of CAR1 and CAR9. The revised analysis is based on a systematic desk review of authoritative national and sector-specific sources and provides detailed contextual information, national and sector-wide gender gap analysis, and explicit linkages to women's specific needs in the context of early warning systems.

Sept 3, 2026

Is the requested financing justified on the basis of full cost of adaptation reasoning?

Response: Pending

Secretariat: Yes.

However, some amendments are required.

Part II.I (pages 33-35). The project's justification for the full cost of adaptation is structured around a comparison between a baseline scenario and an Adaptation Fund (AF) scenario for each of the three components. However, additional information is required.

CR20: Please strengthen the narrative of the baseline and AF scenarios to clearly explain the logic behind them and include figures to support the comparisons.

CAR10: Please confirm whether the AF will be the sole source of funding. If not, please clearly indicate how the project, using only AF resources, will be able to effectively meet its objectives.

Response: Not Cleared

Secretariat: CAR11: At Part II Section I please ensure the following:

1. remove 'additional costs' from sentence 1.
2. remove "full incremental costs of adaptation" from sentence 3
3. remove "additional to ..development" from sentence 4

4. In the sub-headings, remove "additional" and only leave "With AF resources".

Response: Not Cleared

IE: CR20: Part II.I of the revised CN has been substantively reworked and the full cost of adaptation rationale strengthened (paragraphs 99 through 106). The additions focus on the requested AF resources covering the full cost of adaptation to shift from a fragmented system with limited accuracy to an integrated system achieving WMO-compliant accuracy, improved lead times, standardised capacity across 44 districts, and preparedness for over 330,000 people. The logic underpinning the requested investments being additional to business-as-usual is because they: (i) are triggered by climate-driven hazard increases exceeding baseline capacity; (ii) entail strategic modernisation beyond routine expenditure; and (iii) finance last-mile measures generating 2:1 to 3:1 benefit-cost ratios.

CAR 10: Confirmed. The Adaptation Fund is the sole source of funding for this project. The USD 24.94 million budget is sufficient to achieve all project objectives through strategic prioritization maximizing adaptation impact within the AF envelope:

- Component 1 (USD 12.0m) prioritizes observation infrastructure and foundational technical capacity. Output 1.1 (USD 9.5m) funds observation backbone upgrades (60 AWS, 250 ARS, 1 S-Band radar, 2 upper-air systems), while Output 1.2 (USD 2.5m) builds technical capacity for operating and maintaining upgraded systems. While high-performance computing enhancements would further strengthen forecasting, the observation-first approach focuses AF resources on 20-plus-year lifespan infrastructure addressing critical coverage gaps, sustainable within SAWS existing operation and maintenance budget, and providing the essential data backbone for all forecasting improvements.
- Component 2 (USD 6m) delivers nationwide capacity building across 44 districts through cost-efficient master-trainer models.
- Component 3 (USD 2.8m) concentrates community investments in three municipalities at USD 8.40 per beneficiary, demonstrating replicable models.

The AF-only strategy ensures full implementation without co-financing dependencies, delivering measurable adaptation outcomes through strategic prioritization, cost-efficient delivery, and institutional sustainability. Benefit-cost analysis demonstrates 2:1 to 3:1 ratios for avoided losses.

See the revised narrative in Part II.C and Part II.I for detailed prioritization.

CAR11: Acknowledged and corrected.

Response: Cleared

Secretariat: CR20: Cleared

Part II.I of the revised CN has been revised and the full cost of adaptation rationale strengthened (paragraphs 99 through 106). The additions focus on the requested AF resources covering the full cost of adaptation to shift from a fragmented system with limited accuracy to an integrated system achieving WMO-compliant accuracy, improved lead times, standardised capacity across 44 districts, and preparedness for over 330,000 people. The logic underpinning the requested investments being additional to business-as-usual is because they: (i) are triggered by climate-driven hazard increases exceeding baseline capacity; (ii) entail strategic modernisation beyond routine expenditure; and (iii) finance last-mile measures generating 2:1 to 3:1 benefit-cost ratios.

CAR 10: Cleared.

See the revised narrative in Part II.C and Part II.I for detailed prioritization.

CAR11: Cleared

All revisions requested have been made

Is the project / program aligned with AF's results framework?

Response: Pending

Secretariat: Yes.

However, some adjustments are required.

Part III.A (pages 38-40). The alignment of the project with the Adaptation Fund Results Framework is presented, considering outcomes and outputs for each component. However, some amendments are required.

CAR12:

1. Please revise Table under Part III.A and amend according to the instructions provided in Results Framework Alignment Table (Dec 2025, link: <https://www.adaptation-fund.org/document/alignment-with-adaptation-fund-results-framework-template-and-guidance-dec-2025/>).
2. Please ensure the following:
 - consistency of all Fund Outcomes and Outputs (including indicators). For example, Fund Output 3.1. is described as “Participatory community risk assessments, awareness campaigns, and knowledge resources delivered in target communities”, but it should be “Targeted population groups participating in adaptation and risk reduction awareness activities”.
3. Please ensure that all project's outputs and outcomes indicators are SMART.

Response: Not Cleared

Secretariat: I agree with the comments of the co-reviewer.

In addition to the comments provided please add:

CAR12:

4. In the upper part of the table, the Fund Output Indicator is used instead of the Fund Outcome indicator. Please use the appropriate Fund Outcome indicator for Specific Objective 2.
5. Also, ensure consistency between Outcomes in the upper part of the table and Outputs in the lower part of the table. Thus in the lower part of the table, Fund Output 4 is mentioned for Project Outcome 1, but it is not mentioned in the upper part of the table for Specific Objective 1.

Response: Not Cleared

Secretariat: CAR12:

6. Please ensure that all grant amounts are presented at the indicator level in the table.

Response: Not Cleared

IE: CR12.1: Acknowledged. The Part III.A Results Framework Alignment Table has been fully revised in accordance with the Adaptation Fund Results Framework Alignment Table template and guidance (December 2025). The revised table follows the prescribed two-tier structure: the upper section maps the four Specific Objectives to Fund Outcomes with Fund Outcome Indicators and grant amounts; the lower section maps Project Outcomes to Fund Outputs with Fund Output Indicators and grant amounts at indicator level. All entries have been verified against the current AF Strategic Results Framework.

CR12.2: Acknowledged. The table incorrectly substituted project output descriptions for standard AF Fund Output descriptions. The revised table now uses the exact AF standard wording for all Fund Outcomes and Fund

Outputs. Specifically, Fund Output 3.1 is now correctly described as "Targeted population groups participating in adaptation and risk reduction awareness activities" with the corresponding AF indicator "3.1. No. and type of risk reduction actions or activities, and no. of people with reduced risk to extreme weather events."

CR12.3: Acknowledged. All project outcome and output indicators have been revised to meet SMART criteria. Each indicator now includes:

- Specific: Clear definition of what is being measured, with disaggregation parameters specified.
- Measurable: Quantitative baselines and targets provided for each indicator.
- Achievable: Targets calibrated against institutional capacity, project duration, and budget.
- Relevant: Each indicator directly measures the achievement of its corresponding outcome or output.
- Time-bound: End-of-project targets specified (Year 5); midterm milestones to be confirmed during PFG.

Baselines marked as "to be confirmed during PFG baseline survey" reflect data that requires primary collection in target districts. Estimated values are provided where institutional records permit.

CR12.4: Acknowledged. The upper table incorrectly used Fund Output Indicator 2.1.1 ("No. of staff trained to respond to, and mitigate impacts of, climate-related events") for Specific Objective 2, which is an output-level metric. The revised table uses the correct Fund Outcome Indicator: "2.1. No. of targeted institutions with increased capacity to minimise exposure to climate variability risks (by type, sector, and scale)."

CR12.5: Acknowledged. The table was internally inconsistent. The revised table ensures full consistency. Specific Objective 1 now maps to both Fund Outcome 1 (reduced exposure through EWS) and Fund Outcome 4 (increased adaptive capacity within development sector services), reflecting that Component 1 both reduces hazard exposure through improved warnings and strengthens physical infrastructure assets. The lower table correspondingly maps Project Outcome 1 to Fund Output 1.1 (risk assessments/EWS) and Fund Output 4 (physical assets), with grant amounts allocated at indicator level.

CR12.6: Acknowledged. The revised RF Alignment Table presents grant amounts at the indicator level in both the upper and lower tables. In the upper table, grant amounts are allocated to each Specific Objective. In the lower table, grant amounts are disaggregated by output, with amounts specified for each output indicator

Response: Not Cleared

Secretariat: CR12.1: Not cleared.

The revised Results Framework Alignment Table is presented in Part III.A Table 10. The upper section of the table maps the Specific Objectives with the appropriate AF Outcomes and indicators. However, a) Specific Objective 1: AF Output 4 is given as one of the Outcomes. Please note that at this level of the table, only AF Outcomes and Indicators should be used. Please delete AF Output 4 or use the appropriate Outcome and indicator b) Specific Objective 2: The Indicator provided for AF Outcome 2 is that of AF Output Indicator 2.1.2. Please note that the appropriate indicator for AF Outcome 2 is 2.1 - (Capacity of staff to respond to and mitigate impacts of climate-related events from targeted institutions increased) - not 2.1.1. Please use the appropriate Outcome Indicator

c) Specific Objective 4: There are no grant amounts because that objective is comprised of crosscutting outputs and activities whose costs are embedded in Specific Objectives 1 - 3.

It is suggested that a separate fourth component comprising the Learning and Knowledge Management outputs and activities of the other three components be included so that the grant amounts can be easily calculated as well as for better monitoring and evaluation of those outputs.

In the lower section of the table,

CAR12.2: Not cleared

The lower section maps Project Outcomes and Outputs to Fund Outputs with the appropriate Fund Output Indicators and grant amounts at indicator level. For Project Outputs 2.2 and 3.1, AF Output 3.1 was provided as

the appropriate Output but AF Output indicator 3.1.1 was given for that Output. The guidelines show that for AF Output 3.1. there is only one Indicator, which is 3.1 (No of news outlets in the local press and media that have covered the topic). Moreover, there is no AF Output indicator 3.1.1 in the guidelines. Please revise and use the appropriate indicator.

CAR12.3: Cleared

All project outcome and output indicators have been revised accordingly.

CAR12.4: Cleared:

The revised table now uses the correct Fund Outcome Indicator: "2.1. No. of targeted institutions with increased capacity to minimise exposure to climate variability risks (by type, sector, and scale)."

CR12.5: Not cleared. The table is still internally inconsistent. In the upper part of the table, AF Outcome 1 is indicated for Specific Objective 1, however, it is not mentioned in the lower part of the table. Please ensure consistency between the upper and lower parts of the table

CR12.6: Cleared. The revised RF Alignment Table presents grant amounts at the indicator level in both the upper and lower sections of the table. In the upper table, grant amounts are allocated to each Specific Objective. In the lower table, grant amounts are disaggregated by output, with amounts specified for each output indicator.

Please note the comment related to Specific Objective 4 in CAR12.1

Sept 4, 2026

Has the sustainability of the project/programme outcomes been taken into account when designing the project?

Response: Pending

Secretariat: Unsure.

More information is required.

Part II.J (pages 35-36). The CN states that "the project is embedded within SAWS' statutory mandate and the disaster management system defined by the Climate Change Act and the Disaster Management Act". This provides sustainability for the interventions of the proposed programme. However, the information provided is broad and more details are needed.

CR20: Please include information on how O& M of equipment and infrastructure will be addressed for the proposed activities once detailed under each of the 3 components.

CR21: Please describe the arrangements needed to ensure the sustainability of the programme after its completion. This should include different dimensions such as institutional and financial arrangements. For example, are there any pre-arrangements already signed or under preparation? What are the main responsible institutions involved?

CR22: Please explain how the adaptation benefits would enable replication and scaling up after the project has ended.

Response: Not Cleared

IE: CR20: Acknowledged. Fully addressed in the CN.

CR21: Sustainability is embedded through statutory mandates, financial integration, and permanent institutional platforms:

- Institutional: Component 1 infrastructure integrates into SAWS's statutory mandate as South Africa's meteorological authority (SAWS Act No. 8 of 2001), ensuring long-term ownership and operation. Component 2 protocols embed into NDMC's coordination functions (Disaster Management Act No. 57 of 2002) and disseminate through permanent quarterly District Disaster Management Forums. SALGA mainstreams protocols through existing municipal capacity platforms. SANBI's National Adaptation Finance Advisory Body (NAFAB) coordinates future scaling under National Treasury guidance.
- Financial: Component 1 prioritizes observation infrastructure (20-plus-year lifespans) aligned with SAWS existing operation and maintenance budget. Component 2 protocols integrate into municipal disaster management plans, performance targets, and budgets, securing recurrent funding.
- Technical: Master-trainer model embeds capacity within institutions. SAWS in-house manufacturing ensures spare parts availability and ongoing maintenance.
- Policy: Aligns with South Africa's Early Warning for All commitment (universal coverage by 2027) and Climate Change Act (No. 19 of 2022).

CR22: The project facilitates replication and scaling through:

- National infrastructure scalability - Component 1 observation systems provide a public good platform accessible to additional districts at decreasing marginal cost
- Standardised capacity - Component 2 training and protocols are transferable templates shared across all 44 districts via SALGA peer-learning platforms
- Demonstration sites - Component 3 pilots in three municipalities generate documented best practices for last-mile dissemination and inclusive warning systems, captured through Knowledge Management (Outcome 4) for SADC-wide replication
- Institutional anchoring - EWS capacity embedded within permanent mandates (SAWS, NDMC, SANBI/NAFAB) ensures sustained operation and coordination of future scaling across diverse funding sources. The alignment with South Africa's EW4All national commitment (universal coverage by 2027) provides policy momentum for continued expansion.
- Economic scaling logic: initial infrastructure investment generates public good benefits accessible at near-zero marginal cost per additional user, improving benefit-cost ratios with geographic expansion.

The 'scalability and replication' subheading in Part II.J (Sustainability) of the revised CN (paragraph 108) has been strengthened to reflect the mechanisms listed above.

Response: Cleared

Secretariat: CR20: Cleared

Measures taken are described under life cycle asset management in Part II J (para 107)

CR21 Cleared:

Sustainability is embedded through statutory mandates, financial integration, and permanent institutional platforms as explained in Part II J (para 107): Specifically:

- Institutional: Component 1 infrastructure integrates into SAWS's statutory mandate as South Africa's meteorological authority (SAWS Act No. 8 of 2001), ensuring long-term ownership and operation. Component 2 protocols embed into NDMC's coordination functions (Disaster Management Act No. 57 of 2002) and disseminate through permanent quarterly District Disaster Management Forums. SALGA mainstreams protocols through existing municipal capacity platforms. SANBI's National Adaptation Finance Advisory Body (NAFAB) coordinates future scaling under National Treasury guidance.

- Financial: Component 1 prioritizes observation infrastructure (20-plus-year lifespans) aligned with SAWS existing operation and maintenance budget. Component 2 protocols integrate into municipal disaster management plans, performance targets, and budgets, securing recurrent funding.
- Technical: Master-trainer model embeds capacity within institutions. SAWS in-house manufacturing ensures spare parts availability and ongoing maintenance.
- Policy: Aligns with South Africa's Early Warning for All commitment (universal coverage by 2027) and Climate Change Act (No. 19 of 2022).

CR22: Cleared

See Part II J, paragraph 108

September 4, 2026

Does the project / programme provide an overview of environmental and social impacts / risks identified, in compliance with the Environmental and Social Policy and Gender Policy of the Fund?

Response: Pending

Secretariat: Yes.

However, more information is required.

Part II.K (pages 36-38). The CN provides an overview of the environmental and social impacts and risks in compliance with the AF ESP and Gender Policy. The project is classified as Category B. Risk have been identified against each of the 15 ESP principles. An Initial Gender Assessment is included in Annex 4, but provides broad information. In addition, there is no discussion of potential indirect, transboundary, or cumulative impacts that could result from the proposed project/programme. More information and some amendments are required.

CAR13: Please revise Table 6 to:

1. Describe all potential impacts (direct, indirect, transboundary and cumulative) and risks that could result from the project.
2. Revise the magnitude of the risks and impacts (low, moderate, high). Risks should describe as: "There is a risk" and should be accompanied by mitigation plans as: "Mitigation measures are" or "To mitigate this risk, the project"
3. Please remember that principles 1, 4 and 6 always apply and, therefore, principle 4 should be amended.
4. If no risk is identified for a given principle, a sound justification must be provided.
5. No text should be included in the second column. Just include a "X" or check mark when corresponds.

Response: Not Cleared

IE: CAR13: Part II.K, and Table 6 in particular, has been comprehensively revised in response to CAR13. The revised table:

- Classifies all potential impacts and risks as direct, indirect, transboundary, or cumulative for each ESP principle, with project-specific descriptions linked to the three project components and their activities (sub-item 1).
- Adopts the prescribed risk description format throughout: "There is a risk that..." followed by "To mitigate this risk, the project will..." for each identified risk. Risk magnitude is stated as low, moderate, or (where applicable) low-to-moderate (sub-item 2).
- Confirms that Principles 1 (Compliance with the Law), 4 (Human Rights), and 6 (Core Labour Rights) are marked as always applying. Principle 4 has been amended to include an assessment of identified risks and corresponding mitigation measures (sub-item 3).
- Provides project-specific justification for each principle where risks are assessed as low or not triggered,

explaining why the project design avoids or minimises the relevant impact category (sub-item 4).

- Removes all descriptive text from the second column and replaces it with an "X" where further assessment is required for compliance (sub-item 5).

The Part II.K narrative (paragraph 109) has been strengthened to reference the screening methodology, summarise key risks and mitigation strategies, and confirm the commitment to developing a full Environmental and Social Management Plan (ESMP) and associated management plans during the Fully-Developed Proposal (FDP) phase.

Response: Cleared

Secretariat: CAR13: Cleared

Table 9 - Overview of environmental and social impacts and risks in Part II K has been revised in accordance with the comments provided. In addition, Part II.K narrative (paragraph 109) has been strengthened to reference the screening methodology, summarise key risks and mitigation strategies, and confirm the commitment to developing a full Environmental and Social Management Plan (ESMP) and associated management plans during the Fully-Developed Proposal (FDP) phase.

September 4, 2026

Resource Availability

Is the requested project / programme funding within the cap of the country?

Response: Pending

Secretariat: Yes.

The project is USD 24,937,016.

Response: Cleared

Secretariat: N/A

Response: Cleared

IE: N/A

Is the Implementing Entity Management Fee at or below 8.5 per cent of the total project/programme budget before the fee?

Response: Pending

Secretariat: Yes.

All figures are rounded to whole numbers, and the Implementing Entity Management Fee is 8.5% (USD 1,953,591). The figures add up across the tables alongside the CN. The PFG request is correct in size (USD 149,996) and includes a PFG fee of 8.5%.

Response: Cleared

Secretariat: N/A

Response: Cleared

Secretariat: CAR13:

1. Please confirm if SAWS will also execute the PFG. If the PFG will be executed by SANBI please update the PFG request form accordingly.

2. Please ensure that the IE fees budget line as well as the total budget line are included in the PFG table.

Response: Cleared

IE: 1. SANBI will be the Executing Entity for the PFG. This is now reflected accordingly in the PFG Form.

2. The IE Fees Budget line and total budget line have been included in the PFG table.

Are the Project/Programme Execution Costs at or below 9.5 per cent of the total project/programme budget (including the fee)?

Response: Pending

Secretariat: Yes.

As per information provided in Table of "Project components and financing".

All figures are rounded to whole numbers, and the Execution Costs are 9.5% (USD 2,183,425). The figures add up across the tables alongside the CN.

Response: Cleared

Secretariat: N/A

Response: Cleared

IE: N/A

Eligibility of IE

Is the project/programme submitted through an eligible Implementing Entity that has been accredited by the Board?

Response: Pending

Secretariat: Yes.

South Africa National Biodiversity Institution (SANBI) is an accredited National Implementing Entity (NIE).

Accreditation Expiration Date: 18 January 2031

Response: Cleared

Secretariat: N/A

Response: Cleared

IE: N/A

Implementation Arrangements

Is there adequate arrangement for project / programme management, in compliance with the Gender Policy of the Fund?

Response: Pending

Secretariat: N/A. Proposal is a CN.

Are there measures for financial and project/programme risk management?

Response: Pending

Secretariat: N/A. Proposal is a CN.

Are there measures in place for the management of for environmental and social risks, in line with the Environmental and Social Policy and Gender Policy of the Fund?

Response: Pending

Secretariat: N/A. Proposal is a CN.

Is a budget on the Implementing Entity Management Fee use included?

Response: Pending

Secretariat: N/A. Proposal is a CN.

Is an explanation and a breakdown of the execution costs included?

Response: Pending

Secretariat: N/A. Proposal is a CN.

Is a detailed budget including budget notes included?

Response: Pending

Secretariat: N/A. Proposal is a CN.

Are arrangements for monitoring and evaluation clearly defined, including budgeted M&E plans and sex-disaggregated data, targets and indicators, in compliance with the Gender Policy of the Fund?

Response: Pending

Secretariat: N/A. Proposal is a CN.

Does the M&E Framework include a break-down of how implementing entity IE fees will be utilized in the supervision of the M&E function?

Response: Pending

Secretariat: N/A. Proposal is a CN.

Does the project/programme's results framework align with the AF's results framework? Does it include at least one core outcome indicator from the Fund's results framework?

Response: Pending

Secretariat: N/A. Proposal is a CN.

Is a disbursement schedule with time-bound milestones included?

Response: Pending

Secretariat: N/A. Proposal is a CN.

CONCEPT NOTE PROPOSAL FOR SINGLE COUNTRY

PART I: PROJECT/PROGRAMME INFORMATION

Title of Project: Advancing Climate Resilience in South Africa through Integrated Multi-Hazard Early Warning and Climate Services (Advancing EWS Project)

Country: South Africa

Thematic Focal Area: Disaster Risk Reduction & Early Warning Systems

Type of Implementing Entity: National Implementing Entity

Implementing Entity: South African National Biodiversity Institute

Executing Entities: South African Weather Service

Amount of Financing Requested: **24,937,016** (in U.S Dollars Equivalent)

Project Formulation Grant Request: Yes ☒ No ☐

Amount of Requested financing for PFG: **149,996** (in U.S Dollars Equivalent)

Letter of Endorsement (LOE) signed: Yes ☒ No ☐

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

Stage of Submission:

- ☒ This proposal has been submitted before
- ☐ This is the first submission ever of the proposal at any stage

In the case of a resubmission, please indicate the last submission date: 8/11/2026

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

Table of Contents

PART I: PROJECT/PROGRAMME INFORMATION	1
Project background and context.....	4
Project objectives	9
Project components and financing	10
Projected calendar	11
PART II: PROJECT/PROGRAMME JUSTIFICATION.....	12
A. Description of project/programme components.....	12
B. Economic, social, and environmental benefits	21
C. Cost-effectiveness of the proposed project.....	23
D. Consistency with national strategies	25
E. Alignment with technical standards	26
F. Duplication with other funding sources	29
G. Learning and knowledge management	32
H. Consultative process	32
I. Justification for funding requested	33
J. Sustainability of the project	35
K. Environmental and social impacts and risks.....	36
PART III: IMPLEMENTATION ARRANGEMENTS.....	40
A. Alignment with the Adaptation Fund Strategic Results Framework	40
B. Management arrangements.....	43
PART IV: ENDORSEMENT BY GOVERNMENT & CERTIFICATION BY THE IMPLEMENTING ENTITY	45
A. Record of endorsement	45
B. Implementing Entity certification.....	45
ANNEX 1: LETTER OF ENDORSEMENT	46
ANNEX 2: THEORY OF CHANGE.....	47
ANNEX 3A: ABRIDGED PRELIMINARY GENDER ASSESSMENT	48
ANNEX 4A: ABRIDGED STAKEHOLDER ENGAGEMENT REPORT	50

List of Figures

Figure 1. Census 2022 population density.....	4
Figure 2. Location of target municipalities in South Africa.....	8
Figure 3. Management and governance arrangements for the Advancing-EWS project.....	43

List of Tables

Table 1. Summary of projected changes in temperature for South Africa in 2030 and 2050.....	6
Table 2. Summary of projected precipitation in South Africa in 2030 and 2050.....	6
Table 3. Breakdown of direct project beneficiaries by province and district.....	9
Table 4. Overview of project components, expected outcomes, outputs, and budget.....	10
Table 5. Projected project calendar.....	11
Table 6. Summary of project cost-effectiveness relative to technological alternatives.....	24
Table 7. Overview of applicable technical standards and legislation.....	26
Table 8. Summary of project overlaps and synergies.....	29
Table 9. Overview of environmental and social impacts and risks.....	36
Table 10. Alignment of the project with the Results Framework of the Adaptation Fund.....	40
Table 11. Summary of management and governance roles.....	43

List of Acronyms

AWS	Automated Weather Station	CAP	Common Alerting Protocol
EHS	Environmental, Health and Safety	EIA	Environmental Impact Assessment
ESP	Environmental and Social Policy	ESMP	Environmental and Social Management Plan
EWS	Early Warning System	FPIC	Free, Prior and Informed Consent
G4AW	Geodata for Agriculture and Water	GAP	Gender Action Plan
GBV	Gender-Based Violence	GCF	Green Climate Fund
GDP	Gross Domestic Product	GEOSS	Global Earth Observation System of Systems
GHG	Greenhouse Gas	GRM	Grievance Redress Mechanism
HPC	High-Performance Computing	ICMHEWS	Integrated climate-driven Multi-Hazard Early Warning System
NAFAB-SC	National Adaptation Fund Advisory Body Sub-Committee	NAP	National Adaptation Plan
NCCAS	National Climate Change Adaptation Strategy	NDC	Nationally Determined Contribution
ND-GAIN	Notre Dame Global Adaptation Initiative	NDMC	National Disaster Management Centre
NFCS	National Framework for Climate Services	NIHR	National Institute for Health and Care Research
NMHS	National Meteorological and Hydrological Service	NWP	Numerical Weather Prediction
POPIA	Protection of Personal Information Act	PPE	Personal Protective Equipment
QPE	Quantitative Precipitation Estimate	R&D	Research and Development
R4A	Rain for Africa	RCP	Representative Concentration Pathway
SABS	South African Bureau of Standards	SADDD	Sex-, Age- and Disability-Disaggregated Data
SEA/SH	Sexual Exploitation, Abuse and Sexual Harassment	SOP	Standard Operating Procedure
WMO	World Meteorological Organization	WISER	Weather and Climate Information Services for Africa

Project Background and Context

General context

1. South Africa has an estimated population of 62 million, based on the latest census in 2022. It shares borders with six neighbouring countries: Namibia, Botswana, Mozambique, Zimbabwe, Eswatini, and Lesotho. Population distribution is uneven across the country, with the highest densities found in major urban centres along the east coast, the Cape Metropole, and the Gauteng City Region (Figure 1¹). Rural areas generally have lower population densities, with exceptions in parts of KwaZulu-Natal, the Eastern Cape, and Limpopo. Approximately 40% of RSA's population lives in extreme poverty, with a high unemployment rate; around 32% of the population was without work in 2023 ². While urbanization is increasing, over 30% of South Africa's population resided in rural areas in 2022, where poverty, unemployment, and limited economic opportunities are widespread³. National-level stakeholders play a critical role in ensuring that these vulnerable populations receive timely, coordinated support to address climate impacts. However, the lack of effective early warning systems at the national level limits the ability to proactively address climate-related risks for both urban and rural communities.

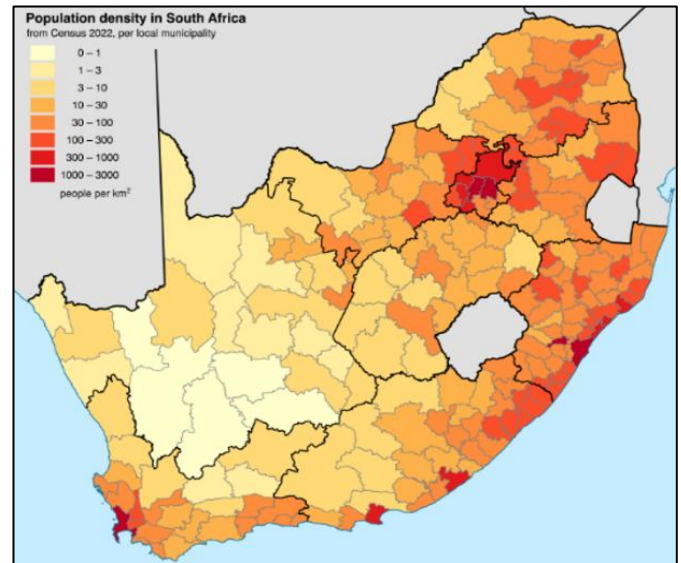


Figure 1. Census 2022 population density

Economy

2. South Africa's economy is diversified, with well-developed service, manufacturing, and financial sectors. However, it remains structurally reliant on mining and primary agriculture, both of which are highly sensitive to climate variability. The agricultural sector, which is a critical source of employment and food security, is vulnerable to changes in rainfall patterns, increased frequency of droughts, and rising temperatures. South Africa is also a water-scarce country, and increasing water stress poses a significant risk to economic development, energy production, and human settlements. The tourism sector, another key contributor to GDP, depends heavily on the country's natural biodiversity and landscapes, which are under threat from climate change. Economic growth averaged around 1% per year between 2009 and 2019, well below comparator upper-middle-income economies, with per-capita incomes declining after 2014 and inequality remaining the highest in the world, as measured by the Gini coefficient⁴. This scenario highlights how South Africa's climate risk profile compounds already severe development constraints⁵.

Gender

3. South Africa has a progressive legal and policy framework for gender equality, anchored by a constitution that explicitly prohibits discrimination based on sex and gender. The state has established a robust national institutional architecture for gender equality, which includes the Ministry for Women, Youth and Persons with Disabilities and the independent Commission for Gender Equality, to advance and protect women's rights. Despite this strong legal foundation, significant gender inequalities persist in practice, particularly impacting women in rural and impoverished communities. Women bear a disproportionate burden of unpaid care and domestic work, such as collecting water and fuel and caring for family members, which curtails their access to formal employment, education, and other economic opportunities. This reality contributes to significant economic disparities, with women having less access to and control over productive assets like land and financial credit compared to men. Gender-based violence (GBV) remains a pervasive and critical challenge across the country, acting as a major barrier to women's safety, well-being, and empowerment. The risks associated with GBV are frequently exacerbated in the aftermath of disasters, which can heighten the vulnerability of women and girls.
4. In the context of climate change and disaster risk, women are recognized as a particularly vulnerable group. This vulnerability stems from their conditions of poverty, their high reliance on climate-sensitive livelihoods such as subsistence agriculture, and their traditionally limited authority in decision-making processes within households and community governance structures. While national strategies on climate change and disaster management increasingly acknowledge these gender-differentiated impacts, the report indicates a persistent gap between policy and practice, specifically in the systematic and adequately resourced implementation of gender-responsive actions at the sub-national and local levels.

¹ Frith, A. (2023). Population density in South Africa. [Online]. Available: <https://docclimate.short.gy/yTRFdY>

² i.e., below the food poverty line.

³ World Bank Group. (2022). Rural population (% of total population) - South Africa. [Online]. Available at: <https://docclimate.short.gy/x0XVRs>

⁴ World Bank Group. (2022). World Bank Country Climate and Development Report: South Africa. [Online]. Available: <https://docclimate.short.gy/9UTSjm>

⁵ Ibid.

Overview of the South African Weather Service

5. The South African Weather Service (SAWS) is a public entity under the Department of Forestry, Fisheries and the Environment (DFFE). As the national meteorological authority, SAWS is mandated to provide a range of public good services, including weather and climate forecasting, the issuing of severe weather warnings to protect life and property, and fulfilling South Africa's international obligations under the World Meteorological Organization (WMO). SAWS is also the official custodian of the National Framework for Climate Services (NFCS).
6. While SAWS possesses a high level of technical expertise, it faces significant challenges in the era of climate change. The foundational 2024 SAWS Rapid Assessment⁶, which informs this project, identified critical gaps in the existing early warning value chain, including aging observation infrastructure, an inability to produce high-resolution, impact-based forecasts, and systemic challenges in ensuring warnings reach the most vulnerable communities in a timely and actionable format. SAWS currently operates a national surface observation network comprising 276 Automatic Weather Stations, 229 Automatic Rainfall Stations, 11 weather radars, 24 lightning detection sensors, and 11 upper-air sounding stations. Despite this installed base, significant coverage gaps persist: the AWS and ARS networks each provide geographic coverage of approximately 60% of the country, while the radar and upper-air networks cover approximately 80%. The Lightning Detection Network achieves the broadest reach at 98% national coverage. To close identified observation gaps and meet WMO minimum network density standards, SAWS requires an additional 60 AWS, 250 ARS, up to 3 weather radars, 1 lightning detection sensor upgrade, and up to 3 upper-air observation systems. These gaps are most acute in data-sparse regions with high exposure to agricultural drought, severe convective storms, and flash flooding, where the absence of real-time observational data limits forecast skill, warning lead times, and the shift to impact-based services that this project is designed to enable.
7. Looking ahead (2025 – 2029), SAWS has developed a national Early Warning for All (EW4ALL) Roadmap to guide the systematic strengthening of early warning systems and climate services across South Africa. The EW4ALL Roadmap provides a coherent, multi-sectoral framework to address identified gaps in the early warning value chain by enhancing communication strategies, upgrading observation and forecasting infrastructure, strengthening institutional and stakeholder collaboration, and supporting meaningful, sustained capacity-building and training with communities. Anchored in international best practice and aligned with national disaster risk management and climate policy frameworks, the Roadmap is structured around four mutually reinforcing pillars aimed at improving resilience through: (i) strengthened disaster and risk knowledge; (ii) improved observations and forecasting capacity; (iii) effective dissemination and communication of warnings; and (iv) enhanced community preparedness to respond⁷.

Climate baseline and future trends

Observed climate trends

8. South Africa is warming at an average rate of 0.2°C per decade⁸, intensifying climate impacts such as extreme heat, drought, sea level rise, and flooding⁹. In recent decades, human-driven climate change has increased the frequency and intensity of heat extremes, while average rainfall has decreased across most regions, except the northwest¹⁰. This warming and drying trend has been accompanied by notable changes in rainfall patterns and an increase in the frequency and intensity of extreme weather events^{11,12}. The western parts of the country have experienced a trend towards drier conditions, while the eastern regions have seen more frequent intense rainfall events. The country has been subject to several multi-year droughts, most notably the 2015-2018 event that led to a severe water crisis in the Western Cape, as well as devastating flood events, such as the 2022 floods in KwaZulu-Natal which caused significant loss of life and damage to infrastructure. Rainfall observations compiled by the World Bank point to weak trends in annual totals but a strong signal of increasing variability. The number of rain days has decreased across most hydrological zones, while intense rainfall events have become more frequent, implying longer dry spells punctuated by heavy downpours¹³. This pattern of “fewer, heavier” rainfall events is associated with higher flash-flood risk, soil erosion and damage to infrastructure and settlements, especially where drainage and stormwater systems are already under strain.

Projected climate trends

9. South Africa's projected temperature and precipitation trends are summarised in Table 1 and Table 2 overleaf for the RCP4.5 and RCP8.5 scenarios in 2030 and 2050, respectively.

⁶ Government of South Africa Department of Planning, Monitoring and Evaluation. (2024). *Frontline Monitoring and Support Programme: South African Weather Service Rapid Assessment*. Unpublished technical report.

⁷ South African Weather Service. (2025). *Early Warnings for All Initiative: Roadmap for South Africa 2025-2029*. [Online]. Available: <https://docclimate.short.gy/o8zJHV>

⁸ Intergovernmental Panel on Climate Change. (2022). *IPCC WGI Interactive Atlas: Regional information*. [Online]. Available: <https://docclimate.short.gy/lvvdJK>

⁹ Johnston, P., Egbeyebi, T.S., Zvobgo, L., Omar, S.A., Cartwright, A., and Hewitson, B. (2024). *Climate change impacts in South Africa – what climate change means for a country and its people*. [Online]. Available: <https://docclimate.short.gy/cOZnHB>

¹⁰ Trisos, C.H., I.O. Adelekan, E. Totin, A. Ayanlade, J. Efitre, A. Gameda, K. Kalaba, C. Lennard, C. Masao, Y. Mgaya, G. Ngaruiya, D. Olago, N.P. Simpson, and S. Zakieldean (2022). *Climate Change 2022 – Africa: Impacts, Adaptation, and Vulnerability. Contribution of Working Group II to the Sixth Assessment Report of the Intergovernmental Panel on Climate Change* [Online]. Available: <https://docclimate.short.gy/wUj4Av>

¹¹ Between 1900 and 2018, the sea level rose in the South Atlantic Ocean by 2.07 mm per year and in the Indian Ocean by 1.33 mm per year.

¹² Johnston, P., Egbeyebi, T.S., Zvobgo, L., Omar, S.A., Cartwright, A., and Hewitson, B. (2024). *Climate change impacts in South Africa – what climate change means for a country and its people*. [Online]. Available: <https://docclimate.short.gy/l1X25D>

¹³ World Bank Group. (2021). *Climate Risk Country Profile: South Africa*. [Online]. Available: <https://docclimate.short.gy/vcH53V>

Table 1. Summary of projected changes in temperature for South Africa in 2030 and 2050¹⁴

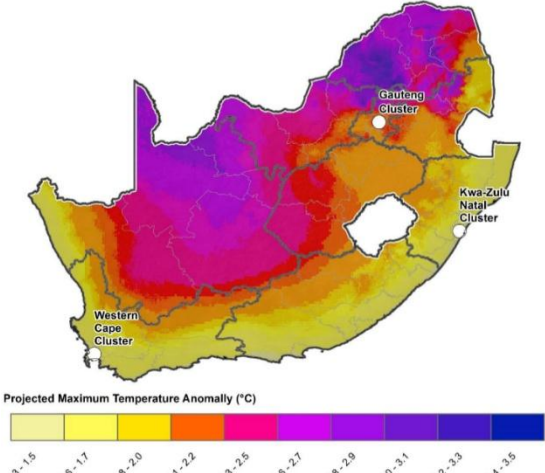
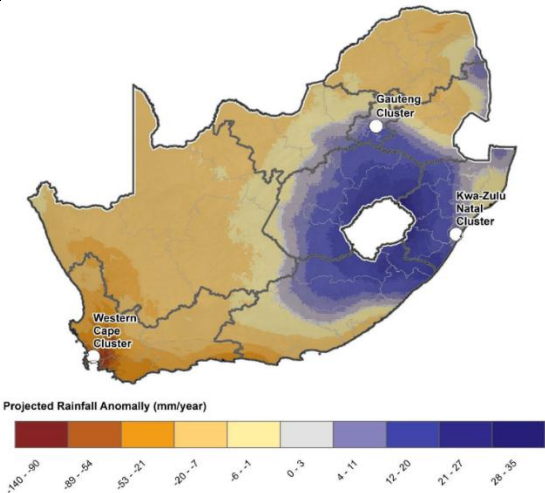
Scenario	Projected changes	Spatial anomaly
Future 2030	For RCP4.5 and RCP8.5, the country's mean annual temperature is expected to rise by +0.98°C to +1.15°C. For all seasons, the interior regions are expected to warm by +1.0 to +2.0°C.	
Future 2050	For RCP4.5 and RCP8.5, the country's mean annual temperature is expected to rise by 1.5°C to 2.05°C. This interior is expected to grow to a greater extent once more. The proximity to the ocean mitigates the increases along the coast.	

Table 2. Summary of projected precipitation in South Africa in 2030 and 2050¹⁵

Scenario	Projected changes	Spatial anomaly
Future 2030	The median ensemble runs for RCP4.5 and 8.5 show an average annual rainfall change of -3.4 percent across the country, but there is a significant difference between this, and the decreases noted of up to 0% and increases of 36.4 percent under RCP4.5. The range under RCP8.5 is -43 percent, -4.4 percent, and +37 percent.	
Future 2050	Precipitation estimates aren't the same all over the country. For mean annual precipitation, RCP4.5 ensembles predict a range of -46 percent, -6.7 percent, and +35 percent. These are -57 percent, -9.9 percent, and +32 percent for RCP8.5. A drying trend in the western parts of the country is expected to continue for the rest of the century, putting the southwest at risk of severe drought. Drought is expected to worsen and become more frequent as a result of reduced precipitation and/or increased evapotranspiration.	

Vulnerability, exposure and adaptive capacity

- South Africa's vulnerability to climate change arises from the interaction of intensifying climate hazards with deep-seated poverty, inequality, and dependence on climate-sensitive sectors¹⁶. The country is highly vulnerable to climate variability and change due to its significant reliance on rain-fed agriculture and natural resources, prevalent poverty, particularly in rural areas, and limited adaptive capacity. Droughts, floods, and wildfires are identified as the three most significant drivers of climate-related disasters. Between 1980 and 2013, droughts affected an estimated 15 million people, while floods impacted over 483,000 individuals and caused extensive damage to infrastructure, housing, productive assets, and ecosystems, with climate-related disasters incurring average annual damages of approximately ZAR 3 billion (~ USD 163 million)¹⁷. These patterns of recurrent, multi-hazard loss reinforce the need for a robust, multi-hazard early warning and climate information system capable of anticipating and reducing risk across diverse regions, sectors, and population groups.
- Climate impacts are unevenly distributed and disproportionately borne by impoverished and marginalised groups¹⁸. Poorer households tend to be more exposed to air, water, and soil pollution, and are more likely to reside in hazard-prone locations, including informal settlements lacking adequate services or protective infrastructure. These households also rely more heavily on climate-sensitive livelihoods, such as rain-fed agriculture and informal urban services, and possess

¹⁴ Ibid.

¹⁵ Adapted from: Ogier, D. (2023). *National Level Current and Projected Climate for South Africa*. [Online]. Available on request from: <https://www.docclimate.co/>

¹⁶ World Bank Group. (2022). *World Bank Country Climate and Development Report: South Africa*. [Online]. Available: <https://docclimate.short.gy/9UTSjM>

¹⁷ World Bank Group. (2021). *Climate Risk Country Profile: South Africa*. [Online]. Available: <https://docclimate.short.gy/vcH53V>

¹⁸ World Bank Group. (2022). *World Bank Country Climate and Development Report: South Africa*. [Online]. Available: <https://docclimate.short.gy/9UTSjM>

limited savings, insurance, or access to credit to absorb shocks¹⁹.

12. These structural vulnerabilities were starkly illustrated by the severe floods of January to March 2026, which affected parts of KwaZulu-Natal, Limpopo and Mpumalanga, following prolonged and intense rainfall linked to a strong La Niña phase. The floods overwhelmed river systems and drainage infrastructure, leading the Government of South Africa to declare a national disaster. Across the three provinces, tens of thousands of people were affected, with dozens of fatalities reported and widespread destruction of housing, roads, bridges, schools and health facilities. Damages were estimated to exceed several billion Rand, with rural communities and informal settlements suffering disproportionate impacts due to settlement in flood-prone areas, weak infrastructure, and limited capacity to respond or recover²⁰. The 2026 floods underscored both the increasing intensity of climate-related hazards and persistent gaps in anticipatory preparedness, last-mile warning dissemination, and coordinated response, reinforcing the urgency of strengthening a nationally coherent, people-centred, multi-hazard early warning and climate information system capable of reaching vulnerable populations before disasters escalate into humanitarian crises.

Early-warning systems and emergency preparedness

13. South Africa has an established emergency preparedness system, where SAWS issues warnings that are disseminated through the National Disaster Management Centre (NDMC) and its provincial and local counterparts. However, the 2024 SAWS Rapid Assessment²¹ revealed critical gaps that limit the effectiveness of this system in the face of escalating climate hazards. The key challenges identified, which form the rationale for this project, include: infrastructural gaps in the weather observation network, particularly radar coverage in vulnerable eastern regions (current radar coverage is approximately 80% nationally, with the AWS and ARS networks each covering approximately 60% of the country, leaving significant data voids in regions most exposed to flash flooding, severe convective storms, and agricultural drought); a "last-mile" communication problem, where warnings do not consistently reach those most at risk in an understandable format; a need to shift from providing purely hazard-based warnings (e.g., "heavy rainfall expected") to impact-based warnings that articulate specific risks (e.g., "high risk of flooding in informal settlements along the uMngeni River"); and a lack of formal mechanisms for integrating local and indigenous knowledge into the warning process or for gathering feedback from communities to improve the system over time. This project is designed to address these specific gaps in a holistic and integrated manner.

Sectoral impacts relevant to early warning and climate services

14. Climate impacts on key sectors underscore the centrality of strengthened climate information and early warning systems as a cross-cutting adaptation measure. In agriculture, only 14% of South Africa's land is arable, and crop and livestock systems are highly sensitive to shifts in rainfall, increased drought frequency, and extreme heat²². Climate change is expected to have generally adverse impacts on cereal production and intensive animal husbandry, with higher temperatures, more variable rainfall, and more frequent dry spells projected to reduce yields, alter the timing of planting seasons, and change the geographic distribution of viable crops²³. Smallholder and subsistence farmers, who are predominantly reliant on rain-fed systems and have limited access to finance and insurance, are identified as particularly vulnerable to climate shocks²⁴. These findings support the project's focus on delivering tailored, impact-based forecasts and seasonal climate information to agricultural users and rural institutions, enabling anticipatory decisions on planting, input use, livestock management and drought preparedness. In the water sector, the Climate and Development Report characterises South Africa as a water-scarce country with mean annual precipitation of about 450 mm and over 98 percent of freshwater resources already allocated²⁵. Climate projections indicate a worsening water scarcity index in key basins, including the Orange, Limpopo, Vaal, Berg and Olifants, driven by rising temperatures, changing rainfall patterns and increasing demand²⁶. At the same time, parts of the country, particularly along the eastern seaboard and in major metropolitan areas, face growing flood risk as intense rainfall events become more frequent. Recent events such as the Western Cape "Day Zero" drought and the 2022 floods in KwaZulu-Natal, which caused damages estimated at over ZAR 17 billion, illustrate the scale of potential impacts on water supply, sanitation, transport and economic activity²⁷. The World Bank explicitly identifies improved climate data, monitoring and early warning as core components of a climate-resilient water strategy, highlighting the need for high-quality hydrometeorological information to support reservoir operation, demand management, flood preparedness and emergency response²⁸. The proposed strengthening of SAWS's observing network, forecasting capability and dissemination systems directly responds to these identified gaps.
15. Urban areas and infrastructure are also highlighted as increasingly climate-sensitive domains that depend on reliable early warning and climate services. Under pessimistic climate and socio-economic scenarios, up to 19% of South Africa's urban population could be exposed to flooding by 2050, with particularly high risks in large metropolitan areas such as

¹⁹ World Bank Group. (2021). *Climate Risk Country Profile: South Africa*. [Online]. Available: <https://docclimate.short.gy/vcH53V>

²⁰ African News Agency. (2026). *Godongwana increases disaster recovery funding for provinces, municipalities*. [Online]. Available: <https://docclimate.short.gy/htOz1K>

²¹ Government of South Africa Department of Planning, Monitoring and Evaluation. (2024). *Frontline Monitoring and Support Programme: South African Weather Service Rapid Assessment*. Unpublished technical report.

²² World Bank Group. (2021). *Climate Risk Country Profile: South Africa*. [Online]. Available: <https://docclimate.short.gy/vcH53V>

²³ *Ibid.*

²⁴ *Ibid.*

²⁵ World Bank Group. (2022). *World Bank Country Climate and Development Report: South Africa*. [Online]. Available: <https://docclimate.short.gy/9UTSjm>

²⁶ *Ibid.*

²⁷ *Ibid.*

²⁸ *Ibid.*

Cape Town, Durban/eThekweni, and the Gauteng City Region²⁹. Climate-resilient urban planning, supported by accurate hazard and climate information, can significantly reduce exposure to flooding and landslides, especially in informal settlements and low-income neighbourhoods³⁰. For the transport sector, more intense rainfall and flooding are already damaging roads, bridges and railways, while higher temperatures are affecting the performance and maintenance needs of transport and energy infrastructure³¹. By enhancing the timeliness, spatial resolution and impact-orientation of weather and climate information, the project will provide critical inputs for municipal disaster management centres, infrastructure operators and service providers to plan, prepare for and respond to extreme events, thereby protecting lives, assets and essential services across sectors.

Target municipalities

Selection rationale

16. The selection of eThekweni, Vhembe, and Waterberg as target municipalities (Figure 2) for the project was undertaken through a structured, multi-criteria assessment that prioritised climate hazard exposure and vulnerability, socioeconomic indicators, weather and climate impacts over the past decade, and institutional readiness for early warning system implementation. This methodology ensures that the project targets districts where enhanced climate services and multi-hazard early warning systems will deliver the greatest adaptation benefits to the most vulnerable communities.

17. The three municipalities exhibit pronounced but distinct climate vulnerabilities. **eThekweni Metropolitan Municipality** in the province of KwaZulu-Natal, encompassing South Africa's fourth-largest urban economy and home to approximately 4 million people, faces increasing temperatures, more intense storms and flooding, prolonged drought periods, and sea level rise. Approximately 800,000 people (22.4% of the population) reside in informal settlements, often on environmentally sensitive land highly exposed to climate hazards. By contrast, **Vhembe District Municipality** in Limpopo province experiences a semi-arid climate with observed increases in mean annual temperature and extreme rainfall frequency, alongside projected decreases in mean annual rainfall and increased agricultural and meteorological drought (high confidence). Far-future projections indicate temperature increases approaching 6.0°C under low mitigation scenarios, with drastic increases over the Limpopo River Valley. Similarly, **Waterberg District Municipality**, also in Limpopo, is characterised by warm semi-arid conditions, and has similarly experienced observed temperature increases and rising frequency of heavy rainfall events, with projected rainfall decreases (high confidence) and intensifying drought conditions (high confidence). Near-future temperature increases may reach 2.0°C, with far-future projections approaching 6.0°C, accompanied by increased heatwaves and fire danger (virtually certain).

18. Socioeconomic vulnerability compounds climate exposure across all three municipalities. eThekweni's unemployment rate stands at 18.7%, with over half the population (approximately 2.1 million people) living below the upper boundary poverty line. A Gini coefficient of 0.62 reflects deep structural inequality, whilst 42.1% of households are female-headed, with 45% of these households experiencing poverty compared to 25% of male-headed households. Poor households are disproportionately vulnerable to climate impacts, lacking adaptive capacity and financial resilience to cope with extreme weather events. In Vhembe and Waterberg, livelihoods remain heavily dependent on climate-sensitive agriculture and natural resources, rendering rural and peri-urban communities particularly exposed to increasing drought frequency, crop failures, and water insecurity. Limited access to timely, actionable climate information further constrains adaptive

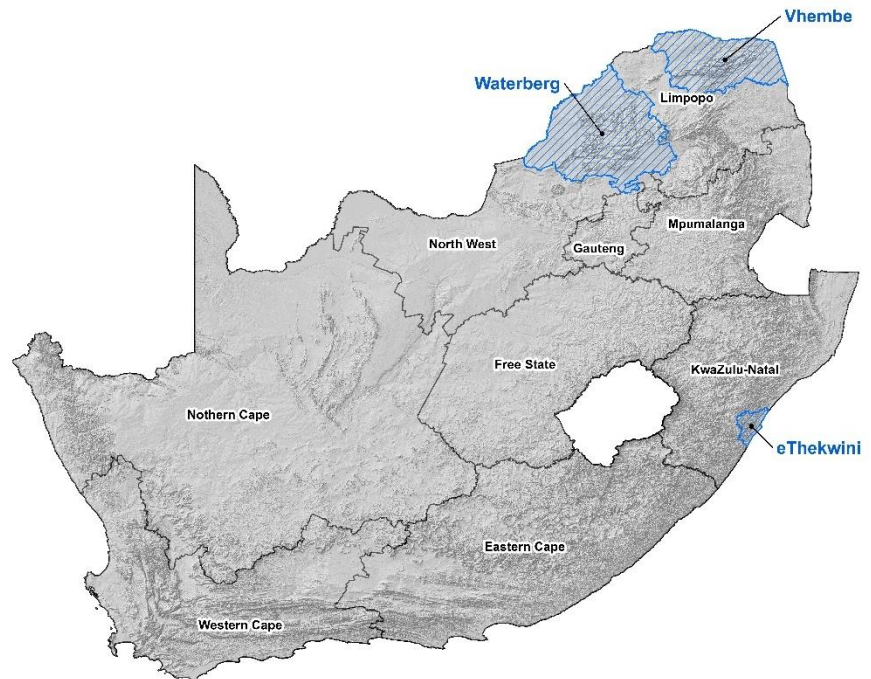


Figure 2. Location of target municipalities in South Africa

²⁹ World Bank Group. (2022). *World Bank Country Climate and Development Report: South Africa*. [Online]. Available: <https://docclimate.short.gy/9UTSjm>

³⁰ Ibid.

³¹ World Bank Group. (2021). *Climate Risk Country Profile: South Africa*. [Online]. Available: <https://docclimate.short.gy/vcH53V>

decision-making across agricultural, water, and disaster management sectors.

19. The selection of these three municipalities directly addresses critical early warning system gaps in contexts where enhanced hydromet services can deliver measurable adaptation outcomes. The convergence of high climate hazard exposure, significant socioeconomic vulnerability, recent climate-related losses, and institutional frameworks supportive of EWS integration positions eThekweni, Vhembe, and Waterberg as strategic intervention sites. eThekweni's advanced climate governance structures provide an enabling environment for EWS mainstreaming into municipal planning and disaster risk reduction. Vhembe and Waterberg's rural and peri-urban profiles, coupled with projected intensification of drought and extreme heat, underscore the urgent need for improved forecast capacity, community-based early warning dissemination, and climate-informed livelihood adaptation. By targeting these municipalities, the project will strengthen end-to-end multi-hazard early warning systems that protect lives, livelihoods, and development gains amongst South Africa's most climate-vulnerable populations, whilst demonstrating scalable models for sub-national EWS implementation aligned with national climate change adaptation frameworks.

Direct and indirect project beneficiaries

20. All beneficiary figures are preliminary CN-stage estimates. Direct-reach percentages, district distribution, and final counts will be confirmed through PFG-funded consultations and presented in the fully-developed proposal (FDP) phase.

Indirect beneficiaries

21. The AEWS project's national forecasting, multi-hazard monitoring and warning-dissemination backbone (Component 1 and 2) is a public-good infrastructure: once upgraded, every resident of South Africa can receive improved warnings. Counting the entire national population (~62 million) as indirect beneficiaries is consistent with approved Adaptation Fund EWS precedent^{32,33}. National EWS investments legitimately claim the whole served population as indirect beneficiaries because the warning system is non-excludable.

Direct beneficiaries

22. Component 3 delivers last-mile, community-level preparedness in selected communities within the three target municipalities. The application of a conservative 5% direct-reach assumption³⁴ to each district's population based on Stats SA's Census 2022 data is tabled below.

Table 3. Breakdown of direct project beneficiaries by province and district

Component 3 district	Total Population (Census 2022)	Direct beneficiaries (5%)
eThekweni Metropolitan Municipality	4,239,901	211,995
Vhembe District Municipality	1,653,077	82,654
Waterberg District Municipality	762,862	38,143
Total	6,655,840	332,792

23. The three districts span very different settlement types: a dense coastal metro, eThekweni, and largely rural, dispersed populations in Limpopo, namely Vhembe and Waterberg. Because a flat percentage cannot adequately capture differences in exposure, vulnerability, connectivity, and last-mile delivery costs across these contexts, stakeholder consultations between the CN and FDP phases will ground-truth and refine both the direct-reach percentage and the district-level distribution. These consultations will also capture urban and rural nuances and confirm household-level targeting.

Project Objectives:

24. To address the risks and challenges described under the background and context section, the proposed project employs an overarching objective, and four specific objectives. The general objective is to strengthen South Africa's institutional capacity for climate-responsive early warning and the climate resilience of vulnerable communities across national, sub-national, and local levels. The four specific objectives address: (1) national institutions' capacity to deliver impact-based warnings; (2) sub-national authorities' capacity to disseminate warnings through standardised protocols; (3) communities' capacity to access and act on warnings; and (4) systematic learning and knowledge management to support adaptive management and replication.

General Objective

25. Strengthen South Africa's institutional capacity for climate-responsive early warning and the climate resilience of vulnerable communities across national, sub-national, and local levels.

Specific Objective 1 (Component 1: National EWS capacity and infrastructure)

³² PACT, Belize (AF, FDP approved 2024) counts 100% of the national population (419,199) as indirect beneficiaries of a national EWS backbone with community last-mile.

³³ CAF, Uruguay – REACC COSTAS (AF, FDP approved 2024) counts the entire exposed coastal-zone population (~520,000) as indirect beneficiaries.

³⁴ The 5% rate reflects households reached through direct community engagement, training and local warning infrastructure during the project period.

26. National institutions deliver timely, impact-based, multi-hazard warnings and climate information services through upgraded observation, forecasting, and data management systems that meet WMO standards.

Specific Objective 2 (Component 2: Sub-national warning dissemination)

27. Provincial and district disaster management centres across all nine provinces receive, interpret, localise, and disseminate impact-based warnings and climate information through standardised protocols aligned with the Climate Change Act.

Specific Objective 3 (Component 3: Community-level preparedness)

28. Climate-vulnerable communities in target districts demonstrate improved risk knowledge, access to actionable warnings, and tested response capability through inclusive, locally owned preparedness mechanisms.

Specific Objective 4 (Learning and Knowledge Management, cross-cutting)

29. Lessons, evidence, and knowledge products generated across all components are systematically captured, shared, and institutionalised to support adaptive management during implementation and replication of effective EWS practices beyond the project period.

Project Components and Financing

30. Table 4 below and overleaf summarises the proposed project's components, outputs, outcomes, and corresponding budget allocation.

Table 4. Overview of project components, expected outcomes, outputs, and budget

Project Components	Expected Concrete Outputs	Expected Concrete Outcomes	Amount (USD)
<u>Component 1</u> Strengthening the technical and infrastructural foundation of the national early warning system	Output 1.1. National observation, forecasting, and data management infrastructure upgraded to WMO standards.	Outcome 1. National institutions generate, quality-assure, and issue timely, impact-based warnings and climate information services through a resilient, multi-hazard EWS.	9,500,000
	Output 1.2. Training and capacity development programme on advanced forecasting and impact-based warning services delivered to SAWS technical staff.		2,500,000
<u>Component 2</u> Enhancing sub-national capacity to receive and disseminate warnings	Output 2.1. Nationwide training programme and standard operating procedures (SOPs) for warning reception, localisation, and dissemination delivered to all 44 district disaster management centres.	Outcome 2. Provincial and district disaster management centres across all nine provinces and 44 district municipalities receive, interpret, localise, and disseminate impact-based warnings and climate information through standardised protocols aligned with the Climate Change Act.	4,000,000
	Output 2.2. Participatory risk communication strategies and community preparedness tools developed and tested in three target districts.		2,000,000
<u>Component 3</u> Community-level interventions and innovative practices for EWS/CIS/DRR	Output 3.1. Participatory community risk assessments, awareness campaigns, and knowledge resources delivered in target communities.	Outcome 3. Communities at risk demonstrate improved risk knowledge, recognition of warning messages, and tested response capability via inclusive, locally owned mechanisms.	900,000
	Output 3.2. Last-mile warning dissemination assets and community-based alert systems installed and operationalised in target communities.		1,900,000

Project Components	Expected Concrete Outputs	Expected Concrete Outcomes	Amount (USD)
<u>Cross-cutting</u>	Output 4.1: M&E and adaptive management framework.	Outcome 4. Lessons, evidence, and knowledge products generated across all components are systematically captured, shared, and institutionalised to support adaptive management during implementation and replication of effective EWS practices beyond the project period.	Cross-cutting (budget distributed across outcomes 1-3)
	Output 4.2: Knowledge products.		
6. Project/Programme Execution cost			2,183,425
7. Total Project/Programme Cost			22,983,425
8. Project/Programme Cycle Management Fee charged by the Implementing Entity			1,953,591
Amount of Financing Requested			24,937,016

Projected Calendar

31. The proposed project will be implemented over five years between 2028 and 2033. Key milestones are defined below in Table 5.

Table 5. Projected project calendar

Milestones	Expected dates
Start of Project Implementation	June 2028
Mid-term Review (if planned)	November 2030
Project/Programme Closing	June 2033
Terminal Evaluation	September 2033

PART II: PROJECT/PROGRAMME JUSTIFICATION

A. Describe the project/programme components, particularly focusing on the concrete adaptation activities of the project, and how these activities contribute to climate resilience. For the case of a programme, show how the combination of individual projects will contribute to the overall increase in resilience.

Theory of Change

32. The Advancing EWS project addresses the central adaptation challenge of fragmented, under-resourced early warning systems in South Africa, where warnings generated at national level do not consistently reach vulnerable communities in timely, understandable, and actionable formats. Despite progressive national policy frameworks, institutional and community capacity to anticipate and respond to climate extremes remains inadequate, leaving populations exposed to avoidable disaster losses.
33. The project employs a three-tier intervention logic aligned with the early warning value-chain to address critical gaps identified in the 2024 SAWS Rapid Assessment. **Component 1** establishes the national technical and observational backbone by upgrading infrastructure and building SAWS operational capacity to generate impact-based, multi-hazard warnings aligned with WMO standards (Outcome 1: national institutions reliably generate, quality-assure, and issue timely warnings). **Component 2** builds systematic capacity across all 44 district municipalities to receive, interpret, localise, and disseminate national warnings through standardised protocols and institutional strengthening aligned with the Climate Change Act (Outcome 2: sub-national authorities disseminate warnings through tested channels that enable timely protective action). **Component 3** delivers intensive, people-centred preparedness in three targeted high-risk districts (eThekweni, Vhembe, and Waterberg), ensuring communities vulnerable to climate change can access, understand, trust, and act upon early warnings through inclusive, locally owned mechanisms that integrate indigenous and scientific knowledge systems (Outcome 3: communities at risk demonstrate improved risk knowledge, warning recognition, and tested response capability). **Cross-cutting** learning and knowledge management activities (Strategic Objective 4) ensure that lessons are captured, practices refined, and knowledge institutionalised for adaptive management and post-project replication across South Africa and the wider SADC region. The project's three-component structure addresses the complete early warning value chain while avoiding duplication. Component 1 provides national-level technical infrastructure; Component 2 institutionalizes EWS capacity at provincial and district governance levels; Component 3 ensures community preparedness and response. Each component requires distinct expertise (meteorological/technical, institutional governance, community development) and follows different implementation modalities (procurement, capacity building, participatory engagement). The architecture ensures complementarity: improved forecasts from Component 1 are institutionalized through Component 2 systems and operationalized via Component 3 community mechanisms. Together, these mutually reinforcing components create a coherent, nationally scaled EWS/CIS system capable of anticipating and reducing climate-driven disaster losses while supporting long-term climate-resilient development pathways.
34. **Key assumptions include:** (i) National and provincial government commitment to EWS investment is sustained; (ii) SAWS retains and absorbs trained staff; (iii) district municipalities allocate operational resources for warning dissemination beyond project support; (iv) communities maintain ownership of local warning mechanisms; and (v) climate variability does not exceed design parameters of upgraded infrastructure.
35. **Key risks include:** (i) Staff turnover in trained institutions; (ii) fiscal constraints limiting government co-investment in maintenance; (iii) extreme events during early implementation before systems are fully operational; and (iv) political transitions disrupting institutional continuity. Mitigation measures for these risks are detailed in Part II.K (Environmental and Social Safeguards). The project's theory of change is shown graphically in Annex 2.

Alignment with Adaptation Fund Strategic Outcomes

36. The A-EWS project directly supports five of the eight Adaptation Fund Strategic Outcomes (revised Strategic Results Framework, December 2025):
- **Strategic Outcome 1 (Reduced exposure to climate-related hazards and threats):** Components 1 and 2 reduce exposure of communities and infrastructure in target municipalities through enhanced observation infrastructure and dissemination systems that generate timely warnings for floods, droughts, storms, and extreme heat. Component 3 ensures warnings reach vulnerable populations through inclusive last-mile alert systems.
 - **Strategic Outcome 2 (Strengthened institutional capacity to reduce risks associated with climate-induced socioeconomic and environmental losses):** Components 1 and 2 strengthen institutional capacity by upgrading SAWS technical capacity for impact-based warnings (Component 1) and building capacity across 44 district disaster management centres to disseminate warnings through institutionalised protocols (Component 2).
 - **Strategic Outcome 3 (Strengthened awareness and ownership of adaptation and climate risk reduction processes at local level):** Component 3 strengthens community awareness and ownership through participatory

risk assessments, awareness campaigns, and community DRM committees that ensure local populations understand climate risks and appropriate response actions.

- **Strategic Outcome 4 (Vulnerable development sectors, infrastructure, and built environment assets strengthened):** Component 1 enhances resilience of South Africa's meteorological infrastructure by upgrading observation networks and data management systems to WMO standards, ensuring continuity of critical early warning services under accelerating climate change.
- **Strategic Outcome 8 (Support for innovative adaptation practices, tools, and technologies):** Component 3 generates innovation by integrating indigenous knowledge into risk communication, piloting last-mile warning technologies (IoT sensors, community alert networks), capturing lessons, and disseminating replicable practices across South Africa and the Southern African Development Community (SADC).

Component 1: National capacity & infrastructure for integrated EWS & CIS (USD 12,000,000)

37. Budget: Output 1.1 (Infrastructure) USD 9,500,000; Output 1.2 (Capacity) USD 2,500,000. This component supports: (i) a national infrastructure gap assessment aligned with WMO standards; (ii) targeted observation and forecasting system upgrades (automated weather stations, radar, data management platforms); and (iii) technical training for SAWS staff on impact-based forecasting and system operation. Lead entity: SAWS (Executing Entity) under SANBI (NIE) oversight.
38. Component 1 addresses the foundational climate adaptation challenge of ensuring that South Africa's national meteorological authority can reliably detect, forecast, and communicate climate-driven hazards under conditions of accelerating climate change. This component directly supports Specific Objective 1: ensuring that national institutions deliver timely, impact-based, multi-hazard warnings and climate information services through upgraded observation, forecasting, and data management systems. The component responds directly to observed climate trends by upgrading the physical and institutional capacity required to translate raw meteorological observations into actionable, impact-based warnings. All interventions are guided by a systematic, evidence-based gap assessment that links infrastructure deployment to current and projected multi-hazard exposure, ensuring that capital investments are climate-informed and strategically targeted to the most critical vulnerabilities.

Outcome 1: National institutions generate, quality-assure, and issue timely, impact-based warnings and climate information services through a climate-resilient, multi-hazard EWS

Output 1.1: National observation, forecasting, and data management infrastructure upgraded to WMO standards

Activity 1.1.1: National infrastructure gap assessment and investment plan

39. This activity ensures infrastructure investments are informed by a robust climate rationale and aligned with South Africa's national multi-hazard risk profile. The assessment overlays existing EWS/CIS observation and dissemination gaps against WMO minimum network density standards, downscaled climate projections, multi-hazard risk maps (floods, severe storms, droughts, heatwaves, coastal hazards), socio-economic vulnerability indicators, and institutional capacity of provincial and district disaster management centres. The baseline draws on the 2024 SAWS Rapid Assessment, SANBI-GCI climate factsheets for all 44 districts, and other authoritative datasets. The current surface observation network coverage is: 60% for AWS and ARS, 80% for radar and upper-air, and 98% for lightning detection. The gap assessment will validate these figures against WMO standards and risk exposure, producing a spatially explicit investment plan identifying priority coverage deficits, placement needs, transmission bottlenecks, and redundancy requirements. The plan includes lifecycle costing, WMO-aligned technical standards for data quality and interoperability, and measures to strengthen local capacity for long-term operation and maintenance. This evidence-based approach ensures that Component 1 improves forecast skill, spatial resolution, and warning lead times for the hazards posing the greatest risks to South Africa's most vulnerable populations.

Activity 1.1.2: Targeted upgrades to core observation and forecasting systems

40. The current national observation baseline, against which all deployment priorities will be assessed, comprises 276 AWS (60% geographic coverage), 229 ARS (60% coverage), 11 radars (80% coverage), 24 LDN sensors (98% coverage), and 11 upper-air stations (80% coverage at 500 km resolution). The following priority investments address the most critical gaps identified within this baseline. The project allocates USD 9.5 million for observation infrastructure, data management, and forecasting capacity enhancements based on Activity 1.1.1 gap assessment findings. The indicative equipment and infrastructure package comprises:
- **Observation Infrastructure (USD 8.0 million / R126.5 million):** 1 S-Band weather radar (USD 4.3 million / R70 million, 250 km range and 1 km resolution, addressing the eastern-region coverage gap); 60 automatic weather stations (USD 1.3 million / R21 million total); 250 automatic rain stations (USD 0.4 million / R6.25 million total, equivalent to approximately USD 1,580 / R25,000 per unit, densifying networks in high-vulnerability districts); 2 upper-air observation systems (USD 982,000 / R16 million, comprising radiosonde systems for atmospheric profiling); lightning detection network expansion (USD 0.19 million / R3 million); installation, integration and commissioning (USD 614,000 / R8.25 million); and contingency (USD 214,000 / R2 million).

- **Data Management and Forecasting (USD 1.5 million / R23.5 million):** Data management system upgrades (USD 0.95m / R15m, real-time ingestion, WMO GBON compliance); forecasting tools and software (USD 0.54m / R8.5m, numerical weather prediction models, impact-based forecasting platforms).

41. The package prioritises observation infrastructure (20-plus-year lifespan) as the foundation for sustainable early warning capacity, addressing critical gaps: radar coverage, automated observation density in flood-prone areas, upper-air data for severe weather forecasting, and interoperable data management meeting WMO standards.

Output 1.2: Training and capacity development programme on advanced forecasting and impact-based warning services delivered to SAWS technical staff

Activity 1.2.1: Advanced climate modelling, impact-based forecasting, and technical training

42. This activity builds the human and institutional capacity required to operationalise the upgraded infrastructure and deliver the shift from hazard-based to impact-based, user-centric early warnings. A comprehensive, modular training programme will be developed and delivered to SAWS technical staff, district and provincial disaster management centre personnel, and relevant sectoral departments (agriculture, water, health, transport), covering:

- **Operation and maintenance of new infrastructure:** Hands-on training for SAWS technical and engineering staff in the installation, calibration, troubleshooting, and preventive maintenance of AWS, radar systems, and data management systems. Training will include manufacturer-led workshops, development of standard operating procedures (SOPs), and certification programmes ensuring that SAWS possesses in-house expertise to sustain infrastructure performance and minimise downtime.
- **Advanced numerical weather prediction and climate modelling:** Training in the configuration, execution, and interpretation of high-resolution NWP models, ensemble forecasting systems, and downscaled regional climate projections. Modules will cover data assimilation techniques, model verification and skill assessment, bias correction methods, and the translation of probabilistic forecast outputs into user-relevant products. Integration of climate change scenarios into operational forecasting workflows will support the development of seamless climate services spanning nowcasting (minutes to hours), short-range forecasting (days), seasonal prediction (months), and long-term climate projections (decades), enabling anticipatory planning across timescales.
- **Impact-based forecasting and risk communication:** Foundational training in translating raw meteorological forecasts (e.g., "50 mm rainfall expected in 6 hours") into impact-based warnings that articulate specific, actionable risks (e.g., "High likelihood of flash flooding in informal settlements along uMngeni River; road closures expected on Route X; evacuate low-lying areas by 14:00"). Training will integrate hazard forecasts with exposure data (settlement locations, critical infrastructure, agricultural zones), vulnerability assessments (poverty, access to services, mobility constraints), and historical loss data to model likely impacts and consequences. Modules will cover the Common Alerting Protocol (CAP) for standardised warning message formatting, risk communication principles tailored to diverse audiences (technical users, media, general public, vulnerable groups), and feedback loops for continuous improvement based on user response and post-event evaluation.
- **Application of artificial intelligence and big data analytics:** Training in the operational use of machine learning and AI techniques for improved pattern recognition in high-dimensional observational datasets, automated quality control, nowcasting of severe convective storms, and downscaling of coarse-resolution climate model outputs. Modules will cover supervised and unsupervised learning methods, neural network architectures for weather prediction, and ethical considerations in algorithmic decision-making. Integration of AI-augmented tools into operational workflows will enhance forecast skill, reduce manual processing time, and enable real-time analysis of non-traditional data sources (social media reports, crowdsourced observations, satellite imagery) to improve situational awareness during rapidly evolving events.

43. All training will adopt a train-the-trainer model, building a cadre of national experts who can deliver ongoing capacity building as staff rotate and technologies evolve. Training materials, SOPs, and e-learning modules will be institutionalised within SAWS and made available to partner institutions, ensuring knowledge transfer is sustained beyond the project period. Gender-responsive training design will ensure equitable participation of women and marginalised groups in technical roles, with scheduling, venue selection, and support services (childcare, accessible facilities) tailored to remove barriers.

Component 2: Subnational impact-based forecasting and climate information in targeted districts USD 6,000,000

44. Budget: Output 2.1 (Training and protocols) USD 4,000,000; Output 2.2 (Risk communication) USD 2,000,000. This component finances: (i) technical training and standard operating procedures for warning dissemination covering all 44 district disaster management centres; and (ii) participatory risk communication strategies and community preparedness tools developed in the three target municipalities (eThekweni, Vhembe, Waterberg). Lead entities: SAWS with NDMC and SALGA coordination; district centres as protocol owners.

45. Component 2 addresses the critical "middle mile" challenge in South Africa's early warning value chain: ensuring that

high-quality national forecasts and warnings generated by SAWS are systematically received, interpreted, localised, and disseminated by the 44 district municipalities responsible for coordinating disaster risk management and emergency response at sub-national level. The component responds to persistent gaps in institutional capacity, standardised protocols, and communication infrastructure that currently prevent national warnings from reaching vulnerable communities in a timely, understandable, and actionable format. By building uniform technical and institutional capacities across all districts, rather than concentrating resources in a few pilot sites, the component creates a resilient, nationally coherent intermediary layer aligned with mandates under the Climate Change Act and the Disaster Management Act, ensuring consistent quality of warning dissemination regardless of district capacity or resource base. This component directly supports Specific Objective 2: ensuring that provincial and district disaster management centres disseminate warnings through standardised, tested protocols that enable timely protective action.

Outcome 2: Provincial and district disaster management centres across all nine provinces and 44 district municipalities receive, interpret, localise, and disseminate impact-based warnings and climate information through standardised protocols aligned with the Climate Change Act

Output 2.1: Nationwide training programme and standard operating procedures (SOPs) for warning reception, localisation, and dissemination delivered to all 44 district disaster management centres

Activity 2.1.1: Nationwide technical training for sub-national disaster management centres

46. This activity delivers systematic, standardised training to disaster management personnel in all 44 district municipalities, ensuring every district functions as an effective link in the national EWS/CIS value chain. The training programme, developed with SAWS, the National Disaster Management Centre (NDMC), and provincial disaster management centres, will be delivered through a cascading train-the-trainer model combining in-person workshops, online modules, and ongoing mentoring. Core training modules cover: 1) **Receiving and interpreting national forecasts and warnings:** Accessing SAWS forecast products, understanding probabilistic and ensemble outputs, interpreting meteorological terminology, and recognising warning level implications for local decision-making, with practical exercises using historical scenarios and real-time case studies; 2) **Localising impact-based warnings:** Translating national hazard forecasts into localised impact assessments by integrating forecast information with district-specific exposure and vulnerability data (SANBI-GCI factsheets, settlement maps, historical loss databases), using spatial analysis techniques and rapid impact assessment methodologies; 3) **Packaging and communicating warnings to local stakeholders:** Risk communication principles, message design for diverse audiences, multi-channel dissemination strategies, plain-language writing, visual communication, social media platforms, partnership protocols with community radio and local media, and accessibility standards for persons with disabilities, non-native speakers, and low-literacy populations; 4) **Developing and institutionalising local dissemination protocols:** Co-developing district-specific standard operating procedures defining roles, communication hierarchies, trigger points, and partnerships, tested through tabletop exercises and simulations; and 5) **Use of digital tools and platforms:** Operating digital early warning platforms including GIS-based decision-support tools, mobile alert applications, and automated dissemination systems, while maintaining non-digital channel redundancy.
47. Training design will be gender-responsive and inclusive, with modules addressing the differentiated early warning needs and communication preferences of women, youth, elderly persons, persons with disabilities, and marginalised communities. Scheduling will accommodate caregiving responsibilities and shift work, venues will be accessible, and training materials will be available in multiple formats (print, digital, audio) and languages. Post-training support will include ongoing mentoring, peer learning networks, refresher courses, and access to an online knowledge hub hosting training materials, SOPs, case studies, and Q&A forums.

Activity 2.1.2: Development and institutionalisation of district-level dissemination protocols

48. Building on the training delivered in Activity 2.1.1, this activity supports each district municipality in co-developing, formalising, testing, and institutionalising locally-tailored early warning dissemination protocols and communication partnerships. The process will be facilitated through participatory workshops convening district disaster management personnel, SAWS regional staff, provincial disaster management coordinators, municipal line departments (health, infrastructure, education), community radio stations, local media, civil society organisations, traditional leaders, and community representatives, particularly those from vulnerable and marginalised groups. District dissemination protocols will be co-produced through a structured process:
 - **Stakeholder mapping and partnership formalisation:** Identification of all relevant actors in the local early warning dissemination chain, assessment of their current roles and capacities, and formalisation of partnerships through memoranda of understanding (MOUs) or service-level agreements. Partnerships will establish clear commitments (e.g., community radio stations agree to broadcast warnings within 30 minutes of receipt; ward councillors commit to relay alerts via SMS and community meetings; faith-based organisations activate call trees to reach elderly and mobility-constrained members).
 - **Communication channel assessment and multi-channel strategy design:** Systematic assessment of communication infrastructure, media reach, mobile network coverage, internet penetration, and non-digital information flows (community notice boards, public address systems, word-of-mouth networks) in each district.

Based on this assessment, districts will design multi-channel dissemination strategies that combine digital (SMS, mobile apps, social media, email), broadcast (radio, television), outdoor (sirens, public address, digital signage), and interpersonal (community messengers, door-to-door alerts) channels to ensure redundancy, inclusivity, and resilience to infrastructure failure during extreme events.

- **Message design and accessibility standards:** Co-development of message templates and communication products tailored to local contexts, languages, literacy levels, and cultural norms. Messages will follow impact-based, action-oriented formats specifying what is happening, where, when, likely impacts, protective actions to take, and sources for further information. Accessibility standards will ensure warnings are available in multiple official and indigenous languages, include visual and audio formats for persons with sensory disabilities, and use simple, jargon-free language comprehensible to populations with limited formal education.
- **Testing and simulation exercises:** Regular testing of dissemination protocols through tabletop exercises, desktop simulations, and field drills involving all partners. Exercises will use realistic forecast scenarios (e.g., 12-hour lead time for severe thunderstorms and flash floods) to test the speed, accuracy, and reach of warning dissemination, identify bottlenecks, and refine procedures. Community participation in drills will build familiarity with warning signals, evacuation routes, and protective actions, transforming abstract protocols into practised, trusted routines.
- **Institutionalisation and continuous improvement:** Formal adoption of dissemination protocols by district councils, integration into municipal disaster management plans and annual performance targets, and allocation of municipal budget lines for ongoing operation and maintenance (e.g., siren testing, radio airtime, staff training). Continuous improvement mechanisms will include post-event debriefs, user feedback surveys, monitoring of warning reach and response rates, and annual protocol reviews incorporating lessons learned and emerging best practices.

Output 2.2: Participatory risk communication strategies and community preparedness tools developed and tested in three target Municipalities (eThekweni, Vhembe, Waterberg).

49. Output 2.2 addresses the “last mile” of the early warning value chain, where official warnings and climate information must be received, understood, trusted, and translated into protective action by exposed communities. Building on Component 1 and Output 2.1, it strengthens community capacity to engage actively in climate resilience rather than remain passive recipients of warnings. Recent disaster experience in South Africa, supported by the 2024 SAWS Rapid Assessment, shows that weak early action is driven less by the absence of warnings than by gaps in comprehension, trust, accessibility, and preparedness, particularly among women, elderly persons, persons with disabilities, low-literacy groups, informal settlement residents, and remote rural communities. This output will address these gaps through practical, gender-responsive training, participatory preparedness exercises, and the formal integration of local and indigenous knowledge into risk communication. It adopts a people-centred and inclusive approach consistent with the Adaptation Fund’s commitment to leave no one behind, while complementing the intensive community-level interventions under Component 3. Progress will be tracked through disaggregated indicators on community members trained, improvements in warning comprehension and response, and risk communication products co-produced with communities.
50. The output will design, test, and institutionalise practical, accessible, and culturally relevant risk communication strategies so that impact-based warnings and climate information products are meaningful and actionable. Strategies will be co-developed with community structures, ward committees, traditional authorities, community-based organisations, faith-based organisations, schools, and local media, and anchored in district dissemination protocols developed under Activity 2.1.2. Through training and repeated drills, communities will build confidence in interpreting and responding to alerts, while the integration of local and scientific knowledge will improve trust, relevance, and alignment with local livelihoods and decision-making. Communication products and approaches will be documented as replicable toolkits and included in the project’s knowledge management repository under Section G to support scaling across other South African districts.

Activity 2.2.1: Integrated community training and preparedness programmes

51. This activity will roll out a structured series of accessible, practical, community-based training and preparedness programmes across the target districts, delivered through trusted local intermediaries and a train-the-trainer model that builds an enduring cadre of community-level early warning champions. Programmes will combine awareness-raising on warning levels and associated risks with repeated, hands-on preparedness exercises, deliberately moving communities from passive awareness to tested, confident action. Building directly on the participatory risk profiles produced under Activity 3.1.1 and the district dissemination protocols formalised under Activity 2.1.2, the programmes will comprise:
- **Understanding warnings and climate information:** accessible training in interpreting SAWS impact-based warning levels (advisory, watch, warning), seasonal forecasts, and climate information products, including what each warning means for local livelihoods, settlements, and infrastructure, and the specific protective actions that should follow each alert.

- **Preparedness drills and simulation exercises:** regular, scenario-based drills and full-scale simulation exercises conducted in high-risk areas, allowing communities to practise the complete response pathway, from receiving an alert, through household and community decision-making, to executing safe evacuation and shelter procedures, with structured debriefs that feed lessons back into district protocols and the project learning cycle.
- **Community-based operation and maintenance of local EWS components:** practical training enabling community members to undertake basic installation, operation, and routine maintenance of local early warning assets (e.g. rain gauges, river-level markers, sirens, notice boards, and community radio equipment), fostering local ownership, rapid fault detection, and the long-term sustainability of last-mile infrastructure established under Component 3.
- **Anticipatory and adaptive action planning:** guided support for households and community groups to translate warnings and seasonal outlooks into pre-agreed anticipatory actions (e.g. protecting assets and livestock, safeguarding water and food supplies, adjusting planting and harvesting decisions), strengthening the link between early warning and longer-term adaptation planning.
- **Community early warning networks and volunteer structures:** establishment or strengthening of volunteer early warning committees and focal points, with clearly defined roles, communication trees, and links to ward committees and district disaster management centres, ensuring warnings reach the household level even where digital connectivity is limited.

52. Programme design will be explicitly gender-responsive and inclusive: scheduling, venues, and delivery methods will accommodate the time burdens, mobility constraints, and communication preferences of women, youth, the elderly, persons with disabilities, and residents of remote or informal settlements, and materials will be provided in relevant local languages and in multiple formats (print, audio, visual, and digital). Women and marginalised groups will be deliberately recruited as trainers and committee members to build representative, credible structures. The number of participants trained will be tracked and disaggregated by sex, age, and disability; comprehension and response improvements will be measured through pre- and post-training assessments and drill performance; and all training curricula and preparedness materials will be packaged as open, replicable toolkits to enable cost-effective scaling beyond the target districts.

Activity 2.2.2: Integration of local and scientific knowledge for enhanced risk communication

53. Recognising that trust and cultural relevance are decisive determinants of whether warnings are heeded, this activity will establish durable, formal mechanisms to blend local and indigenous knowledge with scientific climate information in a genuinely two-way exchange. The 2024 SAWS Rapid Assessment documented the continued use of indigenous indicators for weather and seasonal prediction across many communities; rather than treating such knowledge as anecdotal, this activity will systematically value, document, and, where validated, integrate it into official risk communication, while feeding scientific forecasts back to communities in forms that resonate with local understanding. Activities will include:

- **Knowledge co-production workshops:** structured, recurring participatory workshops convening community elders, indigenous knowledge holders, women's and youth groups, local experts, ward committees, district disaster managers, and SAWS forecasters to jointly interpret hazards and co-develop warning messages and communication strategies that are scientifically sound and locally credible.
- **Documentation and ethical safeguarding of indigenous knowledge:** respectful documentation of local indicators, coping strategies, and historical hazard knowledge, with prior informed consent and protocols protecting communities' intellectual and cultural rights in line with the Adaptation Fund Environmental and Social Policy.
- **Validation and blending with scientific forecasts:** collaborative assessment of local indicators against the meteorological and climate record to identify reliable signals that can complement scientific products, improving both the accuracy and the acceptance of warnings.
- **Co-designed, culturally resonant messaging:** development of warning messages, visual aids, and audio content in relevant local languages that combine scientific information with locally meaningful reference points, metaphors, and channels, and that are explicitly tailored to the needs of low-literacy audiences and persons with disabilities.
- **Feedback and continuous improvement loops:** establishment of routine community feedback mechanisms, including post-event reviews and drill debriefs, so that the effectiveness and trustworthiness of messages are continuously evaluated and refined, with findings informing district protocols (Activity 2.1.2) and the project learning cycle (Section G).

Component 3: Community-level interventions and innovative practices for EWS/CIS/DRR (USD 2,800,000)

54. Budget: Output 3.1 (Awareness and knowledge) USD 900,000; Output 3.2 (Last-mile dissemination) USD 1,900,000. Component 3 supports: (i) participatory community risk assessments, awareness campaigns, and knowledge resources; and (ii) last-mile warning dissemination assets, community alert systems, and disaster response plans including limited IoT sensor pilot. Lead entities: SAWS with municipal disaster management structures and community DRM committees; SANBI oversight.
55. Component 3 delivers intensive, people-centred early warning and preparedness interventions in three high-risk district municipalities, addressing the critical "last mile" challenge of ensuring that vulnerable communities, particularly women, children, the elderly, persons with disabilities, and low-income households in informal settlements and rural areas, can access, understand, trust, and act upon early warnings in time to protect lives and livelihoods. This component directly supports Specific Objective 3: ensuring that climate-vulnerable communities in target municipalities demonstrate improved risk knowledge, access to actionable warnings, and tested response capability through inclusive, locally owned preparedness mechanisms.

Outcome 3: Communities at risk demonstrate improved risk knowledge, recognition of warning messages, and tested response capability via inclusive, locally owned mechanisms

Output 3.1: Participatory community risk assessments, awareness campaigns, and knowledge resources delivered in target communities

Activity 3.1.1: Participatory risk profiling, mapping, and community needs assessment

56. This foundational activity establishes the evidence base and community engagement framework for all subsequent Component 3 interventions. In each of the three target districts, the project will facilitate community-led participatory risk assessment and mapping processes in selected communities³⁵ that integrate scientific hazard data with local experiential knowledge, historical accounts, and indigenous environmental observations. The process will be co-facilitated by SAWS, district disaster management centres, local NGOs with established community trust, and trained community facilitators, ensuring inclusive participation of women, youth, elderly persons, persons living with disabilities, and marginalised groups. Participatory risk profiling will combine:

- **Scientific hazard and exposure data:** Integration of downscaled climate projections, multi-hazard risk maps (floods, storms, drought, heat), settlement and infrastructure data, and historical disaster loss records to identify communities, assets, and livelihoods at highest risk. Data will be visualised at ward and sub-ward scales using accessible formats (large-format maps, infographics, physical terrain models) that facilitate community interpretation and validation.
- **Local and indigenous knowledge:** Documentation of community observations of environmental change (shifts in rainfall patterns, river behaviour, vegetation phenology, wildlife indicators), historical accounts of past disaster events (timing, severity, impacts, coping strategies), traditional weather forecasting practices, and indigenous early warning indicators (animal behaviour, cloud formations, wind patterns, plant responses). This knowledge will be recorded through facilitated focus group discussions, oral history interviews with elders, participatory timeline exercises, and transect walks, ensuring that women's knowledge, often distinct from men's due to gendered divisions of labour and resource use, is systematically captured.
- **Vulnerability and capacity assessments:** Participatory analysis of community vulnerability factors (poverty, housing quality, access to services, health status, mobility constraints, social cohesion) and existing adaptive capacities (local institutions, social networks, livelihood diversification, traditional coping mechanisms, access to external support). Assessments will disaggregate vulnerability by gender, age, disability, and socio-economic status, revealing differential exposure, sensitivity, and adaptive capacity within communities and informing targeted interventions.
- **Co-Production of risk maps and profiles:** Community-led production of risk maps identifying hazard-prone areas (floodplains, steep slopes, coastal zones), critical infrastructure (schools, clinics, water points, evacuation routes), vulnerable households and groups, safe zones and evacuation destinations, and local early warning indicators and communication nodes. Maps will be ground-truthed through community transect walks, validated in community plenary sessions, and formally adopted as the basis for local disaster risk reduction planning. Digital and physical copies will be maintained by ward committees, disaster management centres, and community organisations, ensuring widespread ownership and use.

Activity 3.1.2: Tailored public awareness and education

57. Building on the co-produced risk profiles, this activity develops and delivers targeted public awareness and education campaigns designed to enhance community understanding of local climate and weather hazards, interpretation of early warning signals, and knowledge of appropriate protective actions. Campaigns will be delivered through multiple, mutually reinforcing channels to ensure inclusive reach across literacy levels, age groups, languages, and communication

³⁵ This activity will not be implemented in the entire target district, but rather in selected communities. Communities within the target districts will be selected based on a multi-criteria analysis. The methodology for this analysis will combine secondary (desktop) sources and primary data from community consultations and will be further developed during the PFG and FDP phases.

preferences.

58. Campaign components will include: **1) Community workshops and awareness sessions:** Facilitated sessions in accessible community venues (schools, community halls, religious spaces, sports grounds) covering hazard awareness (what floods, storms, droughts, heatwaves are; how they are caused; how climate change is altering their frequency and intensity), interpretation of warning levels and signals (understanding weather alerts, siren codes, radio announcements), protective actions for different hazard scenarios (when to evacuate, how to protect property, where to seek shelter, how to assist vulnerable neighbours), and sources of authoritative information. Sessions will be interactive, using role-plays, scenario exercises, visual aids, and community testimony to enhance engagement and retention. Women-only sessions and youth-focused formats will ensure participation of groups who may be marginalised in mixed-gender or adult-dominated settings; **2) Print and visual materials:** Development of simple, accessible information materials (posters, leaflets, infographics, illustrated flipcharts) in local languages, using plain language, clear visual communication, and culturally resonant imagery. Materials will be co-designed with community representatives to ensure appropriateness and will be widely distributed through ward offices, clinics, schools, shops, community notice boards, and door-to-door distribution. Accessible formats (large print, Braille, audio recordings) will ensure inclusion of persons with visual impairments and limited literacy; **3) Mass media and digital campaigns:** Partnerships with community radio stations, local newspapers, and social media platforms to broadcast awareness messages, interview community members and disaster management officials, and share testimonials from past events. Radio dramas, talk shows, and call-in programmes will engage audiences in accessible, entertaining formats. Social media campaigns (Facebook, WhatsApp, Twitter) will utilise peer-to-peer sharing, video content, and interactive quizzes to reach younger, digitally connected audiences. All media content will be archived and made available for ongoing use by schools, community organisations, and municipalities; **4) School-based education and curriculum integration:** Integration of climate risk, early warning, and disaster preparedness content into primary and secondary school curricula, teacher training programmes, and extracurricular activities. School-based education builds long-term risk literacy, empowers children as agents of household and community preparedness, and reaches parents through take-home materials and family engagement activities. Child-friendly formats (games, songs, storytelling, art competitions) will make learning engaging and age-appropriate. Schools will serve as community hubs for preparedness, hosting drills, awareness events, and information displays accessible to broader community; and **5) Community theatre and participatory arts:** Use of culturally resonant communication forms, drama, song, dance, storytelling, visual arts, to convey early warning messages, model protective behaviours, and stimulate community dialogue. Participatory theatre, where community members co-create and perform scenarios based on local risk contexts, combines awareness-raising with community empowerment, collective problem-solving, and social cohesion-building. Performances will be recorded and shared across communities, amplifying reach and impact.

Output 3.2: Last-mile warning dissemination assets and community-based alert systems installed and operationalised in target communities

Activity 3.2.1: Community-appropriate multi-channel warning systems

59. To provide tangible, reliable, and inclusive warning dissemination capability in selected communities³⁶ within the three target districts, this activity will support the strategic installation and community-led management of physical early warning assets and pilot innovative monitoring technologies. All investments will be determined through consultative processes with communities, ward committees, and district disaster management centres, ensuring that technologies are appropriate to local contexts, trusted by users, and sustained through local ownership and capacity. Warning dissemination assets will include:

- **Outdoor warning sirens and public address systems:** Installation of strategically sited outdoor warning sirens and public address systems in high-risk, high-population-density areas (informal settlements, low-lying floodplains, coastal zones) identified through the participatory risk mapping process. Sirens will provide rapid, attention-grabbing alerts audible over ambient noise, reaching populations without access to mobile phones, radios, or internet. Siren codes (distinct tones for different hazard types and urgency levels) will be standardised, widely publicised through awareness campaigns, and regularly tested to build familiarity and trust. Public address systems will enable broadcast of voice messages in local languages, providing actionable instructions ("Evacuate to X school immediately"; "Shelter indoors; avoid travel"). Solar-powered, battery-backup designs will ensure functionality during power outages. Community-based siren management committees, trained in operation, testing, and maintenance, will ensure long-term sustainability and local accountability.
- **Digital display screens and information kiosks:** Installation of weather-resistant digital display screens in high-footfall community spaces (transport hubs, markets, clinic waiting areas, community halls) to provide real-time weather information, forecasts, and early warning alerts in visual, text-based formats accessible to hearing-impaired persons and populations with limited radio access. Displays will show current conditions, forecast graphics, warning levels, and protective action guidance, updated automatically via cellular or Wi-Fi connectivity.

³⁶ This activity will not be implemented in the entire target district, but rather in selected communities. Communities within the target districts will be selected based on a multi-criteria analysis. The methodology for this analysis will combine secondary (desktop) sources and primary data from community consultations and will be further developed during the FDP phase.

Solar-powered designs and community-based management protocols will ensure operational sustainability.

- **Community-managed alert networks:** Support for the establishment and formalisation of community-based early warning communication networks employing existing social structures (ward committees, street committees, savings groups, faith-based organisations, traditional leadership structures). Networks will combine digital (WhatsApp groups, SMS call trees) and interpersonal (door-to-door alerts, megaphone announcements, bellringing) dissemination methods to ensure redundancy and inclusivity. Training and small grants will support the development of network protocols, regular testing, and integration with district dissemination systems. Women, youth, and persons with disabilities will be actively recruited and supported as network coordinators and messengers, enhancing inclusivity and utilising diverse community connections.
- **Pilot Internet of Things (IoT) sensor networks:** Deployment of pilot IoT-based environmental sensor networks in high-risk catchments and coastal areas within the three target districts to provide real-time, hyperlocal monitoring of river levels, soil moisture, rainfall intensity, and sea-level fluctuations. Sensors will transmit data via low-power, long-range wireless protocols to cloud-based platforms accessible by SAWS, district disaster management centres, and authorised community users. Data will trigger automated alerts when pre-defined thresholds (e.g., river level approaching flood stage; soil moisture indicating landslide risk; storm surge elevation) are exceeded, providing communities with critical additional lead time for protective action. Sensor installation sites will be co-identified with communities through participatory mapping, and community-based monitors will be trained in basic sensor maintenance, data interpretation, and alert dissemination. Pilot deployments will be rigorously evaluated for technical performance, user acceptance, cost-effectiveness, and scalability, informing potential future expansion.

Activity 3.2.2: Community disaster preparedness and response plans

60. This activity translates risk knowledge and warning dissemination into tested preparedness and response capacity at community level through co-development, institutionalisation, and regular testing of community disaster preparedness and response plans (CDPRPs). CDPRP development follows a structured, participatory process:

- **Plan co-development:** Facilitated workshops convene community members (ensuring participation of women, youth, elderly persons, persons with disabilities, marginalised groups), ward councillors, disaster management officials, and local service providers to co-develop plans based on participatory risk assessments. Plans specify: hazard scenarios and early warning triggers; evacuation routes, assembly points, and accessible shelters; roles and responsibilities; asset protection protocols; communication procedures; and recovery arrangements. Plans are documented in simple, visual formats (annotated maps, flowcharts, role cards) accessible to low-literacy populations and translated into local languages.
- **Vulnerable group-specific provisions:** Plans include safety and inclusion measures co-designed with vulnerable group representatives: buddy systems for mobility-impaired evacuation assistance; designated safe spaces for women and children with GBV prevention; stockpiling of essential medications and assistive devices; childcare arrangements; and culturally appropriate support for elderly persons. Vulnerable group representatives are included in plan governance structures.
- **Formalisation and institutionalisation:** Completed plans are formally adopted by ward committees and integrated into municipal disaster management frameworks. Plans are distributed to households, schools, clinics, and community organisations, with digital versions shared with district centres, SAWS, and emergency services. Annual plan reviews ensure currency.
- **Regular drills and simulation exercises:** Bi-annual community-wide drills using realistic scenarios test the full response chain, involve all community actors, and are evaluated by disaster management officials. Post-drill debriefs identify improvements, informing iterative plan refinement. Drills familiarise communities with protective actions, reduce panic, build confidence, and enable continuous improvement.
- **Community-based disaster risk management committees:** Establishment of community DRM committees responsible for plan maintenance, drill organisation, district liaison, advocacy for risk reduction measures, and coordination of mutual aid. Committees include diverse representation linked to ward governance structures. Training covers DRM principles, leadership, first aid, psychosocial support, and advocacy. Committees receive small grants for equipment, meeting costs, and drill activities.

61. Cumulatively, the three project components create a coherent, end-to-end climate adaptation intervention that addresses the full early warning value chain, from hazard detection and forecasting (Component 1), through institutional translation and dissemination (Component 2), to community uptake and response (Component 3). Each component is necessary but insufficient on its own; their integration and mutual reinforcement generate the systemic resilience gains required to protect South Africa's most climate-vulnerable populations in a context of accelerating change.

B. Describe how the project provides economic, social and environmental benefits, with particular reference to the most vulnerable communities, and vulnerable groups within communities, including gender considerations. Describe how the project will avoid or mitigate negative impacts, in compliance with the Environmental and Social Policy and Gender Policy of the Adaptation Fund.

62. The project generates substantial economic, social, and environmental benefits by reducing climate-driven disaster losses, enhancing anticipatory decision-making, and building inclusive early warning and preparedness systems that prioritise South Africa's most vulnerable communities. Without the project, South Africa's early warning capacity will continue degrading through aging infrastructure, fragmented institutional arrangements, and incomplete last-mile dissemination, resulting in sustained forecast limitations and rising climate-driven disaster losses.

Economic benefits

63. **Component 1** investments in upgraded observation networks and forecasting capacity will improve the accuracy, resolution, and lead time of severe weather warnings. International evidence demonstrates benefit–cost ratios of 4:1 to 10:1 for hydrometeorological infrastructure, driven by avoided damages and reduced emergency costs. The scale of potential losses in South Africa is well illustrated by the 2022 KwaZulu-Natal floods (approximately USD 1 billion in damages) and the 2015-2018 Western Cape drought (losses exceeding USD 300 million). Improved forecasts enable anticipatory actions (such as pre-positioning of supplies, targeted evacuations, infrastructure protection) that prevent or substantially reduce such losses at a fraction of post-disaster costs.

64. Capacity building under **Component 2** across all 44 district disaster management centres enables efficient resource deployment through targeted, proportionate responses rather than reactive crisis-mode operations, reducing overtime costs, emergency procurement premiums, and blanket response expenditure. Advance warnings protect agricultural livelihoods (5% of the national workforce) through adjustments to planting and livestock protection. Smallholder farmers lacking insurance benefit most from freely accessible, actionable climate information. In urban informal economies, advance warnings enable traders to protect stock and reduce income losses. Standardised multi-channel dissemination protocols ensure economic benefits extend systematically across all districts.

65. **Component 3** delivers loss reduction for vulnerable households in three target municipalities (eThekweni, Vhembe, Waterberg) through multi-channel alerts (outdoor sirens, community radio, public address systems) and preparedness planning. Informal settlement residents, whose non-permanent housing is highly susceptible to flood, wind, and fire damage, can secure possessions and evacuate, avoiding replacement costs. For households with marginal savings, preventing even modest losses (~USD 125-300) avoids debt spirals. If interventions avert losses for 10% of approximately 1 million households in target districts, cumulative avoided losses could reach tens of millions of Rand, accruing disproportionately to low-income, female-headed, and elderly-headed households.

Social benefits

66. **Component 1** investments in improved lead times, forecast accuracy, and actionable warnings directly reduce mortality and morbidity. Between 1980 and 2013 floods caused over 400 deaths in South Africa, predominantly in low-income and informal communities. The 2026 floods across KwaZulu-Natal, Limpopo, and Mpumalanga resulted in dozens of fatalities. International evidence from Bangladesh, Cuba, and Mozambique demonstrates mortality reductions of 80–95% following investment in people-centred early warning systems. Even a modest fraction of deaths prevented would generate social value far exceeding the project's costs.

67. Equitable warning access is driven by activities under **Component 2**. Current systems rely on digital channels that assume access to smartphones, cellular coverage, electricity, and digital literacy, excluding households without internet, elderly and disabled persons, informal settlement residents with poor connectivity, and migrants without registered mobile numbers. Components 2 and 3 invest in multi-channel dissemination including outdoor sirens, community radio, public address systems, and interpersonal networks, ensuring the most vulnerable receive warnings with the same reliability as digitally connected populations.

68. Under **Component 3**, the project will implement a participatory, co-production approach that generates social capital and empowerment. Risk mapping, co-development of protocols and preparedness plans, community DRM committees, and regular drills create spaces for dialogue and shared decision-making that build trust between communities and institutions. Women gain platforms to articulate differentiated needs such as warnings timed around school routines and safe evacuation arrangements for dependents. Youth contribute digital skills and mobilisation capacity. Elderly persons and traditional leaders contribute historical knowledge and cultural legitimacy. By integrating diverse capacities, the project builds socially cohesive communities better able to cope with climate shocks.

Environmental benefits

69. **Component 1's** enhanced monitoring of rainfall, river flows, soil moisture, and temperature extremes enables anticipatory management of erosion, sedimentation, pollution wash-off, wildfires, and ecosystem stress. Improved

forecasting supports pre-emptive reservoir management, early activation of pollution controls, pre-positioning of firefighting resources, and temporary closures of sensitive areas, reducing environmental damages at lower cost than reactive remediation. National observation infrastructure generates environmental data accessible to water management, agriculture, conservation, and disaster management sectors.

Equitable distribution of benefits across vulnerable groups

70. The project ensures adaptation benefits equitably reach climate-vulnerable populations: women, youth, elderly persons, persons with disabilities, informal settlement residents, rural smallholders, and marginalised communities facing barriers including lower digital access, literacy constraints, physical accessibility limitations, unpaid care burdens, and exclusion from decision-making. Specifically:
- **Component 1:** Multi-channel warning dissemination (outdoor sirens, community radio, public address systems, digital displays) reaches off-grid communities, persons without mobile devices, and those with sensory disabilities. Forecasting upgrades prioritise high-vulnerability districts.
 - **Component 2:** Training applies gender and disability quotas (minimum 50% women's representation) and accessibility standards (sign language, accessible venues, transport and childcare support, caregiving-sensitive scheduling). Dissemination protocols co-designed with vulnerable groups ensure warnings are translated into local languages, use plain-language and visual formats, and reach persons with disabilities through multi-sensory alerts.
 - **Component 3:** Inclusion mechanisms include documented representation of vulnerable groups in workshops and governance; buddy systems enabling mobility-impaired participation in drills; safe spaces for women and children with GBV prevention; and small grants for diverse community DRM committees.
 - **Implementation:** Active outreach with women facilitators, translated materials adapted for low-literacy and sensory-impaired populations, and accessibility standards for all infrastructure (visual and audio alerts, plain-language formats, wheelchair-accessible routes, gender-sensitive shelters).
71. **Monitoring and Accountability:** Sex-, age-, and disability-disaggregated data tracks warning reach, participation, and protective action rates, informing adaptive management. Equity commitments are embedded in the Gender Action Plan, ESMP, and Grievance Redress Mechanism. The equity approach is informed by the gender assessment (Annex 3a and 3b) and stakeholder consultations (Annex 4a and 4b).

Potential Unintended Negative Consequences and Mitigation

72. Six primary risks with gender-differentiated impacts have been identified:
- **Risk 1 (Exclusion and information inequality):** Digital-only warning dissemination could marginalise rural women, elderly persons, persons with disabilities, and low-income residents. **Mitigation:** Multi-channel dissemination combining digital and non-digital channels (outdoor sirens, community radio, interpersonal networks); co-development with women's groups, elderly persons' associations, and disability networks; disaggregated monitoring with adaptive management.
 - **Risk 2 (Increased care burden for women):** Training and activities scheduled without regard to unpaid care responsibilities could increase women's time poverty. **Mitigation:** Gender-responsive scheduling accommodating care responsibilities, childcare provision, accessible venues, compensation, multiple session formats.
 - **Risk 3 (Reinforcement of gender inequalities):** Warnings channelled through male-dominated structures could bypass women. **Mitigation:** Direct-to-women dissemination strategies, partnerships with women's organisations, women's representation on DRM committees (≥40-50% target).
 - **Risk 4 (Increased GBV exposure):** Evacuation and shelters without GBV safeguards could increase women's and girls' exposure to violence. **Mitigation:** Safe shelter design (adequate lighting, gender-separated facilities, security), GBV service information in warnings, GBV awareness training, survivor-centred Grievance Redress Mechanism.
 - **Risk 5 (Displacement of local knowledge):** Emphasis on technical forecasts could displace indigenous knowledge held by women, elderly persons, and smallholders. **Mitigation:** Knowledge co-production integrating indigenous weather indicators, positioning formal forecasts and indigenous knowledge as complementary.
 - **Risk 6 (Non-beneficiary resentment):** Perceived inequity in Component 3 targeting could reduce social cohesion. **Mitigation:** Transparent targeting criteria, nationwide Component 2 capacity building, Component 3 as demonstration sites with documented lessons for replication.

Compliance with the Environmental and Social Policy and Gender Policy

73. The project is classified as **Category B** (medium risk) under the ESP, with impacts limited, site-specific, reversible, and manageable through standard mitigation. Principal risks and mitigation: occupational health and safety managed through OHS Act compliance, contractor management plans, certified equipment, and safety audits; marginalisation risks mitigated through inclusive design with gender and disability quotas, accessible participation, and disaggregated

monitoring; community health and safety risks from sirens and drills addressed through careful siting, supervised procedures, and public health measures; data protection through privacy-by-design, informed consent, secure storage, and policies prohibiting non-warning use. No involuntary resettlement, Indigenous Peoples impacts, critical habitat degradation, or transboundary impacts are anticipated. A proportionate ESMP will be developed during inception covering site screening, contractor requirements, accessibility standards, noise and waste management, data protection, community safety protocols, and grievance redress. The ESMP will be disclosed in English and local languages, consulted with communities, and integrated into procurement and monitoring. Refer to Part II.K for full details on environmental and social risk.

Grievance Redress Mechanism

74. A multi-tiered, accessible GRM will ensure project-affected persons have clear, safe channels to raise concerns. Multiple entry points (such as telephone, email, webform, post, in-person submission, district centres, community committees, and anonymous suggestion boxes) ensure accessibility regardless of literacy, technology access, or mobility. The GRM is free to use, with explicit no-retaliation policies and confidentiality options for sensitive complaints including those related to gender-based violence or discrimination. Defined timelines ensure accountability: acknowledgement within 5 working days, initial response within 15 working days, and resolution or escalation within 30 working days. Escalation proceeds from community and district level (Tier 1), through the SANBI Project Management Unit and SAWS (Tier 2), to independent review (Tier 3), and ultimately to the AF Grievance Redress Mechanism (Tier 4). The GRM will be gender-sensitive and disability-inclusive, with trained staff, female focal points, and accessible formats including Braille, audio, and sign language. Anonymised grievance data will be compiled quarterly and used for adaptive management, with annual public reporting ensuring transparency. Performance monitoring will be included in Project Steering Committee oversight.

C. Describe or provide an analysis of the cost-effectiveness of the proposed project/programme

75. The project maximises climate resilience gains per dollar invested by strategically allocating resources where marginal improvements yield the greatest reductions in disaster losses. The approach prioritises cost-effective, scalable interventions over capital-intensive structural and technological alternatives, utilises economies of scale through nationwide capacity building, and incorporates lifecycle costing and adaptive management to ensure value for money.

Cost-Effectiveness Relative to Structural Alternatives

76. Early warning systems consistently deliver benefit–cost ratios substantially higher than large-scale structural infrastructure. International evidence from the World Meteorological Organization, World Bank, and Global Facility for Disaster Reduction and Recovery demonstrates ratios of 4:1 to 10:1 or higher, with some exceeding 30:1, reflecting that timely warnings enable low-cost anticipatory actions that prevent or reduce disaster losses at a fraction of post-event response or structural mitigation costs.
77. The project's overall USD 24.9 million investment compares favourably to structural flood protection for a single urban catchment (typically USD 50–200 million) that protects only the specific area where infrastructure is installed. By contrast, the project delivers nationwide improvements indirectly benefiting all 62 million South Africans across all climate-sensitive sectors and hazards. Avoiding losses from even a single major event (for example, the 2022 KwaZulu-Natal floods (USD 1 billion) or the 2015–2018 Western Cape drought (over USD 61 million) would justify the entire investment multiple times over. While structural infrastructure has a finite lifespan (30–50 years) and protects against a specific hazard magnitude, early warning systems provide flexible, adaptive protection that scales with evolving climate risks and benefits multiple hazards.

Cost-Effectiveness Relative to Technological Alternatives

78. Component 1 allocates USD 9.5m (R150 million) to observation infrastructure, data management, and forecasting capacity upgrades following a prioritization strategy that maximizes adaptation impact within the AF envelope. The USD 8.0m (R126.5 million) observation infrastructure investment addresses critical coverage gaps identified through Activity 1.1.1 gap assessment: eastern region radar coverage, automated observation density in flood-prone catchments, and upper-air data for severe weather forecasting. Table 6 below provides an overview of technological alternatives considered for proposed infrastructure under **Component 1** for the project. It compares the selected option with potential alternatives and explains the rationale behind the selected option.

Table 6. Summary of project cost-effectiveness relative to technological alternatives

Infrastructure	Selected option & unit cost	Alternative considered	Why selected options are more cost-effective
Weather radar	S-Band radar ~USD 4.3 million per unit	C-Band radar (lower unit cost)	C-Band offers significantly reduced range and is less effective in heavy precipitation, making it unsuitable for coverage gaps in the eastern and northeastern regions where orographic and convective rainfall intensification demands high resolution and long-range detection capability. C-Band is also highly susceptible to interference which reduces its effectiveness for early warnings. Interferences may generate false alarms affecting the reliability of the system.
Surface observation	Automatic Weather Station (AWS) ~USD 21,500 per station	Manual weather stations (cheaper to procure)	Manual stations require permanent staffing, produce lower temporal resolution data, and cannot provide the continuous automated feeds required for modern NWP systems and impact-based forecasting. AWS measures five parameters which are critical for weather monitoring (temperature, humidity, wind direction and Speed, rainfall, pressure) and the information is relayed every five minutes i.e. real time weather monitoring.
Rainfall monitoring	Automatic Rainfall Station (ARS) ~USD 4,300 per station	Full AWS deployment for rainfall-only gaps	At one-fifth the cost of a full AWS, ARS deployment offers a high return per unit of investment for targeted gap-filling in flood-prone catchments, providing critical ground-truth data for radar calibration, flash flood early warning, and climate trend analysis.
Atmospheric profiling	Upper Air System ~USD 491,000 per complete system	Surface observations alone	Upper air observations are essential for initialising numerical weather prediction models and cannot be substituted by surface observations alone. Two additional systems address critical gaps in the national sounding network identified by SAWS. Weather patterns are influenced from both the surface and upper atmosphere; it is therefore critical to monitor the vertical profile of the atmosphere.
Lightning detection	LDN sensor ~USD 123,000 per sensor	No dedicated lightning network / reliance on radar only	The LDN extends real-time thunderstorm tracking capability, supporting both public safety warnings and aviation weather services at modest incremental cost. LDN system is critical for early warnings as it has the capability to identify and track the types and exact location of the lightning stroke, whether is cloud to ground or cloud to cloud lightning.
Data management	WMO-compliant DMS ~USD 1.5 million	Ad hoc / fragmented data systems	A centralised DMS is essential for ensuring that enhanced observational data is systematically managed, quality-assured, and made accessible for forecasting, climate monitoring, and reporting.

Economies of Scale Through Nationwide Institutional Capacity Building

79. **Component 2** delivers exceptional cost-effectiveness by building standardised capacities across all 44 district municipalities through a single, nationally coordinated programme. Standardised training curricula, materials, and delivery methods represent a one-time fixed cost amortised across all districts. Centralised training-of-trainers creates a national cadre delivering ongoing refresher training at minimal marginal cost. Uniform protocols and decision-support tools enable seamless coordination during multi-district events and facilitate peer learning. Standardisation eliminates bespoke systems and enables bulk procurement. Nationwide coverage ensures all districts receive equivalent support regardless of fiscal capacity, reducing inequalities. The standardised model provides a tested blueprint for scaling to neighbouring SADC countries, amplifying regional returns.

Targeted, Modular Last-Mile Investments Optimise Marginal Returns

80. **Component 3** concentrates intensive investments in three high-risk districts and pilots IoT sensors in approximately eight districts, based on systematic spatial prioritisation. This targeted approach ensures resources are deployed where high exposure, high vulnerability, and weak coverage combine to yield the greatest reduction in expected losses per dollar invested. Intensive interventions provide controlled settings for testing and refining approaches, creating evidence-based models that can be scaled using domestic budgets or future funding. Community dissemination assets and IoT sensors are selected for low capital and operational costs, local maintenance feasibility, and resilience to infrastructure failures. Pilot-scale deployments enable rigorous assessment before scaling, preventing sunk costs in unproven technologies

Lifecycle Costing and Operational Sustainability

81. The project incorporates full lifecycle cost analysis to ensure sustained benefits. The infrastructure investment plan

includes operation, maintenance, and replacement cost projections. Preference for standards-based equipment with local service availability and energy-efficient designs reduces lifecycle costs. Training personnel in installation, calibration, and maintenance builds in-house capacity, reducing dependence on external contractors. Embedding dissemination protocols within existing municipal disaster management centres and linking to legislated mandates ensures functions are resourced through routine government budgets. Community-based management uses volunteer labour and local accountability to sustain functionality at minimal recurrent cost.

Sustainability as a Cost-Effectiveness Mechanism

82. Cost-effectiveness is assessed across the post-funding horizon to avoid asset decay, skill loss, and institutional reversion. The project integrates four sustainability dimensions:

- **Financial sustainability:** Component 1 procurement favours standards-compliant, energy-efficient equipment with local service availability, lowering lifecycle costs. Assets are sited at existing facilities, reducing civil works costs. Operation and maintenance provisions are built into design, so AF capital investment does not create unfunded obligations at project close. Upgraded systems integrate into SAWS core operational budgets, absorbing recurrent costs into existing institutional platforms. Prioritising observation infrastructure (20-plus-year lifespans) ensures AF resources finance enduring assets that domestic budgets can maintain.
- **Institutional sustainability:** Training uses master-trainer and train-the-trainer models, so skills outlast staff rotations. Curricula and standard operating procedures integrate into SAWS and NDMC training calendars with periodic refreshers. District protocols are designed for formal adoption by councils and integration into municipal disaster management plans and performance targets, locking in institutional ownership beyond the project period.
- **Environmental sustainability:** Equipment siting and operation follow the Environmental and Social Management Plan and national regulations. Enhanced environmental monitoring supports anticipatory management of secondary climate impacts, extending environmental returns and reducing maladaptation risk.
- **Adaptive management:** Mid-term review, annual evaluations, and post-event debriefs enable real-time reallocation toward highest-performing interventions. If monitoring reveals under-used assets or uneven benefits, corrective actions are triggered within the existing budget envelope, protecting AF investment value over the full operational period.

Quantitative Cost-Effectiveness Estimation

83. While a comprehensive cost–benefit analysis will be undertaken during the fully-developed proposal phase, preliminary estimates suggest substantial positive returns. Using conservative assumptions, if the project prevents losses equivalent to just 5% of a single major event comparable to the 2022 KwaZulu-Natal floods (avoiding USD 50 million over the operational and legacy period), the benefit–cost ratio would be approximately 2:1. If the project achieves a more realistic 20–30% reduction in expected annual climate-related disaster losses, cumulative avoided losses over 15 years could reach USD 200–500 million, yielding ratios of 8:1 to 20:1. Additional non-monetised benefits (i.e., lives saved, injuries prevented, maintained essential services, enhanced gender equity, strengthened social cohesion, environmental protection) would further increase the societal return. These preliminary estimates align with international evidence and are considered conservative given the project's national scale, multi-hazard focus, and integration of technological innovation with institutional and community capacity building. The fully developed proposal will present a detailed cost–benefit analysis incorporating local data on hazard frequency, exposure distributions, historical losses, and discount rates.

84. In sum, the project optimises cost-effectiveness by prioritising early warning and institutional capacity over capital-intensive structural works; capturing economies of scale through nationwide standardised training and protocols; targeting intensive last-mile investments where marginal benefits are greatest; incorporating full lifecycle costing and sustainability planning; and enabling adaptive management.

D. Describe how the project/programme is consistent with national or sub-national sustainable development strategies, including, where appropriate, national adaptation plan (NAP), national or sub-national development plans, poverty reduction strategies, national communications, or national adaptation programs of action, or other relevant instruments, where they exist.

85. The project aligns with South Africa's policy and legislative agenda across multiple sectors including climate change, development, education, gender, and social inclusion:

- **The National Development Plan (NDP) 2030, Chapter 5:** A-EWS builds disaster risk reduction capacity protecting vulnerable livelihoods, advancing inclusive development through early warning access for informal settlement and rural populations.
- **National Strategic Plan on Gender-Based Violence and Femicide (2020-2030):** Ensures gender equality

through safe evacuation protocols, gender-sensitive grievance mechanisms, and women's participation in DRM committees. Operationalises Commission for Gender Equality mandates.

- **National Youth Policy (2020-2030) and National Skills Development Strategy:** Component 2 training creates employment pathways in disaster management and meteorological services, supporting National Youth Policy (2020-2030) and National Skills Development Strategy through master-trainer capacity retention.
- **Department of Basic Education Safe Schools Programme:** Aligns with the Safe Schools Programme through Component 3 climate risk awareness activities, school-focused early warning protocols, and disaster preparedness drills building climate literacy among learners and educators.
- **White Paper on the Rights of Persons with Disabilities (2015) and CRPD Obligations:** Implements White Paper on the Rights of Persons with Disabilities (2015) and CRPD obligations through multi-sensory alerts, accessible participation, and disability-disaggregated M&E.
- **Spatial Planning and Land Use Management Act (SPLUMA):** Embeds climate risk information into municipal planning under SPLUMA, supporting climate-responsive spatial development.
- **South Africa's National Climate Change Adaptation Strategy (NCCAS):** The project is a direct implementation of several strategic interventions outlined in the NCCAS. It specifically addresses Strategic Objective 1 ("Reduce human vulnerability to the impacts of climate change") and Strategic Objective 3 ("Climate information, decision-support, and planning"), by strengthening early warning systems, producing tailored, impact-based climate information, and building adaptive capacity at the sub-national and community levels.
- **South Africa's Second Nationally Determined Contribution (NDC):** The project strongly supports the adaptation component of South Africa's updated NDC. It directly addresses the stated need for "strengthening the climate information and early warning systems" as a critical enabling condition for all other adaptation efforts in the country, thereby enhancing South Africa's ability to meet its commitments under the Paris Agreement.
- **The Climate Change Act:** The project strengthens the technical and evidentiary foundation required for the effective implementation of the Climate Change Act. The enhanced climate data, projections, and impact-based forecasts generated by the project will directly support the climate change response planning and risk assessments mandated by the Act for provincial and municipal governments.
- **The Disaster Management Act (57 of 2002) and National Disaster Management Framework:** This project operationalizes the preventative and risk-reduction principles central to the Disaster Management Act. By improving the lead time and accuracy of warnings and building community preparedness, the project helps to shift the national paradigm from costly, reactive disaster response to proactive, risk-informed preparedness.
- **The National Framework for Climate Services (NFCS):** The project is a targeted intervention to enhance and fully operationalize the NFCS for South Africa, for which SAWS is the primary custodian. The project's end-to-end approach, from data generation (Component 1) to co-production and dissemination with end-users (Component 2), directly implements the NFCS vision of ensuring climate services are user-centric and support decision-making across all sectors of society.
- **South Africa's National Communications to the UNFCCC:** The upgraded observation and data management infrastructure will improve the quality and availability of climate data, enhancing South Africa's ability to monitor and report on climate change impacts and adaptation actions in its future National Communications.

E. Describe how the project/programme meets relevant national technical standards, where applicable, such as standards for environmental assessment, building codes, etc., and complies with the Environmental and Social Policy of the Adaptation Fund.

86. Table 7 below presents the specific standards and legislation applicable to the project, including the responsible public entities and the main compliance steps.

Table 7. Overview of applicable technical standards and legislation

Standard/legislation	Objective	Regulator	Main compliance steps
WMO meteorological observation standards			
Guide to Instruments and Methods of Observation (WMO-No. 8, CIMO Guide); WMO Information System (WIS) technical regulations	To ensure that all meteorological observation instruments, methods, and data exchange protocols meet internationally recognised quality, accuracy, and interoperability standards.	World Meteorological Organization (WMO); South African Weather Service (SAWS) as WMO Member State representative	Specify WMO-compliant technical requirements in all equipment procurement; ensure instruments meet CIMO Guide accuracy and calibration specifications; implement WMO metadata standards; align data exchange with WIS protocols; conduct regular calibration and maintenance per WMO schedules; maintain traceability records.

Standard/legislation	Objective	Regulator	Main compliance steps
Procurement and information technology standards			
South African National Standards (SANS) applicable to ICT and electronic equipment; ISO/IEC standards for information technology; Public Finance Management Act (PFMA), Act 1 of 1999; National Treasury SCM Instructions	To ensure that procurement of hydrometeorological hardware, ICT systems, and related services is fair, transparent, competitive, cost-effective, and aligned with recognised safety, quality, interoperability, and information-management requirements.	South African Bureau of Standards (SABS); National Treasury; SAWS SCM Unit	Identify applicable SANS, ISO/IEC, WMO, and Common Alerting Protocol (CAP) requirements; include standards and technical specifications in bid documents; procure through approved SCM processes in accordance with the PFMA and National Treasury regulations; verify supplier certification and product conformity; test and commission equipment against specifications; maintain records for audit and operational handover.
Environmental assessment standards			
National Environmental Management Act (NEMA), Act 107 of 1998; EIA Regulations (2014, as amended); NEMA Listing Notices 1, 2, and 3	To assess, avoid, minimise, and manage potential environmental impacts before project activities commence, and to ensure that listed activities are authorised and implemented in line with NEMA and the EIA Regulations.	Department of Forestry, Fisheries and the Environment (DFFE); provincial environmental authorities	Screen proposed activities against the NEMA Listing Notices; appoint an independent registered Environmental Assessment Practitioner (EAP) where required; conduct Basic Assessment or full Scoping and EIA as applicable; undertake public participation in accordance with the EIA Regulations; submit assessment reports and an Environmental Management Programme (EMPr) to the competent authority; obtain Environmental Authorisation before implementation; monitor and report compliance with approval conditions throughout implementation.
Construction and building standards			
National Building Regulations and Building Standards Act, Act 103 of 1977; SANS 10400 (Application of the National Building Regulations); applicable electrical (SANS 10142), fire, drainage, and energy-efficiency standards	To ensure that buildings, installations, and associated infrastructure are designed, constructed, and maintained safely, structurally soundly, and in accordance with national building, fire, drainage, energy-efficiency, and occupational requirements.	South African Bureau of Standards (SABS); National Regulator for Compulsory Specifications (NRCS); local municipalities / building control authorities	Apply the National Building Regulations and relevant SANS standards; appoint competent professionals (engineers, architects) where required; submit building plans and technical drawings for municipal approval; obtain building permits before construction; conduct required inspections and quality checks during and after construction; secure completion and occupation approvals; maintain compliance records.
Occupational health and safety standards			
Occupational Health and Safety Act (OHSA), Act 85 of 1993; Construction Regulations (2014)	To protect the health and safety of workers and the public during all project construction, installation, and maintenance activities.	Department of Employment and Labour	Appoint a competent health and safety agent and construction work supervisor where required; prepare and implement a health and safety plan for all construction and installation activities; conduct risk assessments; provide personal protective equipment; ensure compliance with Construction Regulations for all civil works; report incidents as required by OHSA.
Data protection and privacy standards			
Protection of Personal Information Act (POPIA), Act 4 of 2013	To ensure that all personal information collected, processed, or stored during project implementation (including stakeholder consultations, beneficiary data, and community engagement records) is handled in accordance with lawful processing conditions and data subject rights.	Information Regulator (South Africa)	Register with the Information Regulator where required; appoint an Information Officer; ensure lawful basis for processing personal information; implement appropriate technical and organisational security measures; obtain consent where applicable; provide data subjects with access to their information; report data breaches within prescribed timeframes.
Telecommunications and spectrum standards			

Standard/legislation	Objective	Regulator	Main compliance steps
Electronic Communications Act (ECA), Act 36 of 2005; Independent Communications Authority of South Africa Act, Act 13 of 2000; applicable ICASA regulations for radio frequency spectrum	To ensure that all telecommunications equipment, radio frequency transmitters, and IoT sensor networks deployed under the project comply with South African spectrum allocation and equipment type-approval requirements.	Independent Communications Authority of South Africa (ICASA)	Obtain radio frequency spectrum licences for radar systems and other RF-emitting equipment; ensure all telecommunications and IoT equipment is type-approved by ICASA; comply with applicable power output and interference management requirements; register installations as required.

Compliance with Adaptation Fund Policies

87. The project is designed for full compliance with the Adaptation Fund's Environmental and Social Policy (ESP) and Gender Policy (GP). Preliminary environmental and social risk screening has been conducted; the project is expected to be categorised as Category B. A comprehensive Environmental and Social Management Plan (ESMP) will be developed during the FDP stage, outlining procedures for managing identified risks including minor physical disturbances from installations and electronic waste disposal. The ESMP will be informed by a detailed gender assessment and will include a Gender Action Plan ensuring gender-responsive implementation promoting equitable access to benefits and empowering women. A grievance redress mechanism will be established to provide project-affected people with a clear, accessible channel to raise and resolve concerns.

F. Describe if there is duplication of project/programme with other funding sources, if any.

88. Table 8 below provides an overview of the most relevant EWS-related and AF/GCF-funded projects, and highlights potential overlaps and synergies with A-EWS.

Table 8. Summary of project overlaps and synergies

Fund, project title, timeline and specific location	Main project interventions and target population	Implementing entity	Lessons learned and implications for design	Overlaps and synergies with the proposed project
FCDO/WISER Africa: Early Warnings for Southern Africa (EWSA). 2022–2025. Regional (South Africa, Zambia, Mozambique); selected urban areas in SA.	Builds nowcasting capacity using real-time satellite data to provide six-hour impact-based forecasts. Co-produces accessible warnings with disaster agencies, NGOs and communities targeting disadvantaged urban populations. Research-oriented, time-bound.	NCAS and University of Leeds (lead); UK Met Office; SAWS (SA partner).	Nowcasting and impact-based forecasting are most effective when embedded within operational national systems rather than delivered through time-bound research projects. Co-production of warning formats with end-users improves uptake and protective action.	EWSA focuses on nowcasting research for selected urban areas and has ended/is ending. The proposed project institutionalises and scales EWSA methods nationally. Complementarity: EWSA tools, training curricula and pilot outputs are treated as technical baselines. The proposed project will not finance the same nowcasting systems or pilot sites; it will integrate proven methods into operational SAWS systems and extend impact-based practices to provinces, rural and peri-urban areas not covered by EWSA. Joint workplans and shared curricula with WISER partners ensure AF resources consolidate rather than re-pilot.
NIHR (UK): Warning System for Extreme Weather Events, Awareness Technology for Healthcare, Equitable Delivery and Resilience (WEATHER). 2024–2030. KwaZulu-Natal (11 districts).	Develops and evaluates an AI-enabled, low-cost EWS linking extreme weather (floods, heat, rainfall) with disease outbreaks and health-system response. Deploys environmental sensors, integrates SAWS and health data, builds machine-learning models and apps, and conducts economic evaluations.	University of KwaZulu-Natal (lead); SAWS; SA Department of Health; UK academic partners.	Health-sector EWS applications are most effective when built upon a reliable, generic meteorological backbone rather than developing parallel data infrastructure. Sector-specific downstream applications can add substantial value to national multi-hazard systems.	WEATHER operates in KZN developing health-centred EWS applications using SAWS data. Distinct scope: WEATHER is a sector-specific (health) downstream application; the proposed project builds the generic hydrometeorological backbone and multi-sector interfaces. The proposed project will not duplicate WEATHER-funded sensors, data platforms or apps; it strengthens provincial/district disaster management centres, multi-hazard products and broader community EWS assets. The proposed project will scale validated approaches beyond KZN and the NIHR project period.
Government of Flanders: Integrated Climate-driven Multi-Hazard Early Warning System (ICMHEWS). 2021–2024. Three pilot district municipalities: Vhembe (Limpopo Province), Lejweleputswa (Free State Province) and uMgungundlovu (KwaZulu-Natal Province).	Designed, developed and operationalised an integrated, climate-driven multi-hazard early warning system to strengthen anticipation of and response to weather- and climate-related hazards (drought, flooding, lightning, wildfire and heat). Delivered the Severe Weather Information Database (SWID), the ICMHEWS Web Portal, district control rooms, the CCAM seasonal forecasting system and a 2024 Climate Change Atlas. Developed over 30 sector-specific products spanning agriculture, water, health, energy and biodiversity, and installed biometeorological stations carrying human-health and air-quality sensors. Multi-channel dissemination (radio,	South African Weather Service (SAWS) — Executing Entity. Sub-executing partners during 2021–2022: Central University of Technology and University of KwaZulu-Natal.	Pilot-scale EWS implementation generates essential operational lessons but requires national consolidation and sustained resourcing to move from project-based pilots to permanent operational services. Integrating multiple hazard types within a single platform increases efficiency and user trust. Embedding sector-specific applications (including health, through biometeorological and air-quality monitoring) on a common meteorological backbone maximises value and avoids parallel data infrastructure. Long-term	ICMHEWS piloted an integrated multi-hazard EWS in Vhembe (Limpopo), Lejweleputswa (Free State) and uMgungundlovu (KwaZulu-Natal). These sites were used for developing, testing, and refining a model EWS. The proposed project is designed as the national consolidation and scale-up of ICMHEWS. While there is partial geographic overlap in Vhembe DM between ICMHEWS and AEWS Component 3, AF financing will not be directed to assets already funded by ICMHEWS in Vhembe (SWID, Web Portal, district control rooms, biometeorological stations and training); instead it will institutionalise and build upon them, while extending the hydrometeorological backbone to eThekweni and Waterberg, where ICMHEWS did not operate. There is no geographic overlap in Lejweleputswa or uMgungundlovu, which fall outside AEWS Component 3 target areas. Thematically, ICMHEWS demonstrated sector-

Fund, project title, timeline and specific location	Main project interventions and target population	Implementing entity	Lessons learned and implications for design	Overlaps and synergies with the proposed project
	SMS, web and social media) reached over 3 million listeners, and more than 3,000 municipal officials, educators and community members were trained. Final-phase implementation budget of approximately R18 million. Target population: disaster-management structures, schools and communities across the three pilot districts.		sustainability is strengthened when systems migrate to national infrastructure (for example NDMC data platforms) and when institutional coordination, standardised protocols and inclusive community engagement are prioritised from the outset.	specific downstream applications (including climate-driven health and heat-stress monitoring), whereas the proposed project provides the underlying national observation, forecasting and data infrastructure on which such applications depend. All ICMHEWS investments (infrastructure, software, training and district pilots) are treated as baseline. AF funds will support nationwide infrastructure integration, expansion to additional provinces and districts, standardised protocols and training, and long-term operational sustainability.
Green Climate Fund: Scaling up ecosystem-based approaches to managing climate-intensified disaster risks in vulnerable regions of South Africa (Eco-DRR). 2025–2033. uMgungundlovu, Ugu, iLembe, and King Cetshwayo district municipalities (KwaZulu-Natal and Eastern Cape).	Scales ecosystem-based approaches to manage droughts, floods and wildfires. Rehabilitates ecological infrastructure, supports ecosystem-based livelihoods, strengthens district disaster management and people-centred early warning, and develops financial mechanisms. USD 49.51M (GCF grant + co-finance from DFFE and SALGA). Direct beneficiaries: ~5.48 million.	SANBI (Accredited Entity); DFFE and SALGA (Executing Entities).	Ecosystem-based DRR requires a reliable national hydrometeorological backbone to be effective; local early warning capacity must be underpinned by standardised national warning products. SANBI's dual role as NIE for both Eco-DRR and the proposed project enables institutional coordination and avoidance of duplication by design.	Eco-DRR strengthens district disaster management and community EWS in four KZN/EC districts. The proposed project provides the national observation, forecasting and warning infrastructure that feeds into Eco-DRR landscapes. No geographic overlap: Eco-DRR targets uMgungundlovu, Ugu, iLembe, King Cetshwayo; the proposed project targets eThekweni, Vhembe, Waterberg for Component 3. No thematic duplication: Eco-DRR is the ecosystem/DRR intervention; the proposed project builds the hydrometeorological backbone. The proposed project will not finance community hardware, preparedness plans or district capacities already covered by Eco-DRR. Coordination formalised through SANBI joint investment planning and geospatial mapping of intervention sites.
Adaptation Fund: Upscaling and Enhancing the Locally-led Adaptation Small Grants Facility for South Africa – Phase 1. 2027–2032 (implementation May 2027 – December 2032; terminal evaluation January 2033). Four district municipalities: Amathole (Eastern Cape), uThukela (KwaZulu-Natal), Thabo Mofutsanyana (Free State) and Gert Sibande (Mpumalanga). Concept Note under Adaptation Fund review (first submission, 2025).	Devolves decision-making and finance to communities through locally-led adaptation (LLA) small grants. Component 1 strengthens the institutional and technical capacity of local government, grant-eligible institutions and partners to co-create and implement LLA sub-projects (USD 1,087,625). Component 2 funds concrete community-level adaptation sub-projects that strengthen climate-sensitive livelihoods, protect vulnerable infrastructure and maintain ecological assets (USD 2,427,400). Component 3 establishes the framework for a national LLA grant facility (USD 647,628). Amount of financing requested: USD 5,000,000 (plus a Project Formulation Grant of USD 248,568). Direct beneficiaries: approximately 8,000, with millions benefiting indirectly through Component 3. Prioritises women and	South African National Biodiversity Institute (SANBI) – National Implementing Entity. Executing Entities to be confirmed.	Community-level, demand-driven adaptation grants are most effective when beneficiaries can draw on reliable climate information and multi-hazard early warning products, which the SGF itself identifies as informed by the best available science and early warning. A locally-led financing modality reaches vulnerable rural communities that a national hydrometeorological backbone alone cannot serve directly, underscoring the value of pairing demand-driven community finance with a robust national early warning system. SANBI's dual role as NIE for both the SGF and the proposed project enables coordinated planning, shared safeguards and	No geographic overlap: the SGF targets Amathole, uThukela, Thabo Mofutsanyana and Gert Sibande district municipalities, none of which are AEWS Component 3 target areas (eThekweni, Vhembe and Waterberg). Clear scale and thematic difference: the SGF is a community-level small-grants instrument (USD 5M total, sub-projects at community scale, approximately 8,000 direct beneficiaries) delivering demand-driven local adaptation actions, whereas the proposed project provides the national hydrometeorological observation, forecasting and multi-hazard early warning backbone (institutional and infrastructure investment). No functional duplication: the SGF finances local livelihoods, ecological and small-infrastructure sub-projects, while the proposed project will not finance community grants and the SGF will not finance national EWS infrastructure. Strong coordination: both are implemented by SANBI as NIE, allowing shared governance, joint planning and integrated safeguards. Synergy by design: SGF community sub-projects can draw on AEWS climate information and warning products, while AEWS

Fund, project title, timeline and specific location	Main project interventions and target population	Implementing entity	Lessons learned and implications for design	Overlaps and synergies with the proposed project
	women-led organisations.		avoidance of duplication by design.	dissemination channels can reach SGF beneficiaries, ensuring the two AF investments are mutually reinforcing rather than duplicative.
Dutch Ministry of Foreign Affairs / G4AW: Rain for Africa (R4A). 2015–2019. South Africa (national, smallholder farming areas).	Integrated weather and climate data into the AgriCloud platform, app and USSD services to deliver farm-specific advisories to 125,000+ small-scale farmers. Established public-private business model for climate services. Completed.	ARC (lead); SAWS; Dutch partners.	Agricultural climate services are most sustainable when built on robust national data infrastructure rather than standalone platforms. Public-private partnerships can sustain climate services beyond project funding if the underlying data backbone is reliable.	R4A ended in 2019. No duplication risk. R4A/AgriCloud is treated as legacy and proof of concept for sector-specific CIS. The proposed project will not develop new standalone agricultural advisory platforms. It strengthens the underlying observation, forecasting and data systems that feed AgriCloud and similar services, improving data quality, spatial coverage and operational sustainability of the national backbone.
European Commission / Horizon 2020: Transforming Weather Water data into value-added Information services for sustainable Growth in Africa (TWIGA). 2018–2022. Sub-Saharan Africa (regional, including SA).	Enhanced satellite data with low-cost in situ sensors and ~500 weather stations. Developed thirteen operational services (flood early warning, irrigation advice, drought monitoring). Established data platform and business models targeting 12 million users. Completed.	Delft University of Technology (coordinator); SAWS (SA partner); multiple African NMHSS.	Low-cost sensor networks and satellite-derived products can fill critical observation gaps but require integration into national operational systems for long-term sustainability. Prototype services must transition from research environments to operational hosting within NMHSS.	TWIGA ended in 2022. No duplication risk. TWIGA hardware, software and methods are treated as technological baselines. The proposed project channels resources into integrating and upgrading TWIGA sensors within SAWS networks, operational hosting and maintenance of platforms, and national roll-out of proven TWIGA services. The project demonstrates the shift from project-based pilots to nationally owned, fully operational services.

G. If applicable, describe the learning and knowledge management component to capture and disseminate lessons learned.

89. Learning and knowledge management is operationalized through Specific Objective 4, coordinated by the SANBI Project Management Unit and embedded within existing institutional platforms. The following implementation mechanisms characterise the project: **1) SAWS (Component 1):** Quarterly documentation of infrastructure standards, technical specifications, and operational protocols integrated into SAWS operational manuals. Annual technical workshops with provincial services and SADC partners; **2) NDMC (Component 2):** Quarterly knowledge review through District Disaster Management Forums (44 districts, every 3 months) capturing warning dissemination and coordination lessons. Bi-annual national learning events synthesizing cross-district experiences; **3) SALGA (Component 2):** Quarterly peer-learning through existing local government forums. Bi-monthly webinars with all districts. Quarterly provincial and national Environment and Climate Resilience Working Groups refining capacity-building products based on municipal feedback; **4) Community Level (Component 3):** Quarterly community feedback sessions and bi-annual case study documentation through municipal disaster management coordinators and community DRM committees; and **5) SANBI Project Management Unit (Cross-Cutting):** Quarterly learning reports from Executing Entity templates capturing implementation lessons. Annual knowledge syntheses consolidating findings across components.

90. Quarterly review cycles across all platforms enable real-time refinement of training materials, dissemination protocols, community engagement approaches, and institutional coordination mechanisms based on implementation evidence and user feedback. Findings will inform the mid-term review (Year 3) and adaptive management decisions.

Post-Project Knowledge Sustainability:

91. Knowledge products will be institutionalized within permanent platforms: SAWS: Technical standards integrated into operational manuals and training programmes; NDMC: Training curricula and protocols integrated into national training calendar; SALGA: Capacity-building models integrated into ongoing municipal support programmes; and District/Municipal Plans: Warning protocols mainstreamed into Integrated Development Plans and disaster management plans

92. Year 5 deliverables include best-practice policy briefs, technical guidance, case studies, and transferable toolkits disseminated through government repositories and SADC networks. Sustainability will furthermore be ensured through institutional mandates, existing platforms (District Disaster Management Forums, SALGA working groups), version-controlled knowledge products, and SANBI NAFAB coordination.

H. Describe the consultative process, including the list of stakeholders consulted, undertaken during project preparation, with particular reference to vulnerable groups, including gender considerations, in compliance with the Environmental and Social Policy and Gender Policy of the Adaptation Fund.

93. Stakeholder consultation for the A-EWS project has been conducted through a phased approach appropriate to the Concept Note stage of development, with comprehensive community-level consultations planned during full proposal development³⁷.

Phase 1: Rapid Assessment and Institutional Scoping (March to May 2024)

94. Between March and May 2024, SANBI and SAWS conducted a rapid assessment of South Africa's early warning systems landscape, engaging key national and provincial institutions to identify systemic gaps, institutional capacity constraints, and priority infrastructure needs. Consultations targeted entities with statutory mandates for meteorological services, disaster management, and climate adaptation: the South African Weather Service (SAWS), National Disaster Management Centre (NDMC), South African Local Government Association (SALGA), Department of Forestry, Fisheries and the Environment (DFFE), and provincial disaster management centres. These consultations informed the initial project design and component structure.

Phase 2: Project Co-Design Consultations (December 2024 to June 2026)

95. Following initial scoping, SANBI convened a series of co-design workshops and bilateral consultations with implementing partners and municipal stakeholders to refine project components, validate technical specifications, and ensure alignment with national priorities. A total of 144 participants (72 women, 72 men) from 15 consultation events contributed to project design, representing national government departments, SAWS technical divisions, NDMC coordination structures, SALGA municipal support programmes, provincial disaster management centres, district municipalities (eThekweni, Vhembe, Waterberg), academic institutions, and civil society organisations.

Consultation Methods and Participation

³⁷ Refer to Annex 4a and 4b for full details of the project's consultative process.

96. Consultations employed multiple formats to ensure accessibility and substantive engagement: national co-design workshops (3 events, 87 participants), provincial and district workshops (6 events, 28 participants), technical working group sessions (5 events, 12 participants), and bilateral institutional meetings (3 events, 7 participants). Gender-disaggregated participation data were systematically recorded, with women comprising 50% of total participants. Consultations were conducted in English with translation support where requested, and accessibility provisions (venue accessibility, virtual participation options) were provided.

Key Inputs and Influence on Project Design

97. Stakeholder inputs directly shaped project design across all components. Institutional stakeholders emphasised the need for infrastructure redundancy, standardised dissemination protocols across all 44 districts, and systematic capacity retention mechanisms. Municipal representatives highlighted last-mile communication challenges, limited technical capacity for impact-based forecasting interpretation, and the necessity of multi-channel dissemination reaching digitally excluded populations. These inputs informed the Component 2 nationwide institutional capacity-building approach, Component 3 multi-channel public alert systems, and the master-trainer capacity retention model. Detailed consultation outcomes and their translation into project design are documented in Annex 4a (Abridged Stakeholder Engagement Report) and Annex 4b (Full Stakeholder Engagement Report).

Future Consultations (Fully-developed Proposal)

98. At the Concept Note stage, SANBI and project partners strategically focused consultations at institutional and municipal levels to manage expectations and minimise stakeholder fatigue prior to confirmed target community selection. Comprehensive community-level consultations will be undertaken during full proposal development, once target communities within eThekweni, Vhembe, and Waterberg municipalities have been identified through localised climate vulnerability and risk assessments supported by Project Formulation Grant (PFG) resources. Community consultations will employ participatory methodologies ensuring representation of vulnerable groups (women, youth, elderly persons, persons with disabilities, informal settlement residents) and will inform detailed Component 3 activity design, including risk mapping, dissemination channel preferences, and preparedness protocols. All community consultations will be documented with gender- and age-disaggregated participation data and will comply with AF Gender Policy and Environmental and Social Policy requirements.

I. Provide justification for funding requested, focusing on the full cost of adaptation reasoning.

99. The funding requested for this project, sought solely from the AF, is justified based on the full cost of adaptation reasoning, as it covers the implementation of concrete adaptation activities to address the adverse effects of climate change. South Africa faces intensifying climate hazards, including recurrent droughts, flash floods, heatwaves, storm surges and increasing rainfall variability, which are overwhelming legacy early warning arrangements. Current national early warning capacity is characterised by incomplete observation network coverage (AWS 60%, ARS 60%, radar 80% nationally), coverage gaps in high-vulnerability regions, fragmented institutional capacity, and limited last-mile dissemination to vulnerable communities. These infrastructure and capacity constraints limit forecast lead times and reliability, particularly for rapid-onset severe weather events affecting vulnerable populations. Annual disaster losses average ZAR 3 billion nationally, with catastrophic events reaching ZAR 17 billion (2022 KZN floods). The requested funding represents the cost to: (i) upgrade national observation and forecasting infrastructure improve forecast accuracy and lead times; (ii) institutionalise standardised dissemination capacity across all 44 districts; and (iii) implement people-centred preparedness measures protecting ~330,000 direct beneficiaries in target municipalities.

Component 1: National capacity & infrastructure for integrated EWS & CIS

Baseline scenario (without Adaptation Fund resources)

100. The national backbone relies on aging and spatially uneven observation networks and constrained data management systems. It currently comprises 276 AWS and 229 ARS providing only 60 per cent geographic coverage, and 11 radars covering 80 per cent of the country. Current forecast accuracy and lead times are insufficient for effective anticipatory action. Coverage gaps persist in eastern and northeastern regions where climate vulnerability is highest. Without adaptation finance, infrastructure degradation continues, forecast skill improvements stall, single points of failure remain, and cascading risks from compound climate events are inadequately modelled. Domestic allocations fund routine operations and incremental replacements but cannot resource the strategic, climate-risk-driven infrastructure modernisation and redundancy required.

With Adaptation Fund resources

101. Adaptation finance will fund climate resilience measures beyond business-as-usual, including targeted upgrades to observation systems, enhanced data management platforms, and advanced forecasting capacity within SAWS. These investments directly reduce climate-attributable losses by increasing forecast accuracy and extending lead times, enabling effective early action protocols. The upgrades deliver resilience through redundancy, WMO standards-based

interoperability, and lifecycle operation and maintenance provisioning that domestic budgets cannot absorb. Economic analysis demonstrates a benefit-cost ratio of 2:1 to 3:1 through avoided disaster losses. The funding thus meets full-cost reasoning by covering additional investments required solely because climate change increases hazard frequency, intensity and complexity beyond the capacity of existing infrastructure.

Component 2: Subnational impact-based forecasting and climate information in targeted districts

Baseline scenario

102. District municipalities lack standardised protocols, tools and capacities to interpret national forecasts, translate them into local impact statements, and disseminate timely, accessible warnings. Currently, early warning dissemination practice across South Africa's district municipalities varies widely, with no standardised national protocols. The SAWS Rapid Assessment (2024) found that communication is fragmented and inconsistent, with over half of surveyed respondents lacking knowledge of disaster management structures and how to respond to warnings. Reliance on ad hoc channels leads to inconsistent reach, limited trust and poor protective action, especially in vulnerable communities. Without adaptation finance, uneven capacity persists, institutionalisation of impact-based dissemination is delayed, and the national shift to anticipatory action is undermined. The disconnect between improved national forecasts and local action means that forecast improvements fail to translate into reduced losses.

With Adaptation Fund resources

103. Adaptation finance will cover the costs of designing and delivering a national, standardised training programme for all 44 districts; developing and institutionalising localised dissemination protocols; and embedding interoperable, impact-based message formats and decision thresholds aligned with national products. The systematic capacity building creates a durable intermediary layer in the early-warning value chain, enabling anticipatory, lower-cost actions that avert climate-related losses. This nationwide upgrade of disaster communication competencies and standard operating procedures represents adaptation-specific costs that domestic funds do not cover. AF resources therefore finance the additional effort required to ensure climate information translates into protective behaviour consistently across all districts, completing the observation-to-action value chain that isolated infrastructure improvements cannot deliver alone.

Component 3: Community-level interventions and innovative practices for EWS/CIS/DRR

Baseline scenario

104. At community level, warning comprehension is low, channel accessibility is uneven, and preparedness capacity is rarely tested. Physical last-mile dissemination assets are scarce in high-risk localities; community drills and after-action learning are *ad hoc*; and integration of local and indigenous knowledge with scientific warnings is limited. Without adaptation finance, uptake of warnings remains poor in exposed settlements, with continued avoidable injuries, fatalities and livelihood losses during heatwaves, flash floods and storm surges. Improved national forecasts and district capacity deliver limited adaptation benefits if warnings do not reach vulnerable populations in accessible, actionable formats, or if communities lack preparedness to respond effectively.

With Adaptation Fund resources

105. Adaptation finance will support targeted, people-centred measures in three high-risk municipalities reaching ~330,000 direct beneficiaries: participatory risk profiling, tailored awareness materials, regular drills, multi-channel public warning assets (sirens, outdoor audio and digital displays), and piloting of IoT sensors to trigger localised alerts in priority catchments and coastal zones. These are costs directly attributable to climate risk and necessary to convert improved forecasts into timely protective action for vulnerable groups (women, elderly persons, persons with disabilities, informal settlement residents, remote rural communities). They are not covered by routine municipal budgets and would not occur absent the climate change burden. Last-mile investments complete the integrated early warning value chain, ensuring that national infrastructure and institutional capacity translate into measurable reductions in climate-related losses at community level.

Conclusion

106. Across all components, the requested resources (USD 24.94m) cover the full cost of adaptation required to shift from a fragmented, aging system with accuracy and coverage concerns to a resilient, impact-based, end-to-end early warning system achieving WMO-compliant accuracy, 12-24 hour lead times, standardised capacity across all 44 districts, and last-mile preparedness for over 330,000 vulnerable people. The investments are additional to business-as-usual because they: (i) are triggered by climate change-driven increases in hazard frequency, intensity and complexity that exceed baseline infrastructure capacity; (ii) entail strategic modernisation, redundancy and nationwide institutionalisation beyond routine operational and capital expenditure; and (iii) finance last-mile measures that convert warnings into protective action, generating benefit-cost ratios of 2:1 to 3:1. No co-finance is presently available for these adaptation-specific costs, and domestic budgets do not cover the necessary infrastructure and systems transformation. The AF grant therefore finances the adaptation costs that yield material reductions in loss of life, damage to assets and disruption to livelihoods under a changing climate.

J. Describe how the sustainability of the project/programme outcomes has been taken into account when designing the project/programme.

107. The sustainability of the project's outcomes has been a central consideration throughout its design. The project incorporates several integrated strategies across the institutional, social, and financial domains to ensure that the enhanced capacity for climate change adaptation is maintained and continues to evolve after the project funding period concludes. Specific sustainability-related measures include:

- **Institutional anchoring and ownership:** The project is embedded within SAWS' statutory mandate and the disaster management system defined by the Climate Change Act and the Disaster Management Act, ensuring that upgraded forecasting workflows, SOPs and dissemination protocols become standard operational practice. Implementation through SAWS, the National/Provincial Disaster Management Centres and all 44 district municipalities institutionalises roles, embeds accountability, and enables budget line integration for continued use beyond the project period.
- **Capacity building and retention:** Training focuses on operational teams who will run models, maintain systems and issue impact-based products, using a master-trainer approach to sustain skills nationally. Curricula, toolkits and SOPs will be version-controlled and integrated into SAWS and NDMC training calendars, with periodic refresher cycles and after-action reviews to maintain proficiency. Cross-training of staff on critical systems and documented procedures reduces key-person dependency.
- **Lifecycle asset management:** Infrastructure investments are guided by a risk-based gap assessment and include provisions for operations, maintenance, calibration and redundancy. Procurement favours standards-compliant, energy-efficient equipment with local service availability and e-waste take-back, lowering lifecycle costs. Siting at existing public facilities and hardened locations simplifies permissions and upkeep, while district-level protocols assign routine testing and maintenance responsibilities for sirens, outdoor audio systems and displays.
- **Financial viability:** By utilising existing institutional platforms and integrating SOPs into routine mandates, recurrent costs are minimised. Efficiency gains from interoperable data systems and standardised processes reduce duplication and overtime costs. The national training-at-scale model and reusable toolkits reduce future transaction costs for onboarding new personnel. These features support absorption of modest recurrent expenditures within domestic budgets, while creating a credible basis for future co-financing to scale last-mile assets.
- **Policy and planning integration:** Outputs align with and inform guidance under the Climate Change Act and municipal disaster management planning, locking in the transition to impact-based services. District dissemination protocols, community drill guides and impact statement templates are incorporated into municipal by-laws or standing instructions where applicable, supporting continuity despite staff turnover.
- **Knowledge management and continuous improvement:** A structured learning cycle, comprising drill debriefs, event after-action reviews, technical clinics and annual synthesis reports, feeds back into SOPs, toolkits and training content. An accessible repository maintained by SAWS hosts operational guidance, case studies and drill reports, enabling nationwide replication and rapid onboarding of new staff.
- **Social sustainability and accessibility:** Multi-channel dissemination, plain-language products and inclusive drill design improve comprehension and trust among vulnerable groups, strengthening demand for warnings. Community co-design of asset placement and preparedness measures fosters local stewardship, improving upkeep and sustained use of public warning assets. Integration of local and indigenous knowledge into risk communication enhances relevance and long-term uptake.

Scalability and replication

108. The project design facilitates replication and national scaling beyond the three target municipalities. Component 1 infrastructure provides a national service platform accessible to additional districts at decreasing marginal cost, as the observation backbone is already established. Component 2 training curricula and dissemination protocols are standardised templates shared across all 44 districts through SALGA peer-learning networks and national DRM coordination mechanisms. Component 3 demonstration sites generate documented best practices for last-mile dissemination and inclusive warning systems, systematically captured through Knowledge Management (Outcome 4) for replication across South Africa and SADC. The institutional embedding of EWS capacity within SAWS, NDMC, and SANBI permanent mandates, combined with alignment to South Africa's EW4All commitment (universal coverage by 2027), ensures sustained political momentum and coordination capacity for future scaling through diverse funding sources.

K. Provide an overview of the environmental and social impacts and risks

identified as being relevant to the project/programme.

109. The project has been screened against the Adaptation Fund's 15 Environmental and Social Policy principles based on the 2024 SAWS Rapid Assessment, district vulnerability profiles, gender assessment (Annex 3), and stakeholder consultations. The project is classified as **Category B** with limited, site-specific, largely reversible impacts readily mitigated through standard measures. Principal risks relate to: (i) regulatory compliance for equipment siting, spectrum licensing, and data protection; (ii) equitable warning access across language groups, persons with disabilities, and off-grid communities; (iii) privacy and data protection; (iv) gender-differentiated access and safeguarding; (v) contractor labour standards; and (vi) localised environmental disturbance from installations. Risks will be managed through an ESMP, Stakeholder Engagement Plan, accessible multilingual GRM, Gender Action Plan, labour management procedures, and SEA/SH safeguarding protocols. Table 9 below presents the detailed screening results for each of the 15 ESP principles, including the type of potential impact (direct, indirect, cumulative), risk magnitude, risk description, and planned mitigation measures. A full ESMP and associated sub-plans will be developed during the FDP phase, informed by site-specific assessments, community consultations, and the detailed Gender Action Plan.

Table 9. Overview of environmental and social impacts and risks

Checklist of environmental and social principles	No further assessment required for compliance	Potential impacts and risks – further assessment and management required for compliance
1. Compliance with the Law (always applicable)	X	Impact type: Direct. Risk magnitude: Low. Equipment installations may require environmental authorisations under the National Environmental Management Act (NEMA), spectrum licensing from the Independent Communications Authority of South Africa (ICASA), and heritage screening under the National Heritage Resources Act. Collection and dissemination of personal data through alerting platforms may not comply with the Protection of Personal Information Act (POPIA) without consent and data governance frameworks. Mitigation includes: (i) maintaining a legal compliance register and permit matrix covering all installations and operational activities; (ii) securing all required environmental authorisations, spectrum licences, and heritage clearances prior to construction or commissioning; (iii) implementing POPIA-compliant data governance protocols including privacy impact assessments, legitimate-interest bases for emergency alerts, and data minimisation principles; (iv) requiring contractors to comply with occupational health and safety regulations including Construction Regulations under the OHS Act; and (v) including e-waste management clauses in all procurement contracts, aligned with the National Environmental Management: Waste Act.
2. Access and Equity	X	Impact type: Direct and indirect. Risk magnitude: Low to moderate. Early warning products and climate information may not reach all population groups equitably, particularly non-native language speakers, persons with disabilities, persons without mobile phone or internet access, and communities in off-grid or remote settlements. Digital channel dominance may systematically exclude populations without devices or connectivity, deepening inequalities in access to life-saving information. Mitigation includes: (i) mandatory multi-channel dissemination strategy combining digital (SMS, apps), broadcast (community radio, television), outdoor (sirens, public address systems, digital displays), and interpersonal (community messengers, ward committees, faith-based networks) channels ensuring redundancy and reach; (ii) co-designing warning messages with communities tailored to local languages, literacy levels, and cultural norms; (iii) applying accessibility standards ensuring warnings are available in visual, audio, and plain-language formats for persons with sensory or cognitive disabilities; (iv) conducting communication channel assessments in each target district to identify coverage gaps and design targeted outreach for underserved populations; and (v) monitoring warning reach through disaggregated household surveys and adjusting strategies to close identified gaps.
3. Marginalized and Vulnerable Groups	X	Impact type: Direct and indirect. Risk magnitude: Low to moderate. Women, elderly persons, youth, persons with disabilities, and informal settlement residents may be inadvertently excluded from consultations, training, drills, and alert dissemination. Public activities may create safeguarding concerns including sexual exploitation, abuse, and harassment (SEA/SH). Affordability barriers may arise where warning channels imply user costs. Mitigation includes: (i) inclusive Stakeholder

Checklist of environmental and social principles	No further assessment required for compliance	Potential impacts and risks – further assessment and management required for compliance
		Engagement Plan requiring documented representation of vulnerable groups in all activities; (ii) reasonable accommodation for participation including accessible venues, childcare support, transport assistance, sign language interpretation, and scheduling accommodating caregiving responsibilities; (iii) Codes of Conduct and SEA/SH prevention protocols for all project staff, contractors, and facilitators, with mandatory training and survivor-centred referral pathways; (iv) ensuring all public warning channels are zero-cost to end users; and (v) tracking participation and warning reach through sex-, age-, and disability-disaggregated data with adjusted outreach strategies based on monitoring results.
4. <i>Human Rights (always applicable)</i>	X	Impact type: Direct. Risk magnitude: Low. The project advances rights to life, access to information, and participation by strengthening capacity to warn communities of life-threatening climate hazards. However, collection and storage of personal data in alerting databases may infringe privacy if data governance is inadequate, and evacuation protocols could restrict freedom of movement without adequate justification. Mitigation includes: (i) implementing privacy-by-design in alerting and data management systems, aligned with POPIA and international data protection standards; (ii) establishing clear consent frameworks and legitimate-interest bases for emergency data processing; (iii) embedding non-discrimination commitments in all project protocols ensuring warnings and protective actions are provided without distinction based on race, gender, disability, nationality, or socioeconomic status; (iv) designing evacuation protocols that are advisory rather than coercive, with clear communication of rationale, alternatives, and community agency; and (v) making the GRM accessible for rights-related complaints, with escalation pathways to SANBI and the South African HRC.
5. <i>Gender Equality and Women's Empowerment</i>	X	Impact type: Direct and indirect. Risk magnitude: Low to moderate. Women may experience unequal access to early warning channels due to lower mobile phone and internet access, particularly in rural areas. Unpaid care burdens may prevent women from participating in training, drills, and consultations. Public gatherings may expose women and girls to gender-based violence and SEA/SH risks. Patriarchal household decision-making may limit women's capacity to act on warnings. Mitigation includes: (i) implementing a Gender Action Plan with quantified targets for women's participation (minimum 50% representation); (ii) scheduling activities accommodating caregiving responsibilities, with transport, childcare, and stipend support; (iii) deploying women facilitators and trainers; (iv) enforcing SEA/SH prevention protocols with mandatory training, Codes of Conduct, and survivor-centred referral pathways linked to GBV service providers; (v) designing multi-channel warning dissemination prioritising women-preferred channels (community radio, interpersonal networks, outdoor sirens); and (vi) monitoring gender-disaggregated warning reach and protective action rates as core indicators. The preliminary gender analyses (Annex 3a and 3b) provide baseline analysis; a comprehensive assessment will be conducted during the PFG phase.
6. <i>Core Labour Rights (always applicable)</i>	X	Impact type: Direct. Risk magnitude: Low. Contractors engaged for equipment installation and civil works may not comply with South African labour laws (Basic Conditions of Employment Act, Labour Relations Act, OHS regulations), including inadequate PPE provision, safety training, informal sub-contracting circumventing labour protections, and excessive working hours. Mitigation includes: (i) binding labour management procedures in contractor agreements requiring compliance with national labour law and ILO core conventions; (ii) mandating PPE provision, safety inductions, and site-specific OHS plans; (iii) prohibiting informal sub-contracting lacking transparent employment terms; (iv) establishing a worker grievance mechanism accessible to all project-engaged personnel, separate from the community GRM; and (v) conducting periodic contractor compliance audits and site inspections.
7. <i>Indigenous Peoples</i>	X	Impact type: Direct. Risk magnitude: Low (subject to further screening during FDP). Documentation and integration of indigenous and local knowledge (Activity 2.2.2) may result in misrepresentation, decontextualisation, or commercial

Checklist of environmental and social principles	No further assessment required for compliance	Potential impacts and risks – further assessment and management required for compliance
		misuse if adequate safeguards and consent protocols are absent. Engagement with traditional leaders may not meet free, prior, and informed consent (FPIC) standards if consultation processes are not culturally appropriate. Mitigation includes: (i) culturally appropriate engagement with traditional authorities, knowledge holders, and community structures, with FPIC protocols applied where required; (ii) intellectual property safeguards ensuring indigenous knowledge is documented and used only with informed consent and for agreed purposes; (iii) co-production workshops positioning community members as knowledge partners; and (iv) traditional authority representatives in district-level project governance structures.
8. <i>Involuntary Resettlement</i>	X	Impact type: Not applicable (no resettlement anticipated). Risk magnitude: Low. The project does not involve land acquisition, involuntary relocation, or restriction of access to natural resources. All equipment installations will be sited on existing public facilities or land designated for public infrastructure. Residual risk of temporary economic disruption to informal vendors or communal use areas is mitigated through: (i) site selection protocol prioritising existing facilities avoiding livelihood displacement; (ii) micro-siting assessments confirming installations do not obstruct informal economic activities or communal access; and (iii) documented community agreements prior to installation, with the GRM available for disputes. No involuntary resettlement action plan is required.
9. <i>Protection of Natural Habitats</i>	X	Impact type: Direct (localised and site-specific). Risk magnitude: Low. Siting of sensors, monitoring equipment, cables, or masts near wetlands, riparian buffers, coastal dunes, or protected areas may cause localised habitat disturbance. IoT sensor installations (Activity 3.2.1) are most likely to interface with sensitive habitats. Mitigation includes: (i) environmental site screening for all installation locations assessing proximity to protected areas, Critical Biodiversity Areas, wetlands, and riparian zones; (ii) no-go buffers around protected and ecologically sensitive areas; (iii) obtaining required environmental authorisations under NEMA and provincial conservation ordinances where installations fall within sensitive zones; (iv) low-impact installation methods (hand excavation, minimal footprint foundations, above-ground cable routing); and (v) reinstatement measures for temporary disturbance.
10. <i>Conservation of Biological Diversity</i>	X	Impact type: Direct (localised) and indirect. Risk magnitude: Low. Outdoor sirens and public address systems may cause noise disturbance to fauna, illuminated displays may attract insects and disrupt nocturnal species, and communication masts present low avifaunal collision risk. Mitigation includes: (i) testing schedules avoiding sensitive periods (dawn/dusk, breeding seasons) with SPL limits consistent with municipal noise by-laws; (ii) shielded, downward-facing lighting for outdoor displays to minimise light pollution and insect attraction; (iii) mast design guidelines reducing avifaunal collision risk (bird flight diverters, avoiding migration corridors); and (iv) biodiversity screening for installations near biodiversity priority areas.
11. <i>Climate Change</i>	X	Impact type: Direct (minor) and indirect (positive). Risk magnitude: Low. Equipment procurement, installation, and operation may generate minor greenhouse gas emissions, and assets may be vulnerable to climate hazards without resilient design. Mitigation includes: (i) energy-efficient equipment with renewable and backup power; (ii) corrosion-resistant, ruggedised materials; (iii) siting outside flood zones with design standards for extremes; (iv) uninterruptible power supplies; and (v) lifecycle carbon assessment in procurement. Net climate impact is strongly positive: the EWS enables anticipatory action, reduces disaster losses, and contributes to South Africa's climate resilience objectives.
12. <i>Pollution Prevention and Resource Efficiency</i>	X	Impact type: Direct (localised and temporary). Risk magnitude: Low. Installation and maintenance activities may generate construction waste, fuel or oil spills, and noise during testing. End-of-life electronic equipment may generate e-waste. Mitigation includes: (i) site waste management plans covering segregation, storage, and disposal; (ii) spill prevention and

Checklist of environmental and social principles	No further assessment required for compliance	Potential impacts and risks – further assessment and management required for compliance
		containment measures; (iii) testing schedules with advance notification and decibel management; (iv) resource-efficient procurement favouring durable, repairable, recyclable equipment; and (v) certified e-waste chain-of-custody and take-back clauses, aligned with the National Environmental Management: Waste Act..
13. <i>Public Health</i>	X	Impact type: Direct (positive) and indirect. Risk magnitude: Low. The project's primary public health impact is strongly positive: improved early warnings will reduce mortality, morbidity, and injury from floods, storms, heatwaves, and droughts. Residual risks include siren noise causing temporary hearing discomfort and crowded activities presenting minor safety risks. Mitigation includes: (i) SPL limits and standoff distances for siren installations; (ii) public safety plans for community events (crowd management, first aid, traffic management); (iii) message pre-testing to prevent panic; and (iv) rumour management and fact-checking protocols.
14. <i>Physical and Cultural Heritage</i>	X	Impact type: Direct (localised). Risk magnitude: Low. There is a risk that equipment installation activities (foundation excavation, mast erection, cable trenching) may inadvertently disturb archaeological deposits, historical structures, or sites of cultural or spiritual significance. There is a risk that siren testing or drill activities may conflict with culturally or spiritually significant practices or events. Mitigation includes: (i) conduct heritage screening with provincial heritage resources authorities and local traditional authorities prior to installation at each site; (ii) apply chance-finds procedures requiring immediate work stoppage and notification of heritage authorities if archaeological material is encountered during excavation; (iii) schedule siren testing and community drills in consultation with traditional leaders to avoid conflict with cultural or spiritual events; and (iv) design warning messages and communication products with cultural sensitivity, informed by community co-design processes.
15. <i>Lands and Soil Conservation</i>	X	Impact type: Direct (localised and temporary). Risk magnitude: Low. Foundation excavation, cable trenching, and platform construction may cause localised soil disturbance, compaction, and erosion, with cumulative effects possible in geomorphologically sensitive areas. Mitigation includes: (i) minimal-disturbance construction methods (hand excavation, shallow foundations, above-ground mounting); (ii) erosion control measures at sites with erodible soils; (iii) reinstatement to pre-construction condition; and (iv) avoiding active dune systems, steep slopes, or sensitive terrain.

PART III: IMPLEMENTATION ARRANGEMENTS

A. Demonstrate how the project aligns with the Results Framework of the Adaptation Fund.

Table 10. Alignment of the project with the Results Framework of the Adaptation Fund

Project Objective(s)	Project Objective Indicator(s)	Fund Outcome(s)	Fund Outcome Indicator(s)	Grant Amount (USD)
Specific Objective 1: National institutions deliver timely, impact-based, multi-hazard warnings and climate information services through upgraded observation, forecasting, and data management systems that meet WMO standards.	Number of operational, people-centred, multi-hazard early warning systems that generate and disseminate impact-based warnings across all WMO four-pillar elements and cover all 44 district municipalities nationally. Baseline: 0 operational, integrated multi-hazard EWS meeting WMO four-pillar standards Target: 1 WMO four-pillar-compliant national EWS by Year 5 MoV: SAWS operational reports; WMO verification assessment; annual M&E reports	Outcome 1: Reduced exposure to climate-related hazards and threats. Output 4: Vulnerable development sector services and infrastructure assets strengthened in response to climate change impacts, including variability.	1.2: No. of early warning systems (by scale) and no. of beneficiaries covered.	12,000,000
Specific Objective 2: Provincial and district disaster management centres across all nine provinces receive, interpret, localise, and disseminate impact-based warnings and climate information through standardised protocols aligned with the Climate Change Act.	Number of district municipalities (out of 44) with operational, tested warning dissemination protocols and demonstrated capability to issue localised warnings within agreed timeframes. Baseline: TBC (PFG baseline survey) Target: 44 (100%) by Year 5 MoV: District SOPs; simulation exercise reports; warning logs	Outcome 2: Strengthened institutional capacity to reduce risks associated with climate-induced socioeconomic and environmental losses.	2.1.2: No. of targeted institutions with increased capacity to minimize exposure to climate variability risks (by type, sector and scale).	6,000,000
Specific Objective 3: Vulnerable communities in target districts demonstrate improved risk knowledge, access to actionable warnings, and tested response capability through inclusive, locally owned preparedness mechanisms.	Percentage of households in targeted high-risk communities that are aware of locally relevant climate-related hazards, can correctly recognise official early warning messages, and can identify at least three appropriate protective actions. Baseline: TBC (PFG baseline survey) Target: 75% by Year 5 MoV: Baseline/endline household surveys (disaggregated by gender, district)	Outcome 3: Strengthened awareness and ownership of adaptation and climate risk reduction processes at local level.	3.1: Percentage of targeted population aware of predicted adverse impacts of climate change, and of appropriate responses.	2,800,000
Specific Objective 4: Lessons, evidence, and knowledge products generated across all components are systematically captured, shared, and institutionalised to support adaptive management during implementation and replication of effective EWS practices beyond the project period.	Number of knowledge products (technical briefs, case studies, toolkits, lesson reports) produced, peer-reviewed, and disseminated. Baseline: 0 Target: Minimum 12 by Year 5 MoV: Knowledge product repository; dissemination records; partner feedback	Outcome 8: Support the development and diffusion of innovative adaptation practices, tools and technologies.	8.0: Innovative adaptation practices are rolled out, scaled up, encouraged and/or accelerated at regional, national and/or subnational level.	Cross-cutting (costs embedded within components 1-3 and execution)
Total outcome-level grant amount				20,800,000
Project Outcome(s)	Project Outcome Indicator(s)	Fund Output	Fund Output Indicator	Grant Amount (USD)
Outcome 1. National institutions generate, quality-assure, and issue timely, impact-based warnings and	Number of physical and ICT assets within the national observation, forecasting, data management and dissemination chain that are	Output 4: Vulnerable development sector services and	4.1.2: No. of physical assets strengthened or constructed to	9,500,000

Project Outcome(s)	Project Outcome Indicator(s)	Fund Output	Fund Output Indicator	Grant Amount (USD)
climate information services through a resilient, multi-hazard EWS Output 1.1: National observation, forecasting, and data management infrastructure upgraded to WMO standards.	strengthened or constructed to withstand climate variability and change, disaggregated by asset type and location. Baseline: 276 AWS (60% geographic coverage), 229 ARS (60% geographic coverage), 11 weather radars (80% geographic coverage), 24 lightning detection sensors (98% coverage), and 11 upper-air sounding stations (80% coverage), 0 WIS-compliant centralised data management system Target: 336 AWS (60 additional), 479 ARS (250 additional), 12 weather radars (1 additional S-Band radar), 25 LDN sensors (1 additional sensor), 13 upper air systems (2 additional systems); 1 WIS-compliant centralised data management system (1 additional system) MoV: SAWS asset register; commissioning certificates; WMO compliance reports	infrastructure assets strengthened in response to climate change impacts, including variability.	withstand conditions resulting from climate variability and change (by sector and scale).	
Output 1.2: Training and capacity development programme on advanced forecasting and impact-based warning services delivered to SAWS technical staff.	Number of SAWS technical and managerial staff trained and certified in advanced forecasting techniques, disaggregated by gender and specialisation. Baseline: TBC Target: Minimum 40 staff trained; 6 hazard-specific SOPs developed by Year 4 MoV: Training certificates; skills assessments; SOP repository	Output 2.1: Strengthened capacity of national and sub-national centres and networks to respond rapidly to extreme weather events.	2.1.1: No. of staff trained to respond to, and mitigate impacts of, climate-related events (by gender).	2,500,000
Outcome 2. Provincial and district disaster management centres across all nine provinces and 44 district municipalities receive, interpret, localise, and disseminate impact-based warnings and climate information through standardised protocols aligned with the Climate Change Act. Output 2.1: Nationwide training programme and SOPs for warning reception, localisation, and dissemination delivered to all 44 district DMCs.	Number of disaster management staff trained and certified as competent, disaggregated by gender, institution, province, and function. Baseline: 0 Target: Minimum 3 certified staff per district (132 total); at least 40% female MoV: Training records; competency assessment certificates Number of districts with formalised, tested dissemination SOPs. Baseline: TBC Target: 44 districts (100%) by Year 4 MoV: SOP repository; MoUs; simulation reports.	Output 2.1: Strengthened capacity of national and sub-national centres and networks to respond rapidly to extreme weather events.	2.1.1: No. of staff trained to respond to, and mitigate impacts of, climate-related events (by gender).	4,000,000
Output 2.2: Participatory risk communication strategies and community preparedness tools developed and tested in three target districts (eThekweni, Vhembe, Waterberg).	Number of replicable risk communication toolkits co-developed with communities and documented for national scaling. Baseline: 0 Target: 3 toolkits (one per district) by Year 4 MoV: Toolkit documentation; community validation reports Number of community preparedness	Output 3: Targeted population groups participating in adaptation and risk reduction awareness activities.	3.1.1: No. and type of risk reduction actions or activities, and no. of people with reduced risk to extreme weather events.	2,000,000

Project Outcome(s)	Project Outcome Indicator(s)	Fund Output	Fund Output Indicator	Grant Amount (USD)
	drills conducted. Baseline: 0 Target: Minimum 3 drills per district per year MoV: Drill reports; participation records (disaggregated)			
Outcome 3. Communities at risk demonstrate improved risk knowledge, recognition of warning messages, and tested response capability via inclusive, locally owned mechanisms. Output 3.1: Participatory community risk assessments, awareness campaigns, and knowledge resources delivered in target communities.	Number of participatory community risk profiles completed and validated. Baseline: 0 Target: 15-20 profiles across 3 districts by Year 3 MoV: Risk profile documents; validation reports Number of people reached through awareness campaigns (disaggregated by district, gender, age, disability). Baseline: 0 Target: 50,000 people by Year 5 MoV: Campaign attendance; radio listener surveys; school registers	Output 3: Targeted population groups participating in adaptation and risk reduction awareness activities.	3.1.1: No. and type of risk reduction actions or activities, and no. of people with reduced risk to extreme weather events.	900,000
Output 3.2: Last-mile warning dissemination assets and community-based alert systems installed and operationalised in target communities	Number of community-based early warning dissemination assets ³⁸ installed and operational (disaggregated by asset type, district, community). Baseline: 0 Target: 15-20 communities equipped by Year 4 MoV: Asset inventory; commissioning reports; community handover certificates Number of community response protocols and evacuation plans developed, tested, and adopted. Baseline: 0 Target: 15-20 protocols by Year 4 MoV: Protocol documents; drill reports; community records	Output 4: Vulnerable physical, natural, and social assets strengthened in response to climate change impacts, including variability.	4.1.2: No. of physical assets strengthened or constructed to withstand conditions resulting from climate variability and change (by sector and scale)..	1,900,000
Outcome 4. Lessons, evidence, and knowledge products generated across all components are systematically captured, shared, and institutionalised to support adaptive management during implementation and replication of effective EWS practices beyond the project period. Output 4.1: M&E and adaptive management framework. Output 4.2: Knowledge products.	Number of knowledge products produced and disseminated. Baseline: 0 Target: Minimum 12 by Year 5 MoV: Repository; dissemination records Number of adaptive management reviews conducted. Baseline: 0 Target: Annual (5 total) MoV: Review reports; PSC meeting minutes	Output 8: Viable innovations are rolled out, scaled up, encouraged and/or accelerated.	8.1: No. of innovative adaptation practices, tools and technologies accelerated, scaled-up and/or replicated.	Cross-cutting
Total output-level grant amount				20,800,000

³⁸ Assets' refers to pre-defined infrastructure types (sirens, IoT sensors, community radio systems) procured and installed by the PMU, not competitive sub-projects.

B. Management arrangements

110. The project will be executed over 5 years in collaboration between SANBI (the NIE), the DFFE, the target municipalities, and the Executing Entity, SAWS. Detailed roles and responsibilities for each stakeholder are provided in Figure 3 and Table 11 overleaf.

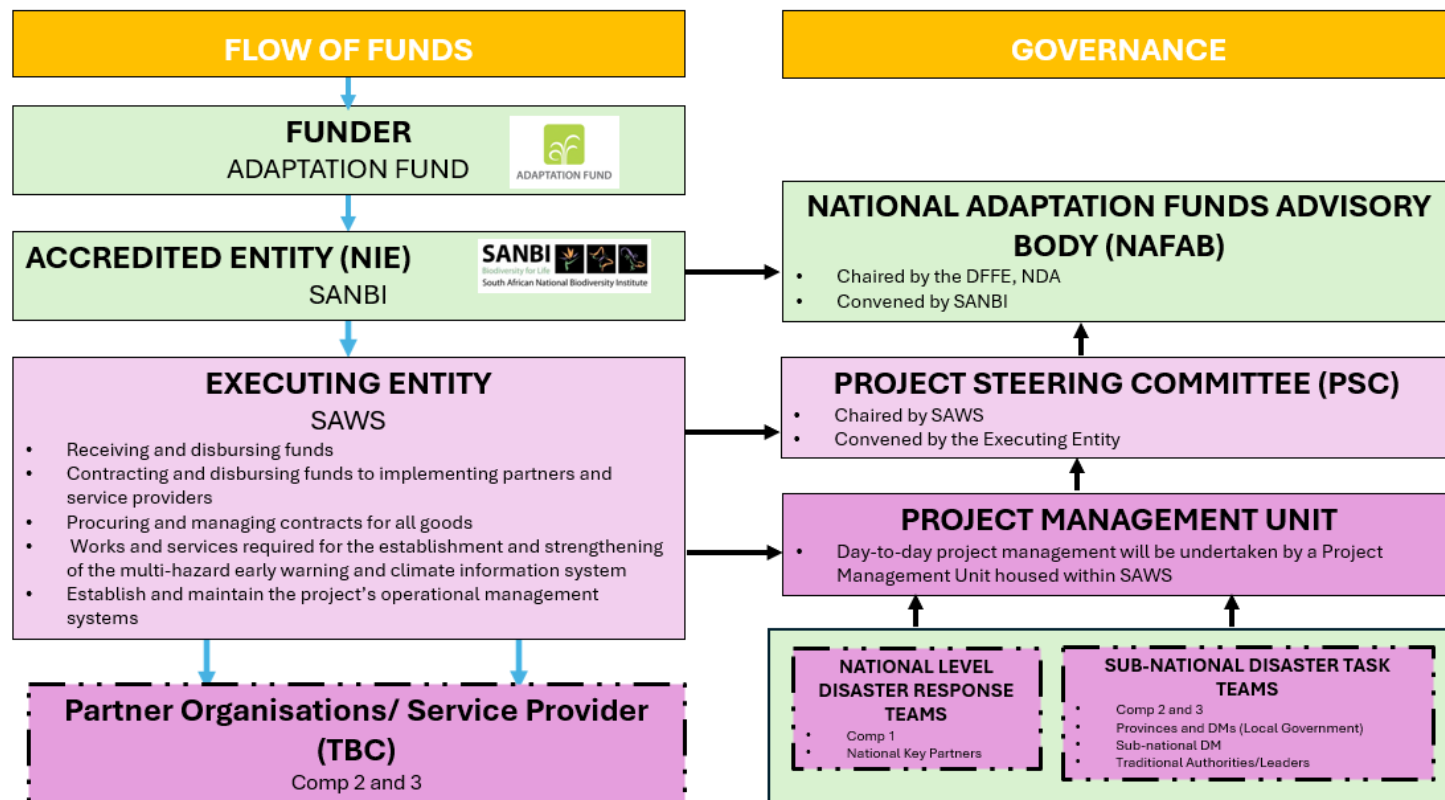


Figure 3. Management and governance arrangements for the Advancing-EWS project

Table 11. Summary of management and governance roles

Stakeholder	Governance/management role
National Implementing Entity (NIE)	SANBI will serve as the NIE for the project, with overall responsibility for ensuring that the project is implemented in accordance with Adaptation Fund policies, including the Environmental and Social Policy, Gender Policy and Evaluation Policy. SANBI will oversee project implementation by i) supervising project budgeting, monitoring and reporting on the use of grant resources; ii) supporting the recruitment and contracting of project personnel, consultant services and other service providers, including the conclusion and management of sub-agreements with the Executing Entity and other partners; and iii) assuring the quality and timeliness of project delivery and the achievement of the approved outcomes and outputs. SANBI will review and consolidate technical and financial reports, submit required reports to the Adaptation Fund Board, and ensure that appropriate corrective measures are taken when implementation challenges or fiduciary, environmental, social or gender risks are identified.
Executing Entity (EE)	SAWS will act as the EE for the project and will be responsible for the technical leadership, day-to-day coordination and execution of all project activities. SAWS will appoint and designate a full-time Project Manager (PM) for the duration of the project. The PM's primary responsibility will be to ensure that the project delivers the results specified in the approved project document, to the required quality standard and within the agreed timeframes and budget envelope. In this role, SAWS will be responsible for: i) receiving and managing project funds from SANBI in line with the approved workplans and budgets; ii) disbursing funds to implementing partners and service providers; iii) procuring and managing contracts for all goods, works and services required for the establishment and strengthening of the multi-hazard early warning and climate information system; and iv) maintaining an auditable record of all project expenditures. SAWS will establish and maintain the project's operational management systems, including planning, financial management, procurement, contract administration, risk management and safeguard monitoring, drawing where possible on existing corporate systems. SAWS will further: i) coordinate the development and implementation of the technical work programme for each component; ii) provide targeted support to provincial and district disaster management centres and other partners to implement activities; iii) design and oversee the implementation of a capacity development and knowledge management programme for EWS/CIS; and iv) lead overall project monitoring, evaluation and learning at outcome and output level, working closely with SANBI to ensure that Adaptation Fund reporting requirements are fully met.

Stakeholder	Governance/management role
Project Steering Committee (PSC)	A Project Steering Committee will be established as the main project-level governance and oversight body. The PSC will comprise representatives from DFFE, SANBI (as NIE), SAWS (as EE), key national partners involved in disaster risk reduction and climate information (for example Cooperative Governance and Traditional Affairs, Agriculture, Water and Sanitation), representatives of provincial and district disaster management centres in the focal areas, and technical experts on early warning systems, climate information services, gender and social inclusion drawn from research institutions and relevant government departments. The PSC will: i) provide strategic guidance and oversight to the project; ii) review and endorse annual workplans and budgets prepared by SAWS and cleared by SANBI; iii) review progress reports, monitor delivery against agreed milestones and targets, and recommend corrective actions where required; iv) provide guidance on coordination with related national and sub-national initiatives; and v) provide recommendations on major technical or policy issues that arise during implementation. The PSC will meet at least biannually, or more frequently if required.
Project Management Unit (PMU)	Day-to-day project management will be undertaken by a Project Management Unit housed within SAWS and led by the Project Manager designated by the EE. The PMU will include technical specialists for EWS and climate information services, institutional capacity development, community engagement and communication, gender and social inclusion, monitoring, evaluation and learning, and financial and administrative staff commensurate with the scale and complexity of the project. The PMU will be responsible for: i) preparing detailed annual workplans and procurement plans; ii) coordinating and supervising the implementation of activities across all components and target areas; iii) providing technical backstopping and on-site support to provincial and district partners; iv) ensuring compliance with fiduciary, environmental, social and gender requirements at activity level; v) compiling technical and financial progress reports for submission to SANBI; and vi) organising PSC meetings and facilitating stakeholder engagement processes. As needed, the PMU may invite representatives from SANBI, DFFE, members of the NAFAB-SC or other key stakeholders to participate in PMU meetings on specific issues. Regular (for example monthly) PMU coordination meetings will be convened by the Project Manager to review progress, address implementation bottlenecks and ensure coherence across components and partners.

Implementation Modality: Direct Delivery

111. This project does not involve Unidentified Sub-Projects (USPs) as defined by the Adaptation Fund's USP guidance. All project components, outputs, target locations, and implementation modalities are defined at concept stage and will be executed through direct implementation by the National Implementing Entity (SANBI) and Executing Entity (SAWS), supported by established government institutions at national, provincial, and district levels. Factors supporting the non-USP designation of A-EWS include:

- **Geographic specificity:** Three target municipalities (eThekweni, Vhembe, Waterberg) were identified through a structured vulnerability and climate risk assessment (Part I, Target municipalities). Component 1 and 2 national/sub-national activities target existing SAWS facilities and all 44 government-mandated disaster management centres. Within the three target districts, specific high-risk communities for Component 3 last-mile interventions will be identified during the Project Formulation Grant (PFG) phase through vulnerability assessments across selected districts, not through competitive selection processes. This intra-district refinement is standard concept-to-proposal detailing, not USP identification, as the geographic boundaries (three districts), activity types, budget envelopes, and implementation modality (direct delivery by SANBI/SAWS and government partners) are fixed at concept stage.
- **Activity specificity:** All outputs are defined with clear deliverables (Part III.A, Results Framework). Infrastructure investments (Component 1) are guided by a national gap assessment aligned with WMO standards and South Africa's multi-hazard risk profile. Training (Component 2) is delivered to pre-identified institutions. Community-level interventions (Component 3) comprise participatory risk assessments, awareness campaigns, and installation of warning assets co-designed with communities and municipalities, not sub-projects selected through calls for proposals.
- **Budget allocation:** Resources are allocated by component and output with cost estimates tied to defined activities (Table 4, Part I). No unallocated funding pools for competitive sub-project selection exist.
- **Implementation responsibility:** SANBI/SAWS and government partners directly deliver all services (training, infrastructure, community engagement). Communities receive capacity-building support and warning assets through facilitated processes, not grants to design and execute autonomous sub-projects. No intermediary grant-making bodies, competitive selection committees, or Enhanced Direct Access (EDA) small grants facility mechanisms are involved.
- **Intra-district targeting refinement during PFG:** Consultations during the Project Formulation Grant phase will identify specific high-risk communities within the three target districts for Component 3 interventions, refine asset quantities and placement, and confirm beneficiary numbers. This standard CN-to-FDP design detailing does not constitute USP identification, as geographic boundaries (districts), activity types, budget envelopes, and implementation modality (direct delivery) are fixed at concept stage.

PART IV: ENDORSEMENT BY GOVERNMENT & CERTIFICATION BY THE IMPLEMENTING ENTITY

A. Record of Endorsement on behalf of the government³⁹

Provide the name and position of the government official and indicate date of endorsement. If this is a regional project/programme, list the endorsing officials all the participating countries. The endorsement letter(s) should be attached as an annex to the project/programme proposal. Please attach the endorsement letter(s) with this template; add as many participating governments if a regional project/programme:

Ms Nomfundo Tshabalala Director General: Department of Forestry, Fisheries and the Environment (DFFE)	Date: June 18th, 2026
--	-----------------------

B. Implementing Entity Certification

Provide the name and signature of the Implementing Entity Coordinator and the date of signature. Provide also the project/programme contact person's name, telephone number and email address.

Dr Mandy Barnett	
General Manager: Adaptation Policy and Resourcing Division	
Date: June 30th, 2026	Tel. and email: M.Barnett@sanbi.org.za +27 (0)21 799 8875
 Signature	

³⁹ Each Party shall designate and communicate to the secretariat the authority that will endorse on behalf of the national government the projects and programmes proposed by the implementing entities.



forestry, fisheries & the environment

Department:
Forestry, Fisheries and the Environment
REPUBLIC OF SOUTH AFRICA

Private Bag X447, Pretoria, 0001, Environment House, 473 Steve Biko Road, Pretoria, 0002 Tel: +27 12 399 9000, Fax: +27 86 625 1042

Ref: EDMS 273212

Enquiries: Shakhira Parker

Tel: 012 399 9240 Email: sparker@environment.gov.za

The Adaptation Fund Board
c/o Adaptation Fund Board Secretariat

Email: Secretariat@Adaptation-Fund.org

Fax: 202 522 3240/5

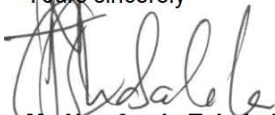
Dear Sir/Madam

ADVANCING CLIMATE RESILIENCE IN SOUTH AFRICA THROUGH INTEGRATED MULTI- HAZARD EARLY WARNING AND CLIMATE SERVICES (ADVANCED EWS PROJECT)

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

Accordingly, I am pleased to endorse the above project proposal with support from the Adaptation Fund. If approved, the project will be implemented by the South African National Biodiversity Institute (SANBI) and executed by South African Weather Service (SAWS).

Yours sincerely



Ms Nomfundo Tshabalala
DIRECTOR-GENERAL
DATE: 18/06/2026

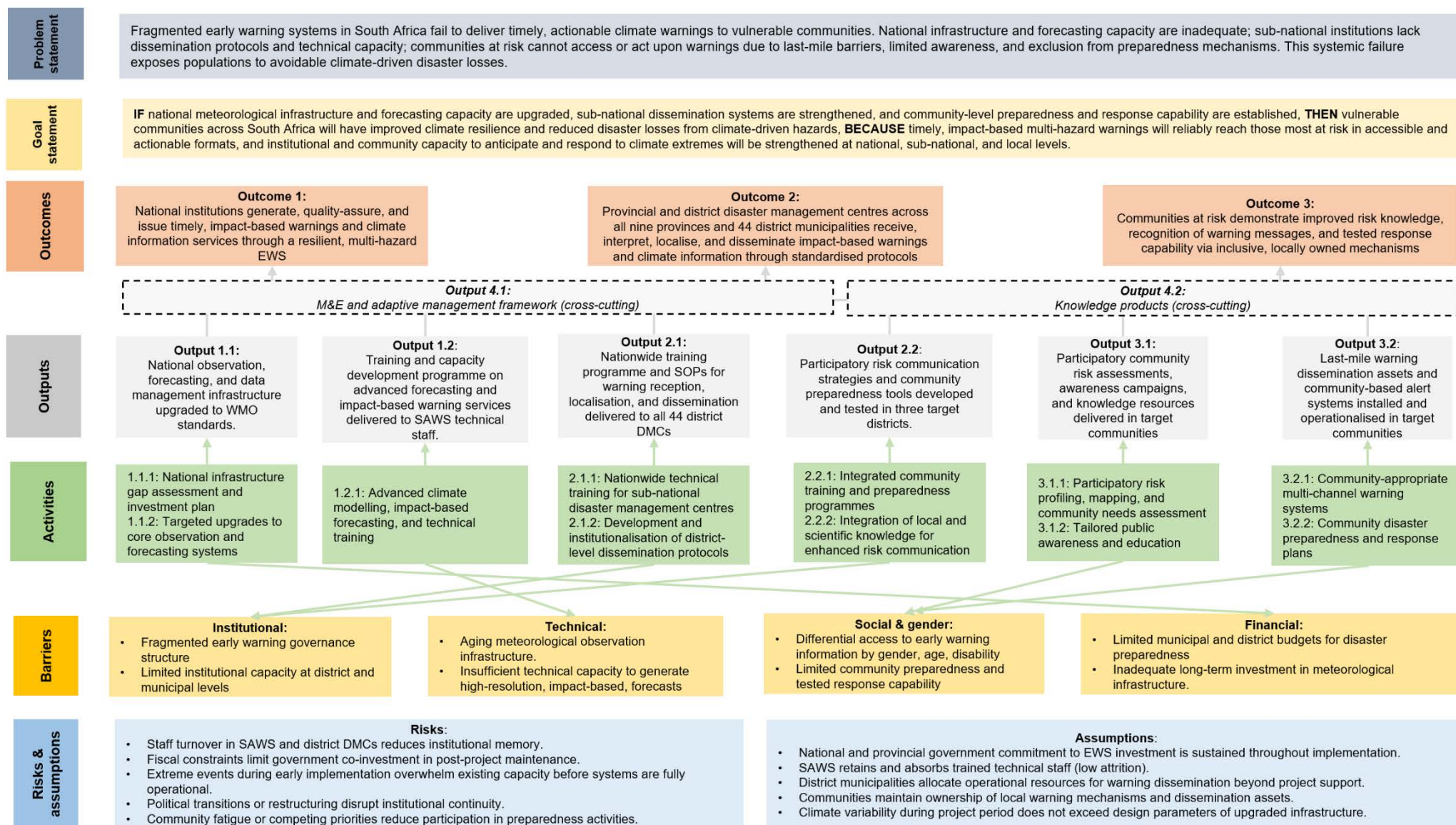


Batho pele – putting people first

Departement van Bosbou, Visserie en die Omgewing • Department of Forestry, Fisheries and the Environment • UmNyango wezamaHlathi, zokuThiya neBhoduluko • iSebe lezamaHlathi, ezokuLoba noKusingqongileyo • Umnyango WezamaHlathi, Ezokudoba Nezemvelo • Kgoro ya Dithokgwa, Boreahlapi le Tikologo • Lefapha la Meru, Botshwasi ba diithapi le Tikoloho • Lefapha la Dikgwa, Diithapi le Tikologo • Litiko Letemahlatsi, Tinhlanti Netendzawo • Muhasho wa zwa Vhusima-magaka, Vhureakhovhe na Mupo • Ndzawulo ya Swihlahla, Vunjoveri na Mbango. The processing of personal information by the Department of Forestry, Fisheries and the Environment is done lawfully and not excessively for the purpose of processing in compliance with the POPI Act, any codes of conduct issued by the Information Regulator in terms of the POPI Act, and/or relevant legislation providing appropriate security safeguards for the processing of personal information of others.



ANNEX 2: THEORY OF CHANGE



112. This annex presents the preliminary gender assessment for the Advancing Climate Resilience in South Africa through Integrated Multi-Hazard Early Warning and Climate Services (A-EWS) project. It provides the analytical foundation for gender-responsive project design and identifies gender-differentiated vulnerabilities relevant to early warning systems. A comprehensive, district-specific gender assessment employing primary research methods will be conducted during the Project Formulation Grant (PFG) phase, subject to PFG approval. This annex is abridged due to page limits. The full preliminary gender assessment, Annex 3b, is available using [this link](#)⁴⁰.

National Gender Context and Structural Drivers

113. Despite South Africa's constitutional protections, structural gender discrimination persists as a root cause of disproportionate climate impacts on women. Men control nearly 90% of commercial agricultural water licences; Black, Asian and Coloured women hold less than 5% of women's overall 10% share. An estimated 2.6 million agricultural households, mostly women-headed, are clustered at the lower end of production. Female-headed households (41.9% of all households, highest among Black African and Coloured communities) face compounded vulnerabilities: lower incomes, higher grant dependence (51.8% in rural areas), and reduced asset access. Unemployment among women stands at 36.4% versus 33.0% for men, with women's median earnings at 77.8% of men's.
114. Women contribute double men's unpaid care work time (253 versus 102 minutes daily), directly constraining economic participation and engagement with early warning activities. Approximately one in five women has experienced intimate partner violence, with climate disasters exacerbating gender-based violence risks through social disruption, displacement, and economic stress.

Target Municipality Context

115. **eThekweni Metropolitan Municipality (population 4.24 million):** Women in informal settlements face non-permanent flood-prone housing, limited device access for warnings, restricted mobility from care responsibilities, and minimal savings. The 2022 floods (over ZAR 17 billion in damages) illustrated acute vulnerability of women-headed households.
116. **Vhembe District Municipality (population 1.65 million):** Predominantly rural, with women concentrated in subsistence farming, informal trading, and unpaid care work, lacking access to irrigated land, inputs, extension services, or credit. Droughts undermine women's food production and increase water collection burdens. Warning dissemination faces last-mile challenges: lower mobile phone ownership among women and elderly; limited radio coverage; lower literacy; and language barriers (warnings in English/Afrikaans rather than Tshivenda/Xitsonga).
117. **Waterberg District Municipality (population 762,862):** Women excluded from mining and commercial farming, concentrated in informal services and subsistence agriculture. Droughts undermine subsistence gardens; flash floods damage informal settlements. Across all districts, patriarchal decision-making limits women's disaster preparedness control despite their central risk management role. Indigenous knowledge systems held by women and elders are rarely integrated into formal warning systems.

Gender-Differentiated Barriers to Early Warning

118. Access barriers: lower mobile phone, radio, and internet (i.e. data access) connectivity among rural women; literacy constraints restricting text-based alerts; language barriers when warnings bypass indigenous languages; mobility constraints from care responsibilities and cultural norms. Comprehension barriers: technical meteorological language inaccessible to populations without formal education (where women are over-represented); warnings failing to articulate risks to women's livelihoods (planting schedules, market days, water collection). Response barriers: childcare and eldercare limiting mobility and evacuation; lack of household decision-making authority; economic constraints limiting anticipatory action capacity. Institutional barriers: women's underrepresentation in meteorological services, disaster management centres, and community leadership.

Gender Mainstreaming in Project Design

119. Component 1 (National capacity): gender-balanced training for SAWS staff; impact-based forecasting integrating gender analysis of differential exposures and capacities; accessibility requirements (plain language, visual formats, indigenous languages); sex-disaggregated and disability-disaggregated baseline data on early warning access, comprehension, trust, and response.
120. Component 2 (Sub-national capacity): training for disaster management personnel across 44 districts on gender, disability, and vulnerability; dissemination protocols co-developed with women, youth, elderly, persons with disabilities, and community organisations; partnerships with women's organisations; knowledge co-production documenting women's

⁴⁰ The full preliminary gender assessment, Annex 3b, is available using this link: <https://drive.google.com/file/d/1OTWlnvmpRTB181DCqKKwKrKiDnNq48v6/view?usp=sharing>

indigenous environmental knowledge (Activity 2.2.2); at least 40% women participants in training.

121. Component 3 (Community-level): participatory risk profiling disaggregating vulnerability by gender, age, disability, and socio-economic status (Activity 3.1.1); awareness campaigns using multiple formats and channels for diverse literacy and language populations (Activity 3.1.2); warning systems prioritising accessibility (outdoor sirens, visual displays, community networks) (Activity 3.2.1); preparedness plans with evacuation assistance, safe spaces with GBV prevention, drill scheduling accommodating care responsibilities, and childcare arrangements (Activity 3.2.2); active recruitment of women, youth, and persons with disabilities as community DRM committee members.

Gender Action Plan Elements and Monitoring

122. The project ensures meaningful inclusion through participatory methods. During the PFG phase, district-specific gender assessments will use household surveys, focus groups, key informant interviews, and participatory mapping, with scheduling accounting for care responsibilities and agricultural demands.
123. Indicative targets: at least 40% women participants in all Components 2 and 3 training; gender-balanced community DRM committees; sex-disaggregated, age-disaggregated, and disability-disaggregated data for all beneficiary indicators; explicit inclusion of women, youth, elderly, and persons with disabilities in risk assessments, knowledge co-production, and preparedness planning. Final targets will be established during the PFG phase. The Project Management Unit will include a gender and social inclusion specialist. Gender-responsive monitoring will be integrated into the M&E framework, aligned with the Adaptation Fund's Strategic Results Framework. Core indicators will be disaggregated by sex and vulnerable group, including beneficiaries, people using improved climate information, people with strengthened awareness, training participation, and DRM committee composition.

Expected Outcomes and Alignment with AF Gender Policy

124. Women will benefit from improved warning access through multi-channel, multi-language dissemination overcoming device access, literacy, and language barriers. Impact-based warnings will articulate risks to women's livelihoods (subsistence farming, informal trade, water collection), enabling anticipatory action. Participatory risk assessments, knowledge co-production, and DRM committee inclusion will strengthen women's voice in local disaster governance. Gender-responsive training will build women's technical capacity.
125. The project contributes to Adaptation Fund Gender Policy objectives by: conducting gender assessments and integrating findings; ensuring equitable participation; collecting sex-disaggregated indicators; allocating resources for gender-responsive implementation; and establishing accessible accountability mechanisms. By building gender-responsive institutional capacity within SAWS and the disaster management system, the project contributes to systemic change extending beyond the project period. The approach directly supports the revised AF Strategic Results Framework (2025), including Core Indicator 1 (beneficiaries disaggregated by sex and vulnerable group), Strategic Outcome 1 (reduced exposure to climate hazards), and Strategic Outcome 3 (strengthened awareness measured through sex-disaggregated indicators).

Consultation overview

126. This annex summarises stakeholder consultations conducted during Concept Note development for the Advancing Climate Resilience in South Africa through Integrated Multi-Hazard Early Warning and Climate Services (A-EWS) project. Consultations focused on institutional and municipal stakeholders to validate project design and ensure alignment with national priorities. Comprehensive community-level consultations will be conducted during full proposal development once target communities are identified through Project Formulation Grant (PFG) supported assessments. For detailed consultation information, see Annex 4b: Full Stakeholder Engagement Report⁴¹. Between late 2024 and June 2026, SANBI and SAWS convened 15 consultation events engaging 144 participants (72 women, 72 men; 50% female participation). Events included national co-design workshops, provincial and district workshops, technical working groups, and bilateral institutional meetings. Consultations were conducted in-person and virtually with accessibility provisions including venue accessibility, virtual participation options, and translation support.

Stakeholder categories

127. Consultations engaged: **National Government** (DFFE climate policy guidance, NDMC disaster management coordination, DPME monitoring and evaluation); **Meteorological Services** (SAWS technical expertise and forecasting); **Local Government** (SALGA municipal support programmes, eThekweni, Vhembe, and Waterberg municipalities, provincial coordination from KwaZulu-Natal and Limpopo); and **Civil Society** (Red Cross Federation, community representatives including taxi associations and local foundations). Gender equality and social inclusion have been mainstreamed as project design principles throughout the consultation process, with plans to engage academic institutions and specialised gender and disability inclusion experts during the Fully-developed Proposal phase.

Key themes and project design influence

128. The following key themes emerged from the stakeholder engagement process: 1) **Infrastructure Gaps**: SAWS and provincial disaster management centres identified critical observation network gaps in eastern and northeastern regions, informing Component 1 prioritisation of S-Band radar, automated weather station densification, and upper-air system upgrades in high-vulnerability areas; 2) **Protocol Standardisation**: NDMC and SALGA emphasised absent standardised dissemination protocols across 44 districts, directly informing Component 2 nationwide institutional capacity building covering all districts rather than limiting support to three target municipalities; 3) **Last-Mile Barriers**: Municipalities and civil society organisations identified warning accessibility barriers for digitally excluded populations (households without internet, elderly persons, persons with disabilities, informal settlement residents). This shaped Component 3 multi-channel public alert systems incorporating outdoor sirens, community radio, public address systems, and interpersonal networks; 4) **Municipal Capacity Constraints**: District centres reported insufficient capacity to interpret impact-based forecasts, informing Component 2 master-trainer model, simplified toolkits, and integration into permanent institutional platforms (NDMC, SALGA) with refresher cycles; 5) **Sustainability Concerns**: SALGA and NDMC highlighted skills loss from short-term consultant-led initiatives, influencing institutional sustainability mechanisms: master-trainer models, version-controlled curricula integrated into SAWS and NDMC training calendars, and formal protocol adoption by district councils; 6) **Gender and Accessibility**: stakeholders emphasised women's differentiated warning needs, informing Component 3 gender-sensitive protocols, safe evacuation planning, and women's participation in DRM committees. Disability organisations identified single-modality alert barriers, shaping multi-sensory alert design (visual, audio, tactile) and accessible participation protocols; and 7) **Local Knowledge Integration**: stakeholders emphasised local environmental observations and indigenous knowledge, informing Component 3 co-production approach incorporating local knowledge into participatory risk assessments and preparedness protocols.

Future consultations

129. Comprehensive community-level consultations will be conducted during full proposal development (2025) following PFG-supported vulnerability assessments. Consultations will employ participatory methodologies (focus groups, community mapping, co-design workshops) ensuring representation of vulnerable groups: women, youth, elderly persons, persons with disabilities, informal settlement residents, rural smallholder farmers, and marginalised communities. Inputs will inform Component 3 detailed activity design. All consultations will record gender- and age-disaggregated participation data and comply with AF Gender Policy and Environmental and Social Policy requirements. For comprehensive consultation information including event-by-event participation data with full gender disaggregation, detailed stakeholder inputs, thematic analysis, and design linkages, see [Annex 4b: Full Stakeholder Engagement Report](#).

⁴¹ Annex 4a is abbreviated due to page limit constraints. The full annex, including event-by-event participation data with full gender disaggregation, detailed stakeholder inputs, thematic analysis, and design linkages is available using this link: <https://drive.google.com/file/d/1q6GRC663n3ksPvmY3pmWlcvC4dYUCUcL/view?usp=sharing>



Revised PFG Submission Form¹

Submission Date: 30 June 2026

Adaptation Fund Project ID: AF00000558

Country/ies: South Africa

Title of Project/Programme: Advancing Climate Resilience in South Africa through Integrated Multi-Hazard Early Warning and Climate Services (Advancing EWS Project)

Type of IE (NIE/RIE/MIE): NIE

Implementing Entity: South African National Biodiversity Institute (SANBI)

Executing Entity/ies: SANBI ~~outh African Weather Services (SAWS)~~

A. Project Preparation Timeframe

Start date of PFG	February 2027
Completion date of PFG	February 2028

B. Proposed Project Preparation Activities

The requested PFG of **USD 149,996** (inclusive of the 8.5 per cent NIE management fee) will fund two core formulation activities and seven sub-activities required to advance the AEWS concept note to a Board-ready Fully Developed Proposal that meets all Adaptation Fund requirements. These activities address the preparation gaps explicitly identified in the AEWS concept note, including: the need to ground-truth preliminary vulnerability and beneficiary estimates for the three target municipalities through PFG-funded consultations; the need for a spatially explicit EWS infrastructure gap assessment and investment plan to anchor Component 1 of the full proposal; the need for structured stakeholder consultations to confirm institutional arrangements and SOPs, specific community sites within the identified three municipalities; the requirement for a full safeguards screening and ESMP aligned to the AF Environmental and Social Policy; and the requirement for a full gender assessment and Gender Action Plan.

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

Table 1. PFG activities

List of Proposed Project Preparation Activities	Output of the PFG Activities	US\$ Amount	Budget note ²
1. Multi-hazard risk and vulnerability baseline, safeguards screening and stakeholder consultations	1.1: Multi-hazard risk, vulnerability and adaptive capacity profiles for eThekweni, Vhembe and Waterberg, with ground-truthed beneficiary data 1.2: EWS infrastructure gap assessment and climate-aligned investment plan (Component 1 evidence base) 1.3: Cross-sectoral stakeholder consultation report (NDMC, provincial DMCs, DFFE, SAWS, line departments) 1.4: Local organisations and Community consultation report for three target municipalities (Confirmation of community sites, gender-differentiated needs, last-mile channels, indigenous knowledge) 1.5: AF ESP-aligned safeguards screening; ESMP framework; GRM procedures and disclosure plan	93 245	A-E
2. Project development services	2.1: Full gender assessment and Gender Action Plan (GAP) for all three project components 2.2: Technical services for FDP drafting and specialist advisory (MEL framework with AF SRF baselines, economic analysis, institutional arrangements, stakeholder engagement, all mandatory annexes)	45 000	F-G
<u>IE management fee (USD, 8.5%)</u>		<u>11,751</u>	
<u>Total amount of PFG financing requested (USD)</u>		<u>149,996</u>	

Please describe below each of the PFG activities and provide justifications for their need and for the amount of funding required.

Activity description and justification

The following section describes each of the two PFG activities and its associated sub-activities, explains its relationship to specific preparation needs identified in the AEWS concept note, and justifies the resources requested. Activities are sequenced to ensure that analytical and consultative work (Activity 1) informs and feeds into capacity-building and drafting work (Activity 2) proceed in parallel.

² The proposal should include a detailed budget with budget notes indicating the break-down of costs at the activity level. It should also include a budget on the Implementing Entity management fee use.

Activity 1: Multi-Hazard Risk and Vulnerability Baseline, Safeguards Screening, and Stakeholder Consultations

Proposed cost: USD 93,245 (Budget Notes A–E)

This activity generates the analytical, safeguards and participatory foundations without which the A-EWS concept note cannot be developed into a technically sound, AF-compliant FDP. The A-EWS concept note explicitly acknowledges that all beneficiary figures are preliminary CN-stage estimates requiring confirmation through PFG-funded consultations, and that the selection and targeting of the three municipalities requires further validation. The concept note further defers preparation of the full ESMP, GRM and disclosure plan to the formulation phase. Activity 1 addresses these gaps through five sequenced sub-activities.

Sub-activity 1.1 — Multi-hazard risk, vulnerability and adaptive capacity assessment (Budget Note A; USD 22,850)

Municipality-specific multi-hazard risk profiles will be produced for eThekweni, Vhembe and Waterberg using geospatial and participatory methods, building on the climate baseline analysis in the concept note, SANBI and Global Change Institute sub-national climate change fact sheets, and the 2024 SAWS Rapid Assessment. The profiles will map hazard exposure (floods, severe storms, droughts, heatwaves), community vulnerability (poverty, informality, gender, disability, livelihood dependence on climate-sensitive sectors) and adaptive capacity (access to early warning information, institutional reach, infrastructure condition) at a resolution appropriate for targeting Component 3 which focuses on community level interventions. A key output will be the ground-truthing of the CN's preliminary estimate of 332,792 direct beneficiaries across the three municipalities, and refining the 5 per cent direct-reach assumption to reflect differences between the dense coastal metro of eThekweni and the rural and peri-urban Limpopo districts of Vhembe and Waterberg. Risk profiles will anchor Component 1 infrastructure siting, Component 2 training needs and prioritisation and Component 3 targeting in the FDP. Costs cover a technical workshop with SAWS and municipal counterparts, multi-district field verification travel, and 15 days of specialist service provider input for geospatial analysis, dataset assembly and risk profile drafting.

Sub-activity 1.2 — EWS infrastructure gap assessment and climate-aligned investment plan (Budget Note B; USD 26,195)

The A-EWS concept note identifies critical gaps in South Africa's national EWS infrastructure — including radar coverage deficits in the eastern and north-eastern regions, data-sparse automated weather station (AWS) networks, high-performance computing (HPC) capacity constraints, and data management bottlenecks — but defers a spatially explicit, costed investment plan to the full proposal development phase. This sub-activity will commission a systematic infrastructure gap assessment overlaying existing EWS assets against WMO minimum network density standards, downscaled climate projections under RCP4.5 and RCP8.5 for 2030 and 2050, multi-hazard risk maps and the vulnerability profiles from Sub-activity 1.1. The resulting investment plan will specify priority radar siting, AWS deployment, HPC procurement and data management architecture for Output 1.1 of the FDP, with lifecycle costings and WMO-aligned technical standards. This evidence base is indispensable for the FDP's cost-effectiveness demonstration and the technical annexes required by AF reviewers.

Sub-activity 1.3 — Cross-sectoral stakeholder consultations with national and sub-national institutions (Budget Note C; USD 10,850)

Output 2.1 of the A-EWS full proposal envisages nationwide SOPs for warning reception, localisation and dissemination across all 44 district municipalities and one Metro, requiring confirmed institutional commitments and a capacity baseline that cannot be established without structured consultations. This sub-activity will convene three cross-sectoral consultation workshops with the National Disaster Management Centre (NDMC), DFFE, SAWS, provincial disaster management centres and key line departments (agriculture, water, health, transport), covering: existing warning dissemination protocols and identified bottlenecks; data-sharing mandates under the Disaster Management Act and Climate Change Act; synergies with the EW4ALL Roadmap and National Framework for Climate Services; sub-national capacity baselines for the 44 district municipalities; and roles and commitments under the proposed project governance structure. The consultation report will directly inform the institutional arrangements, implementation schedule and risk management sections of the FDP. Costs cover a three 1-day workshop with travel.

Sub-activity 1.4 — Community consultations in three target municipalities (Budget Note D; USD 30,850)

The A-EWS concept note acknowledges that stakeholder consultations between the CN and FDP phases are necessary to ground-truth and refine both the direct-reach percentage and district-level targeting, capturing urban/rural nuances. Component 3 activities also require prior community engagement to understand gender-differentiated warning needs, preferences for last-mile communication channels, and the role of local and indigenous knowledge in hazard anticipation. Six 1-day community consultation workshops will be conducted (two per municipality) with community structures, ward committees, traditional authorities, community-based organisations, women's groups, youth, elderly persons and persons with disabilities. Sessions will be conducted in accessible formats and in local languages, with deliberate inclusion of marginalised groups. Facilitated discussions will cover gender-differentiated exposure and vulnerability; existing and preferred last-mile communication channels; use and trust of early warnings and climate information; indigenous and local knowledge relevant to hazard anticipation; and community preparedness gaps. Consultation findings will feed directly into the gender assessment (Sub-activity 2.1), the safeguards screening (Sub-activity 1.5) and the design of Component 3 outputs. Costs cover six workshops, multi-district travel and five days of facilitation, Information, Education, and Communication (IEC) material development and synthesis service provider input.

Sub-activity 1.5 — Safeguards screening aligned to AF Environmental and Social Policy; ESMP framework and GRM design (Budget Note E; USD 2,500)

The AF Environmental and Social Policy (ESP) requires a fully developed proposal to demonstrate compliance across all 15 environmental and social principles. The A-EWS concept note includes a preliminary summary of environmental and social impacts and risks (Table 6 of the CN) but explicitly defers a full ESMP, project-level disclosure plan and Grievance Redress Mechanism (GRM) to the full proposal formulation phase. This sub-activity will commission an ESP-aligned safeguards screening across all three project components, classify project activities by environmental and social risk category, and produce proportionate instruments including: the ESMP framework; GRM design (procedures, channels, escalation protocols and referral pathways for gender-based violence and sexual exploitation/abuse cases); and a disclosure plan aligned to AF standards. Specific attention will be given to risks associated with Component 1 infrastructure procurement and installation (radar siting, AWS deployment), Component 2 institutional capacity-building (exclusion risks for marginalised groups), and Component 3 community activities (SEA/SH prevention, indigenous knowledge documentation protocols). Two validation workshops with DFFE, COGTA, SANBI, SAWS, NDMC, COGTA and community representatives will review and refine screening findings. Costs cover two workshops, validation travel and approximately five days of specialist safeguards service provider input.

Activity 2: Capacity Development and Project Development Services

Proposed cost: USD 45,000 (Budget Notes F–G)

This activity prepares DFFE, SANBI, SAWS and key project partners to meet Adaptation Fund compliance standards, and commissions the specialist technical services required to produce a high-quality FDP and all mandatory annexes.

Sub-activity 2.1 — Full gender assessment and Gender Action Plan (Budget Note F; USD 5,000)

The A-EWS concept note includes an abridged gender assessment (Annex 3) that identifies key gender considerations and policy alignment but explicitly acknowledges that a full gender analysis and Gender Action Plan (GAP) will be developed during the formulation phase. A specialist gender consultant will produce the full gender assessment and GAP required for the FDP, drawing on primary data from the community consultations in Sub-activity 1.4 and including:

- Sex-, age- and disability-disaggregated data collection and analysis for the three target municipalities;
- Gender-differentiated vulnerability and risk analysis linked to the multi-hazard profiles from Sub-activity 1.1, covering differential exposure, warning access, response capacity and decision-making authority;
- Review of gender dimensions of EWS/CIS access, warning comprehension and behavioural response in the South African context;
- Alignment with the AF Gender Policy, South Africa's Women's Empowerment and Gender Equality Strategic Framework, and relevant national gender equality legislation;

- A structured GAP with component-level actions, SADD indicators, responsibilities, resource allocations and verification methods for integration into the FDP.

The cost covers 10 days of specialist gender consultant input.

Sub-activity 2.2— Technical services for FDP drafting and specialist advisory (Budget Note G; USD 40,000)

This sub-activity covers specialist consultancy inputs required to integrate all formulation outputs into a coherent, technically rigorous FDP and mandatory annexes. The A-EWS project involves a total financing request of USD 24,937,016 across three multi-faceted components spanning national infrastructure, sub-national institutional capacity-building and community-level preparedness in three geographically dispersed municipalities. Producing a proposal of this scale and complexity within AF quality standards requires sustained expert engagement across several technical domains. Specialist services will deliver the following FDP outputs:

- Monitoring, Evaluation and Learning (MEL) framework aligned to the AF Strategic Results Framework, including a complete results matrix with baselines, targets and sex-, age- and disability-disaggregated indicators for all three components;
- Theory of Change refinement and narrative for the FDP, building on the CN's Annex 2 and incorporating formulation-phase findings from vulnerability assessments and stakeholder consultations;
- Environmental and Social Management Plan (ESMP) and AF-compliant disclosure plan, drawing on the safeguards screening from Sub-activity 1.5;
- Institutional arrangements and project management framework sections for the FDP, incorporating governance findings from Sub-activities 1.3 and 3.1 and risk management recommendations;
- Integration, editorial review and finalisation of the complete FDP narrative, including the economic analysis, and all mandatory annexes for SANBI internal review and AF submission.

Costs cover 80 days of senior technical consultant and specialist reviewer input.

Implementing Entity Management Fee

The NIE management fee of **USD 11,751** (8.5 per cent of the USD 138,245 sub-total of direct activity costs) covers SANBI's administrative and oversight costs for managing the PFG, including: financial management and disbursement to service providers and for workshop and travel expenses; procurement of consultancy services in accordance with AF procurement standards; monitoring of PFG activity progress and quality assurance of outputs; and reporting to the AF Secretariat on PFG expenditure and deliverables. The 8.5 per cent rate is within the maximum permitted under AF PFG policy. The management fee does not cover any direct activity costs; all direct activity costs are included in the USD 138,245 sub-total. No implementation or post-approval execution costs are included in any budget line; all proposed expenditures are exclusively directed towards project preparation and formulation activities as defined in AF PFG eligibility guidelines.

C. Implementing Entity

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

Implementing Entity	Signature	Date	Project Contact	Telephone	Email Address
South African National Biodiversity Institute			Dr Mandy Barnett	+27 21 799 8895	m.barnett@sanbi.org.za



forestry, fisheries & the environment

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Dear Sir/Madam

ADVANCING CLIMATE RESILIENCE IN SOUTH AFRICA THROUGH INTEGRATED MULTI- HAZARD EARLY WARNING AND CLIMATE SERVICES (ADVANCED EWS PROJECT)

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

Accordingly, I am pleased to endorse the above project proposal with support from the Adaptation Fund. If approved, the project will be implemented by the South African National Biodiversity Institute (SANBI) and executed by South African Weather Service (SAWS).

Yours sincerely

Ms Nomfundo Tshabalala

DIRECTOR-GENERAL

DATE: 18/06/2026



Batho pele – putting people first

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